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A Guide to Trout and Salmon Habitat for Loggers

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A Guide to Trout and Salmon Habitat for Loggers

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Introduction

The growing mechanization of the logging industry and accelerated construction of access roads in the Maritimes have increased the possibilities of detrimental effects on the inland fishery resource. The days of the horse and winter cutting have been replaced by skidders and bulldozers which have a much greater capacity for fish habitat disruption. In addition, the present practice of year-round cutting results in increased ground disturbance and erosion of soils in wet seasons.

It is difficult to imagine or realize the effects that logging and road construction can have on fish life, because usually the effects cannot be seen. Unfortunately, when most people look at a river or pond, they see water, but fail to recognize the presence of fish or fish habitat.

Importance of Small Streams

Imagine a pond that is fed by one stream. The trout in the pond depend on that stream for spawning and rearing, as well as food and nutrients. If spawning and rearing areas of that stream are destroyed, or fish migration is stopped by an obstruction, then the population of trout in that pond suffers. Small streams and even intermittent streams are usually more productive than large streams.

Requirements for Good Trout and Salmon Production

Food Supply

Small water invertebrates (zooplankton), land and water insects, and small fish make up the diet of salmon and trout. For an abundant growth of the food supply gravel or stone bottoms, cool clean water, and surrounding vegetation are needed.

Oxygen Levels

Salmon and trout require water with a high dissolved oxygen content. High concentrations of dissolved oxygen are particularly important during egg incubation and hatching.

Shelter

Shelter is provided in streams and ponds by undercut banks, deep pools, rocky bottom areas and overhanging vegetation. This cover is important to the fish to ensure protection from predatory birds, fish and animals.

Water Temperature

In general, the temperature tolerance range of salmon and trout is 0-21°C (32-70°F); however, temperatures of up to 24°C (75°F) can be tolerated for short periods under most conditions. Best growth of these fishes takes place between 12-18°C (53-64°F). Most critical are spawning temperatures which range between 4.5-7.0°C (40-45°F).

Spawning Gravels

Clean, loose gravel through which water flows is essential for spawning success. The size of the gravel ranges from 2.5 cm-15 cm (1-6 in) in diameter depending on the size and species. Other requirements include water velocities not exceeding 0.9 m/sec (3 ft/sec), suitable water depth, and access to the spawning grounds.

Atlantic salmon and brook trout usually spawn in the fall from October-December, depending on water temperature, by digging redds (nests) and burying the eggs in the gravel. The site chosen for the redd is located at the head of a riffle. Trout may also spawn on groundwater seeps or springs. The eggs of both species remain in the gravel over winter, hatching in April. The fry emerge from the gravel in May and early June.

Rearing Areas

Rearing or nursery areas consist of stream and pool sections with ample food and shelter for young fish. Salmon parr are typically found feeding in riffle areas while trout feed in the pools and quieter reaches of the stream. These areas require clean, stable water flows with moderate velocities.



Clean, loose gravel through which the water flows is essential for spawning and rearing success.

The spaces or interstices in the gravel and rubble bottoms of streams and ponds provide important instream cover for protection from predators, high velocities, and serve as overwintering habitat. These same interstices are required as habitat by the insects upon which salmon and trout feed.

Effects of Logging and Road Construction on Fish Habitat

Logging and road construction practices can reduce the productivity of streams and ponds in the following ways:

- (1)** Sedimentation, resulting from erosion of exposed soils on stream banks and ditch runoff, can fill in the gravel beds destroying spawning areas and damaging rearing areas.
- (2)** Obstruction of fish movements by the construction of dams, the blockage of streams with logs and slash, and the improper installation of culverts.
- (3)** Depletion of the oxygen supply due to the decomposition of organic material such as sawdust, bark, slash and sunken logs.
- (4)** Destruction of spawning and rearing areas by the use of heavy equipment, and the driving or towing of logs in streams and ponds.

Road construction practices can reduce the productivity of streams.





The Importance of Watershed Vegetation

Many of the fish habitat problems caused by logging operations can be prevented or reduced by maintaining a vegetative buffer zone between the cutting or road construction area and the stream or pond. A vegetative buffer zone is a strip of undisturbed shrubs and carefully managed stands of trees alongside the stream or pond. With proper care, the valuable wood in these zones can be fully utilized while still protecting the stream environment. Vegetation is important for the following reasons:

- Vegetation shades water bodies, preventing overheating. If the water becomes too hot, the fish will move out of the area or be killed.
- Insects dropping from trees and decaying plant material are important sources of food for fish. If the food supply is reduced, so is the fish population.
- Overhanging vegetation and instream roots protect fish from predation by larger fish, animals and birds.
- Vegetation stabilizes the soil and protects against erosion. Erosion of soils adds considerable amounts of silt to streams and ponds.

Silt has the following effects on fish life:

- it decreases the food supply by either covering it over or by destroying it through abrasion;
- silt can clog spawning gravel or cover the eggs and young so they cannot hatch or emerge;
- it can directly kill fish by damaging their gills;
- silt also reduces oxygen content;
- it prevents salmonids from seeing their prey.



Damage done by careless loggers can destroy fish habitat.

Fish habitat problems caused by logging operations can be prevented by maintaining a vegetative buffer zone.



Regulations

Jurisdiction over river systems is a shared federal-provincial responsibility. Federal Fisheries and Oceans works with the provincial departments responsible for the environment so that only one application has to be made for permission to work in a river or brook.

In New Brunswick, applications are required under the Clean Environment Act and can be obtained from:

Department of the Environment
Province of New Brunswick
P.O. Box 6000
Fredericton, N.B.
E3B 5H1

In Nova Scotia, applications are required under the Nova Scotia Water Act and can be obtained from:

Nova Scotia Department of the Environment
Water Planning and Management
P.O. Box 2107
Halifax, N.S.
B3J 3B7

In Prince Edward Island, applications are required under the Environmental Control Commission Act and can be obtained from:

Water Resources Branch
Department of Community Affairs
Province of Prince Edward Island
P.O. Box 2000
Charlottetown, P.E.I.
C1A 7N8

The responsibility for the management and protection of freshwater fish habitat in the Maritimes falls within federal jurisdiction, specifically the Federal Fisheries Act. This Act states:

31(1). No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat.

31(5). . . . "fish habitat means spawning grounds and nursery rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

31.1(1). Every person who carries on or proposes to carry on any work or undertaking that results or is likely to result in . . . the alteration, disruption or destruction of fish habitat, shall, on the request of the Minister . . . provide the

Minister with such plans, specifications, studies, procedures, schedules, analyses, samples or other information relating to the work or undertaking . . . as will enable the Minister to determine . . . whether the work or undertaking results or is likely to result in any alteration, disruption or destruction of fish habitat.

20(1). Every slide, dam or other obstruction across or in any stream where the Minister determines it to be necessary for the public interest that a fish pass should exist, shall be provided by the owner or occupier with a durable and efficient fishway . . . which shall be maintained in a good and effective condition by the owner or occupier . . .

20(2). The place, form and capacity of the fishway . . . must be approved by the Minister before construction thereof is begun.

The above are only extracts from the Act.



Recommended Guidelines

(1) To permit the settling or filtering of sediment and shading of the water, a vegetative buffer zone should be maintained between clear cut areas and all streams and ponds. Logging roads should be located at least 30 m (100 ft) from streams, crossing this buffer area at right angles.

(2) Heavy equipment such as bulldozers or skidders should not be operated in or through any stream or pond.

(3) Streams should not be used for driving or towing of logs.

(4) Bridges are preferred for stream crossings. If culverts are to be used, they should be installed so as not to impede fish passage. This can be done by ensuring that the culvert is large enough to handle peak flows, is in line with the stream flow, is set at least 15 cm (6 in) into the stream bed, and where the stream bed and banks are erodible they should be stabilized with rock or vegetation.

(5) Tops, slash and other debris should not be permitted to enter the stream.

(6) Landings should be made as small as possible, and drainage should be through the woods to filter out silt.



Heavy equipment should not be operated near or in any stream or pond.

(7) Road ditches should be diverted into the buffer zone or settling pools so runoff carrying silt does not enter the streams.

(8) The road right of way should not be grubbed within 30 m (100 ft) of a stream except where necessary for road bed stability.

Further information can be obtained from your local Fishery Office or:

Fisheries and Oceans
Fish Habitat Protection
P.O. Box 550
Halifax, Nova Scotia
B3J 2S7