

THE FISH HABITAT PRIMER



A GUIDE TO UNDERSTANDING FRESHWATER FISH HABITAT



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LIFE ON THE WATERY SIDE: WHAT WE SHOULD KNOW

hy should we be interested in fish and their habitats? Well, because fish are not only an important source of recreation and revenue, they are also key players in the complex balance that keeps aquatic environments and their **ecosystems** healthy. We all know that fish live in water. Yet most of us have little understanding of their habitats or what they need to survive. It should come as no surprise then, that even with the best of intentions, a riverside property owner or a developer considering a lakeside project does not know what steps to take to avoid harming fish and their habitats.

We should be aware that taking certain types of action in terrestrial habitats may have an impact on nearby aquatic habitats. Spreading chemicals or pesticides, discharging sewage from faulty septic tanks, clearing shoreline land or paving walkways located near water bodies are just a few examples. These apparently harmless actions, when repeated on many properties, can in fact endanger habitat quality and the maintenance of fish populations.

Anyone who is interested in the health of lakes, fish and their habitats will find useful information and food for thought in this document. *The Fish Habitat Primer* is a guide to understanding the aquatic environments that fish depend on and the good practices that should be adopted to protect them.

SURVIVING: HOW DO FISH DO IT?

Certain characteristics in the environment are essential to the survival of fish. They may vary considerably depending on the species or life stage, but to make it through their life cycle, fish require the following essential components:

- a place providing conditions conducive to reproduction;
- 2. places to feed;
- shelters for resting or hiding from predators;
- routes for moving among the different habitats that they use throughout their lifetime.

All of these components, often combined in a fragile balance, help meet the needs of fish and basically make up what we refer to as "fish habitat."

MOVING - To survive, fish need to move freely among various habitats in order to meet their needs such as feeding, reproducing and taking cover.

> TAKING COVER - Rocks, woody debris and aquatic vegetation can all provide cover for fish and protect them from their predators.

FEEDING - Small fish typically eat tiny organisms such as algae and insects larvae. Bigger fish mainly feed on smaller fish, worms, crayfish and insects.

REPRODUCING - Most fish need specific surroundings in order to spawn successfully. Cold water species such as brook trout are fond of gravelbottomed shallows in streams with cool temperatures and moderate water flow. Yet, other species such as the northern pike prefer warmer temperatures and slow moving water with dense vegetation.



(large rocks, pebbles, vegetation, areas

exposed to waves, flood-prone areas, etc.) are essential to the survival of fish.

SUITABLE SPAWNING SITES

Quality **spawning** sites are essential in sustaining fish populations, and most species are very fussy about choosing them. Furthermore, preferred reproduction sites are usually different from those used for the growth of juveniles or for feeding. Fish generally invest a great deal of energy in finding a spawning site that suits them. Brook trout (speckled trout), for example, may migrate over long distances to find suitable gravel and cobble for laying their eggs.

Surprisingly, certain fish require very little water to reproduce. Walleye, for example, may spawn in as little as 20 cm of water. Others, such as northern pike and yellow perch, reproduce in submerged terrestrial vegetation during spring flooding. The spawning sites that fish seek out are highly varied: some species prefer areas with abundant aquatic vegetation; others spawn on gravelly shoals shaped by wave action; still others frequent areas where there is an upwelling of groundwater.

Suitable spawning areas are often unique or very limited in a water body. If these areas, limited in number, undergo changes that degrade their quality, then the fish who usually reproduce there will most likely abandon them. For lack of appropriate spawning sites, certain fish populations may decrease in abundance, and as a result, compromise a water body's ecological balance.

A reproductive site could be located on your property, or nearby. Since fish only frequent spawning sites for a few days each year, it may seem as though fish do not use these areas. But think again-these sites are vital to them!

TIMING WINDOWS TO PROTECT FISH

Reproductive periods vary among fish species. For example, here are the reproductive periods for certain species found in the lakes and streams of Quebec:

April	May		June	July	August	September	October	November	December
Northern pike									
Walleye									
Yellow perch									
		Small-mouth bass							
	Cyprinidae (minne				ows)				
						Lake	trout (Lake	char)	
							Brook t	rout (speckle	ed trout)

In a water body with several fish species, such as Lake Memphremagog, which contains brook trout (fall reproduction), northern pike (spring reproduction) and several species of chub (summer reproduction), fish reproductive activities take place over most of the year. Since the reproductive period is essential to sustaining populations, caution should be exercised in such lakes. It is important to get information about the best times of year for performing work in or near water.

FOOD A-PLENTY

Soon after they have hatched, young fish need to eat. Most of them start out by eating **plankton**, and then move on to larger prey, such as insects and even other fish. The food available to fish mainly depends on the quality of the riparian zone. The aquatic vegetation found there often serves as a refuge for the organisms (insects, amphibians, small fish, etc.) that fish feed on. Terrestrial vegetation supports a variety of prey, particularly insects, that fall off into the water, making fish very happy. Shoreline trees and shrubs are in fact very important to aquatic wildlife because they provide a source of food for insects and small fish at the bottom of the aquatic food chain. So, although it may not be obvious right away, chopping down shoreline vegetation can undermine the survival of fish.



Aquatic plants protect the shore against erosion and provide cover and food for fish.

THE RIGHT COVER

Fish, depending on the species and the life stage, are sometimes predators, sometimes prey. As prey, they have a better chance of survival if they have access to cover to escape their predators. Logs, rocks and aquatic vegetation in shallow water provide excellent shelter.

The types of refuge that fish use can vary over the course of their lifetime. For example, to evade its predators, a young pike lurks near shorelines in shallows with vegetation and fallen branches. As it grows bigger, the pike ventures further offshore into deeper water and uses submerged logs as cover where in turn, it ambushes prey of its own.

So, if we clean up swimming areas or access to a water body by removing logs, rocks and vegetation, we are taking precious cover away from fish. They will then have to leave these areas to go to other places that may not fully meet their requirements.

ACCESSIBLE MIGRATION ROUTES

To survive, all fish must be able to migrate between different habitats so they can meet needs resulting from seasonal changes and their life cycle, such as feeding, taking cover, resting and reproducing. They must therefore be able to access both shallows, where they can take cover, and small creeks, where they can spawn or feed.

Any obstacle preventing fish from migrating to sites that are essential for meeting their life needs may undermine species abundance and diversity. Works as small as a 30 cm high weir or an embankment of a few dozen square meters may constitute impassable barriers for fish and prevent them from reaching sites that are essential to their survival.

Atlantic salmon, for example, are renowned for their strength and determination to reach their **spawning** grounds. They fight the current and swim in very fast flowing water to spawn upstream in watercourses. However, artificial structures such as dams can thwart their strong swimming skills and prevent them from reaching the spawning ground they seek.



Logs and rocks provide excellent shelter.



Other obstacles, such as undersized culverts, can create a funnel effect that suddenly transforms a small lazy stream into a fast flowing stream, which makes it difficult for fish to pass. This type of work, which may stop or slow the migration of powerful swimmers such as brook trout and walleye, poses an even greater threat to weaker swimmers, such as northern pike. To reduce



An undersized, poorly installed culvert can be an insurmountable obstacle for fish.

or prevent this kind of impact, it is preferable to install a wider culvert or a bridge that will allow water to flow freely and enable fish to migrate easily upstream and downstream.

SOME LIKE IT WARM, OTHERS LIKE IT COOL OR COLD

The ideal water temperature that fish require to meet their needs varies according to the species. Some adapt easily to temperature fluctuations whereas others can only tolerate minor variations. In fact, species living in cold water do not adapt to temperature variations as well as warmwater species.

If you know the temperature of a water body, you can probably guess which fish live there, because different groups of residents inhabit cold, cool or warm water. For example, lake trout (lake char) require cold water with minor temperature variations (about 10°C, even in summer). Walleye, yellow perch and northern pike prefer slightly warmer water, referred to as cool (between 19 and 25°C). Bass, pumpkinseed sunfish and bullhead like much warmer water (above 25°C). This high temperature (25°C) would be intolerable for species living in cold water such as lake trout and brook trout and would have grave consequences for their survival.



A small bridge or a footbridge allows the free movement of fish.

For guidance, here are the temperature preferences of a few species frequently found in Quebec.

TEMPERATURES	SPECIES
warm water $> 25^{\circ}C$	 largemouth bass pumpkinseed brown bullhead various species of cyprinidae (minnows)
cool water 19-25°C	 yellow perch · northern pike walleye lake whitefish lake sturgeon rainbow trout brown trout
cold water <19°C	 Atlantic salmon brook trout lake trout Arctic char

Overhanging vegetation creates shade and cools the temperature of water bodies. Cutting it back is like turning up the water thermostat. Taking this kind of action can cause an increase in the water temperature that may be lethal to species sensitive to heat.



Shoreline vegetation helps cool the water temperature.

WATER, WATER EVERYWHERE: HABITAT DIVERSITY

ish have been able to adapt to living conditions in a wide range of aquatic environments. Fish may be found in lakes, rivers, ponds, swamps, marshes and surprisingly, even in environments like roadside ditches and flood zones on farmland and in wooded areas. Although these environments often dry up during summer, they may provide areas for reproduction and feeding or be used as cover when flooded. For example, muskellunge use submerged vegetation during spring flooding as a reproduction site. They release their eggs that stick to submerged vegetation until they hatch. The fry then take advantage of the receding waters to migrate toward aquatic environments where there is always water.

Habitat properties and water quality vary among environments. Some are characterized by swift water with strong current, others, by calm water with abundant vegetation and still others, by very deep water where little light penetrates. Every type of water body offers fish specific living conditions, and it is the combination of characteristics, such as diversity of food, variety of cover, the composition of the bed, temperature and the quantity of available oxygen that determine the species that live there. Even the tiniest stream may offer a refuge or a spawning area at certain times of the year. From marshes to streams, via rivers and lakes, a chain of ecosystems offer a wonderful variety of habitats, with something to please every taste!



WHAT CREEKS, STREAMS AND RIVERS OFFER



Streams are practically always linked, and many fish take full advantage, migrating from one environment to the next, depending on their life stage or the time of year. By understanding how streams fulfil the needs of fish, we can gain a better grasp of what they face when we disrupt their environment.

Varying flow patterns of streams, such as the alternation of pools and riffles, provide a diversity of habitats that is essential to fish. Riffles are shallow areas over which the water flows swiftly and where the substrate is relatively coarse-textured (gravel, cobble and blocks). These turbulent zones oxygenate the water originating from pools. In summer, when the water temperature rises and there is less oxygen, many fish species frequent these zones because the water is more oxygenated there. In winter, the vigorous agitation of water in the riffles limits the formation of ice. These sectors then form precious refuge for fish.

Zones of quiet water, commonly called "pools" are usually found downstream of riffles. This type of habitat, where the water is often fresher if the pool is deep, can be used as a resting and feeding area. Moreover, large fish, the most highly prized by anglers, tend to frequent deep pools in streams.

To preserve the ecological integrity of a stream it is important to maintain the equilibrium between pools and riffles. Some types of work can modify the flow dynamics of water and disturb this equilibrium. For example, the stabilization of a bank with rocks or concrete (riprapping, retaining walls), or the installation of weirs or culverts that are too narrow, speed up the current in certain places and slow it down in others. When we modify the flow of water in this way, we may unintentionally destroy habitats that are essential to certain fish species.



In winter, rapids form precious cover for fish.

WHAT LAKES OFFER

Lakes offer a wide variety of habitats, from shoreline **spawning** areas to feeding areas in deep water. The diversity of fish found in lakes is linked to many factors, particularly the depth of the lake, the temperature of the water, the abundance and type of plants found there, as well as the substrate that makes up the lake bed.

Deep lakes are usually cold, because the sun does not heat deeper layers of water, and since the penetration of its rays in the water is limited, the growth of plants on the bottom is



also limited. This type of lake is a perfect habitat for lake trout and lake whitefish, who hang out in deep cold water during summer then migrate to shallow areas in fall to reproduce. Lake trout need rocky shoals to spawn, whereas lake whitefish use hard or stony bottoms. The presence of these varied habitats is essential to the survival of these fish populations.

Shallow lakes are usually warm and rich in nutrients. The sun quickly heats their water and since its rays easily reach the bottom,



Beneath this surface, there is a wide diversity of habitats and fish.

vegetation grows there in abundance. Many fish benefit from this vegetation. For example, yellow perch, often associated with environments in which aquatic vegetation is abundant, use this type of environment to feed and reproduce. At spawning time, they lay



Yellow perch is often associated with environments in which aquatic vegetation is abundant.

long strings of eggs that stick directly to the plants. That is where the eggs develop until they hatch. The presence of abundant vegetation is therefore a habitat characteristic essential to yellow perch.

The creeks and rivers that feed lakes (tributaries) and flow out of them (effluents) also provide important habitats for fish. Certain species that spend their adult lives in lakes will migrate to these streams to reproduce. For example, white sucker leave the lake in spring to spawn in small gravelly streams with moderate currents. Similarly, lake sturgeon migrate to rivers to spawn in fast flowing water or rapids, often at the foot of low waterfalls. For these two species, and for many others, the quality of a lake extends far beyond its immediate perimeter.

WETLANDS: ESSENTIAL TO SUSTAINING FISH POPULATIONS

Wetlands are midway between aquatic **ecosystems** and terrestrial ecosystems. They include peat bogs, marshes, swamps and floodplains.

Sometimes wet, sometimes dry, these environments possess the characteristics of dry land and aquatic habitat. They combine water, soil, nutrients and the sun's rays to form an extraordinarily rich environment that provides shelter for countless species, in particular fish, invertebrates (shellfish, crustaceans), insects, amphibians, birds and mammals. Wetlands are among the most biologically productive habitats anywhere.

The water in wetlands, often protected by the effect of waves and current, contains numerous shelters (aquatic plants, foliage from terrestrial vegetation, tree trunks, etc.) and abundant food resources that meet the needs of young growing fish. Many species are particularly fond of these environments, especially bass, walleye, yellow perch and pike, who use them to complete their life cycle. Some, such as brook stickleback, may spend their entire lifetime in a wetland.



Floodplains are spawning and fry-rearing areas for various fish species.

Wetlands act as real sponges. They temporarily retain **runoff** before letting it flow slowly toward lakes and streams, thereby limiting flooding. Wetlands also contribute to keeping lakes in good health, by filtering sediments and absorbing the **nutrients** contained in runoff before they reach aquatic environments.



Wetlands are important for sustaining fish populations. In particular, they provide them with spawning, fry-rearing and feeding areas while filtering pollutants and protecting surrounding water bodies against serious flooding and extremely low water levels.

Since they overlap the terrestrial environment, wetlands are particularly vulnerable to human activities such as filling and drainage, etc. These activities can destroy or disrupt them, and may well undermine the vital roles they play for fish and for aquatic **ecosystems** in general.

NEARSHORE WATERS: CLOSE TO LAND . . . AND US

The most significant impacts of human activity on large water bodies such as lakes and rivers do not occur where we get in over our heads but rather where we get our feet wet! This area of shallow water is referred to as the **littoral** zone. Since it is usually shallow and it shelters aquatic vegetation, many fish species use it to lay their eggs, hide from predators and even to stock up on treats such as crayfish, dragonflies and leeches.

For some of us, nearshore aquatic plants may resemble weeds, but they are often essential to sustaining all of this aquatic life. If we modify a nearshore habitat by building a dock or by cleaning out an area for swimming, we are damaging an entire ecosystem and jeopardizing the fish that use it to fulfil their needs. Detailed planning is therefore required



before undertaking work on the edge of water to limit as much as possible our impact on habitat that is essential for aquatic wildlife (for more information on this subject, see the section *Performing your Work While Protecting Fish Habitat*, p. 18).

THE RIPARIAN STRIP: A PROTECTIVE BARRIER

The trees, shrubs and grasses that grow naturally along a shoreline of either a creek or a lake play a crucial role in the conservation of fish habitat. They form a protective barrier that provides a habitat for wildlife and acts as filter between land and water. The network of roots acts both as a shoreline stabilizer and as a filter of **runoff**. The filtering role is particularly useful for phosphorus, which is of course a natural nutrient, but which is also found in different products such as detergents and fertilizers. In excessive quantities, phosphorus may disrupt the balance in a body of water and cause the pervasive growth of algae and aquatic plants.

Because tree leaves and branches lessen the impact of heavy rains, and dead leaves, pine needles and broken twigs slow runoff, the soil is able to absorb rain water more easily, which limits flooding and the erosion of banks. Without this natural line of defence, nearby banks and aquatic habitats are unprotected and become vulnerable to natural forces.

Floodplain

Shore

PERFORMING YOUR WORK WHILE PROTECTING FISH HABITAT

nce we understand the complex links between water bodies and their inhabitants, it becomes clear that if we destroy fish habitat, fish and other forms of aquatic life will perish. In other words: no habitat, no fish! That is why it is in our interest to protect this unique environment.

HABITAT- FRIENDLY PRACTICES TO KEEP FISH HAPPY

By adopting good practices and simple measures, you can carry out certain types of work without harming fish or their habitat. Here are some suggestions to guide you:

Get Advice Before Starting Work

Before you grab a shovel and start work, make sure you are thoroughly informed about current regulations, because you must comply with federal, provincial and municipal laws that apply to the work you are planning. It is also advisable to gather information about your planned project and learn about new procedures or new available materials, the best work techniques and the potential impacts of your work on fish and fish habitat. If you have doubts or questions, contact Fisheries and Oceans Canada for guidance and advice (see the list of our regional offices, p. 31).





Understand the Environment Where you Will Perform Your Work

Before you start, it is important that you become thoroughly familiar with the environment where you plan to carry out your work. Do a field visit to identify the best location for your project. By taking this precaution, you will avoid choosing a site where you would be required, for example, to conduct extensive clearing of the shoreline vegetation or move large rocks so you can moor your boat at your dock. You should also know the fish species present in your area. This information will help you identify the areas that must be preserved to ensure a good quality habitat. Locate the high and low water levels to ensure that you don't perform your work in an area that is dry in summer but that is an important habitat for fish during spring flooding.

Dealing with Low Water Levels

Low flow periods, characterized by very low water levels, can cause a lot of hassle for shoreline dwellers, particularly when it comes to docking boats. Many people think that the only way to facilitate access to their docks is to dredge the bed of a water body. However, besides damaging fish habitat, dredging is often a wasted effort, because the dredged spots refill with sediment during the next rise in water levels. A good solution is to temporarily extend the dock with floating sections which can be removed when the water level returns to normal. Besides being simple, this solution causes few impacts on fish and their habitat.





Preserve the Natural Appearance of your Shoreline

Forget about thoroughly cleaning out the littoral zone of your property. The naturally occurring jumble of rocks, aquatic plants and woody cover (logs, branches, etc.) creates a habitat that fish and the diverse aquatic organisms need. So leave it in the water. While the role of aquatic plants in fish habitat is more obvious, rocks and pieces of wood are also important components. They can protect the shoreline against erosion and provide shelter for fish. In lakes with very small streams feeding them, rocky areas in shallow water are often the only place where some species can successfully spawn.

Preserve the Vegetation

You will maintain your water body healthy by preserving the trees and shrubs that line its shores, because they stabilize the soil and filter the **runoff**. Go ahead, be lazy; the less you do, the more you help sustain healthy fish habitat. If you want to improve the view, consider trimming your trees and shrubs rather than chopping them down. To access the water, cut a small pathway at an angle instead of clearing the whole shoreline area.



Avoid Harmful Products near Aquatic Habitats

Even if you have a strip of shoreline vegetation that helps filter contaminants, do not make its job harder by making excessive use of pollutants. If you use fertilizers and pesticides on your property, apply them and store them well away from the littoral zone. If you must refill gas tanks, do it well away from the water.

Always Preserve Wetlands

Wetlands can dry up during low flow periods but they are rejuvenated as soon as higher water levels return. The plants and animals that

live there are well adapted to these natural changes. Destroying even the smallest part of a wetland reduces its value, not only to fish but also to waterfowl and to the other wildlife species that live there. Whether you are dreaming of building a condo on the site of that wetland or eyeing that small marsh to build a dock, think twice before destroying an exceptionally rich environment!

Choose the Proper Time

Cool and warmwater fish species usually reproduce in spring and early summer while coldwater fish generally spawn in spring or fall. Knowing your local species' habits will enable you to avoid interfering with them during the critical periods that are generally either directly or indirectly associated with their reproduction. These critical periods, which vary depending on the species, include migration to **spawning** areas, spawning, and the incubation and hatching of eggs. Check with Fisheries and Oceans Canada or the Ministère des Ressources naturelles et de la



Faune to find out the best time of the year for doing work near a shoreline or in an aquatic environment in your region.

Work "In the Dry"

To lessen the impacts of your work on fish and their habitats, try to schedule it to coincide with a time when water levels are at their lowest, usually at the end of summer or in fall. If you cannot do so, then talk to Fisheries and Oceans Canada staff who can advise you on the steps to get the job done without harming fish habitat. But remember that even though the water levels are low, you must consider spawning times for the fish present in the water bodies of your region before you start work (refer to the section *Timing Windows to Protect Fish*, p. 7).

GET THE REQUIRED AUTHORIZATIONS BEFORE YOU START

Whether you are a seasonal or permanent resident, a farmer or a developer, if you want to carry out work in or near water, you must know the regulations that apply to your project. The federal government's Fisheries Act protects fish and their habitat in both fresh and salt water. Since the development of a shoreline and the construction or maintenance of a structure in or near an aquatic environment may alter or damage fish habitat, an authorization under the Fisheries Act could be required. You are advised to get information about the authorizations you should obtain before you start work. Don't forget that federal, provincial and municipal legislation may all apply to your project.

Operational Statements for Low-Risk Activities

The Operational Statements of Fisheries and Oceans Canada outline the standard measures that apply to activities that cause few impacts on fish habitat. When the conditions and measures described in these statements are met, Fisheries and Oceans Canada does not need to review your project. To find out more about the Operational Statements and to evaluate whether you must submit your project to the Department, visit our Web site: www.qc.dfo-mpo.gc.ca and select the *Regional Publications* tab.



HABITAT APPEARANCES CAN BE DECEIVING

While fluctuating water levels in lakes change the appearance of fish habitat, they do not change the boundaries. If, for example, a lake shoreline slopes gradually, you will notice that a slight drop in the water level in summer translates into a significant retreat of the water's edge. Beaches extend further out into the lake, and the terrestrial vegetation tends to colonize the space left vacant by the water's retreat. Don't make the mistake of using this part of the exposed shore and littoral zone as though it is no longer a part of the water body (see the Figure defining the boundaries of littoral and shore, pp. 16 and 17), because its characteristics will certainly return during spring flooding. This recommendation is equally valid for creeks and rivers where the real habitat boundaries can be different from those observed during low flow.

Even if during snow melt and periods of intense rain, the water level of creeks, lakes and rivers increases to the point of submerging the terrestrial vegetation, curb the urge to control floods, and above all, do not build anything to prevent flooding of these areas. For certain fish species, such as northern pike and yellow perch, flooded areas are the main reproductive sites.

FISH HABITAT LOSSES: TO BE AVOIDED

Make your job easier! As soon as you begin designing your project, plan on measures to protect and preserve fish habitat. This way you will be able to go ahead as soon as possible and you will avoid unpleasant surprises associated with committing an offence under the *Fisheries Act* because you will have taken steps to avoid damaging fish habitat.

The *Fisheries Act* prohibits causing the harmful alteration, destruction or disruption of fish habitat unless authorized by the Minister. If you believe that your project will not cause any fish habitat loss, you do not need to obtain authorization from Fisheries and Oceans Canada. If, however, your project may cause harmful alteration, destruction or disruption of fish habitat, the Department will evaluate whether the habitat losses are acceptable and can be compensated through the implementation of a habitat restoration or creation program.

Harmful alteration: any change to fish habitat that indefinitely reduces its capacity to support one or more **life processes** of fish but does not completely eliminate the habitat.

Destruction: Any permanent change to fish habitat that completely eliminates its capacity to support one or more life processes of fish.

Disruption: Any change to fish habitat occurring for a limited period of time that reduces its capacity to support one or more life processes of fish.



American eel

Don't Forget Species at Risk

When planning your project, check whether or not there are species at risk living near the area where your work will take place. If this is the case, you must also make sure that you comply with the *Species at Risk Act*. To find out more about the status of aquatic species and the permits that you must obtain before proceeding with work near or in the habitat of a species at risk, consult the Species at Risk Public Registry at:

www.sararegistry.gc.ca or our Web site on species at risk:

www.dfo-mpo.gc.ca/species-especes.

SUMMARY: STEPS TO TAKE BEFORE YOU PROCEED WITH YOUR PROJECT

Before starting your work in or around water, here are some things to check to determine whether an authorization under the *Fisheries Act* will be required:

Step 1 Check whether or not your project is in or near a fish habitat.

Some projects may harm fish habitat, and the first step is to find out whether or not the work you are planning will proceed near or in fish habitat. To obtain information about the fish species present in the water bodies in your area, you can contact the Fisheries and Oceans Canada office in your region or the office of provincial authorities. If your water body is a fish habitat, it is essential to use methods that do not harm fish and their habitat. (Refer to the section *Habitat-Friendly Practices to Keep Fish Happy*, p. 18). If this is the case, consult the following steps!

Step 2 Check whether or not an Operational Statement applies to your project.

The next step consists of determining whether your project meets the criteria of the Operational Statements. To determine whether an Operational Statement applies to your project, consult our Web site: www.qc.dfo-mpo.gc.ca and select the *Regional Publications* tab. If you comply with the conditions indicated in the Operational Statement that applies to your project and you incorporate the recommended measures for protecting fish habitat, your project will not harm habitat and will not require a review under the *Fisheries Act*.

Step 3 What if the Operational Statements don't apply to your project?

If no Operational Statement applies to your project and if you believe it could harm fish habitat, or you are unsure about whether it could, then you must submit it to Fisheries and Oceans Canada. Fisheries and Oceans Canada staff will first of all examine whether or not your project is likely to harm fish habitat and if this should prove to be the case, whether or not you have considered all of the possible options to avoid causing damage. If necessary, they will evaluate whether the habitat losses that your project would cause are acceptable or can be compensated by implementing a habitat restoration or creation program. Fisheries and Oceans Canada staff will guide you in defining a development project that is beneficial to fish. In some cases, fish habitat affected by a project may be considered an essential, irreplaceable habitat. In such cases, Fisheries and Oceans Canada may refuse to issue an authorization to destroy or change this habitat.

The information required by Fisheries and Oceans Canada for reviewing projects is presented in the *Proponent's Guide to Information Requirements for Review Under the Fish Habitat Protection Provisions of the Fisheries Act.* You will find this guide on our Web site: www.qc.dfo-mpo.gc.ca and select the *Regional Publications* tab.

Step 4 If you require an authorization

Make sure you have it before starting your project and keep it on hand during the work.

And remember ...

Allow enough time for the review process: After you have submitted the plans for your project to the authorities, your proposal will be evaluated taking into consideration the effects on fish habitat. You can facilitate the process by making sure to provide detailed, accurate and complete information.

Since the review and approval process may take some time, you should submit your project far enough in advance. For example, if you plan to carry out your project in spring, submit it the preceding fall. This way, staff will have enough time to familiarize themselves with your project and make their recommendations to protect fish and their habitat without delaying your work.



Be mindful of fish habitat!

Every time you stand by the shore of a lake or a river, think about the following: you are within a highly complex **ecosystem**. A change to this ecosystem, however small it may appear to you, may have much larger, unpredictable effects than you could have imagined. With a better understanding of aquatic ecosystems and the impacts of human activity on them, we can ensure that our water bodies remain a healthy place for all those who live in and around them.

GLOSSARY

Ecosystem: A whole formed by a community of living beings and its atmospheric, soil and geologic environment. The components of an ecosystem develop a network of interdependencies that sustain and develop life.

Fry: The young stage of fishes

Life processes (of fish): Events linked to the survival of fish: spawning, fry rearing, growth, overwintering, feeding, migration.

Littoral (ecological definition): The part of a water body that extends from the high-water line to the depth at which submerged plants are rooted.

Nutrient: Simple substance that can be assimilated by an organism without digestive transformation.

Plankton: A set of plant and animal organisms that live suspended in water.

Runoff: Rain water that is neither absorbed by the soil nor retained by vegetation and that flows at the surface before flowing into streams and lakes. Also called surface runoff.

Shore: Land adjacent to a lake or a stream extending upland from the high water mark.

Spawning: Reproduction of fish.



FURTHER READING

The Dock Primer

Fisheries and Oceans Canada, Quebec Region

This guide outlines the construction of docks to minimize adverse impacts on fish and fish habitat. For an electronic copy, visit the Fisheries and Oceans Canada Web site, www.qc.dfo-mpo.gc.ca and select the *Regional Publications* tab.

The Shore Primer

Fisheries and Oceans Canada, Quebec Region

This guide deals with the importance of preserving natural shorelines in aquatic environments, showing landowners how to protect and restore their shorelines. For an electronic copy, visit the Fisheries and Oceans Canada Web site, www.qc.dfo-mpo.gc.ca and select the *Regional Publications* tab.

Fish Habitat: More Than Meets the Eye

Ministère des Ressources naturelles et de la Faune and Fisheries and Oceans Canada, Quebec Region

This guide outlines the various habitats that fish depend on and deals with their ecological roles. It suggests work methods that will have few or no impacts on fish habitat. For an electronic copy, visit the Fisheries and Oceans Canada Web site, www.qc.dfo-mpo.gc.ca and select the *Regional Publications* tab.

Fish Traffic ... Yield the right of way!

Fisheries and Oceans Canada, Quebec Region

This brochure explains the importance of allowing fish to move freely between the various habitats they frequent over their life cycle. For an electronic copy, visit the Fisheries and Oceans Canada Web site, www.qc.dfo-mpo.gc.ca and select the *Regional Publications* tab.

Living at the water's edge

Regroupement des associations pour la protection de l'environnement des lacs et des cours d'eau de l'Estrie et du haut bassin de la Saint-François (RAPPEL) and Fisheries and Oceans Canada, Quebec Region

This poster presents a series of good and bad developments conducted around water bodies. For an electronic copy, visit the Fisheries and Oceans Canada Web site, www.qc.dfo-mpo.gc.ca and select the *Regional Publications* tab.

NOTES:

INFORMATION

To obtain more information, contact the Fish Habitat Management Division or the area offices of Fisheries and Oceans Canada. You will also find information on our Web site: www.qc.dfo-mpo.gc.ca

FISH HABITAT MANAGEMENT DIVISION

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