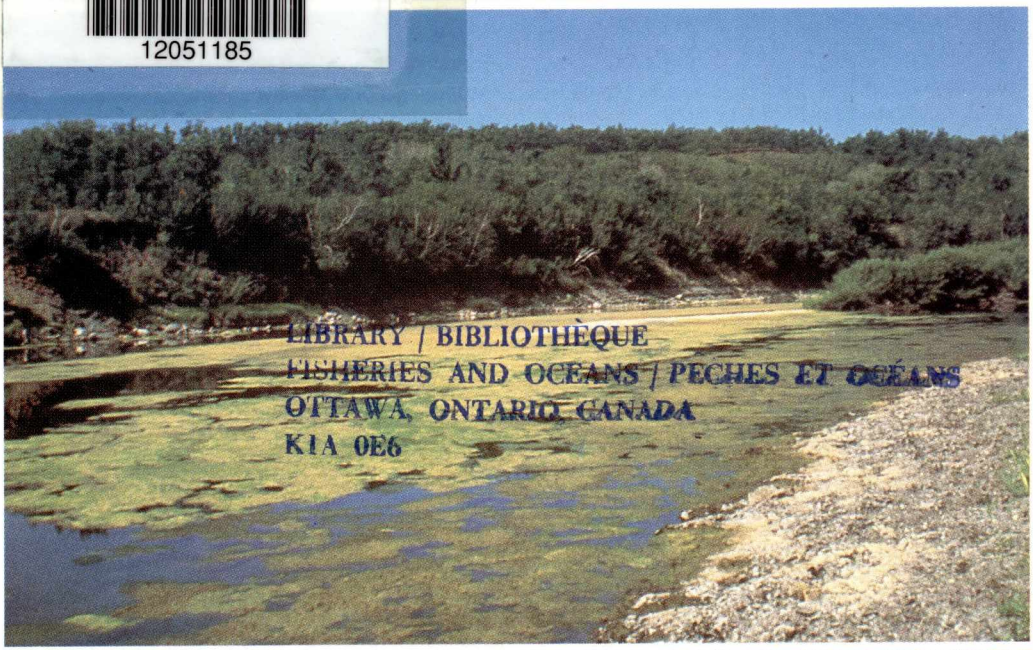
Troubled Waters

Threats to Fish Habitat in the Prairie Provinces



Fisheries and Oceans
Pêches et Océans
Canada

This is one of a series of four brochures designed to foster understanding and awareness of the importance of fish habitat in the prairie provinces. Other brochures in the series are:

Fish Habitat in the Prairie Provinces
What It Is, Why It's Important, How to Help

Living Near Water
Guide to Protecting Fish Habitat in the Prairie Provinces

Enhancing Fish Habitat in the Prairie Provinces
Getting Involved

Front Cover

Clockwise from top: Nutrient loading caused this algal bloom on the Souris River, Manitoba. Common suckers blocked at the foot of a culvert on Stanley Mission Road, Saskatchewan. Discarded herbicide container in ditch draining into the Brokenhead River, Manitoba. Fish kill.

Contents

Habitat Under Seige

Fish habitat supplies the food, shelter, water, and space that fish need at each stage of their life cycle, from egg to adult. Our activities can bring about subtle changes in fish habitat - as difficult to see as fish themselves, but often with deadly results.

Threats range from land uses that ruin spawning sites by blanketing them with silt and clay particles, to domestic animal wastes and agricultural chemicals that promote algal blooms capable of suffocating fish by using up oxygen in the water. Even the invasions of other fish and shellfish species can reduce or destroy local populations by removing food and other elements of habitat that are critical to their life support.

On the prairies, winterkills in lakes, silted over spawning beds, polluted waterways, and spawning runs blocked by dams are among the legacies of habitat damage that have reached the point of compromising the ability of some fish to survive across their natural range.

But habitat enhancement and protection programs, coupled with provincial and federal policies and guidelines, offer assurance that the years ahead will see a major effort to reverse the deterioration of our fisheries habitats and restore our troubled waters to health.

Northern pike at home in healthy habitat that is threatened across the prairie provinces .

Fertilizers

Phosphorus and nitrogen, the key ingredients in field and garden fertilizers, are also abundant in municipal wastewater and livestock waste. When they find their way into lakes and streams, they boost the growth of algae and other aquatic plants – sometimes with disastrous results for fish.

Algae, a type of green plant common to all freshwater, undergoes population explosions when fed with nutrients. These algal 'blooms' cover the water's surface with a green carpet that can block out sunlight, limiting photosynthesis underneath. When the algae dies, it settles to the bottom and decays, consuming valuable supplies of oxygen in the water. Some types of algae also release substances that are toxic to fish.

Fish suffocate when algal die-offs consume oxygen faster than it can be absorbed into the water. In winter, decomposition of algae and plants is even more of a problem since ice cover shuts out the air, preventing the water from absorbing more oxygen.

Water 'weeds' like bulrush and cattail provide cover and feeding habitat. But their excessive growth and spread from nutrient overloading can hamper fish movement. Like algae, the plants use up oxygen as they decompose.

Nutrient loading is natural part of lake enrichment called eutrophication. Nutrient *overloading,* on the other hand, greatly accelerates the process, accomplishing in a matter of years what might take nature several millennia.

Phosphorous and nitrogen are the major culprits in nutrient loading because of their chemical characteristics. Phosphorus sticks to soil particles and nitrogen dissolves in water. Both nutrients can reach lakes and streams in eroded soil and runoff from the land.

Farmers now use 35 times as much fertilizer as they did in the 1950s. With so much of our grasslands and park lands devoted to agriculture, large amounts of fertilizer end up in our surface waters, from sloughs to large lakes, adding to the nutrient overloading problem.

Cattle trampling along this stream bank have destroyed protective vegetation, allowing animal wastes and eroded soil to run off into the water.

Domestic sewage is a major source of nutrients, since treatment does not completely remove nitrogen and phosphorous from the effluent. Waste from private disposal systems can also be a problem if the systems are built too close to water.

The prairie provinces support an estimated 7 million beef cattle that potentially represent a greater threat to fish habitat than human septic waste. Livestock wastes can enter water from feedlots and pens along river banks, and from shoreline fields where manure has been spread during the winter. Locating feedlots below the high-water mark and watering cattle on river ice leave piles of waste for spring melt.

Some lakes have become so overloaded with nutrients that they are no longer able to support fish in winter due to lack of oxygen. Enhancement dollars are often spent on projects that boost oxygen levels.

One approach is to install aerators that release air bubbles from the bottom, increasing dissolved oxygen and keeping a 'window' .open in the ice for air to enter the water. Another is to deepen ponds by digging or damming them to add water that increases oxygen and dilutes nutrients. These measures can reverse damage caused by nutrient overloading and allow the water to support fish life again.

Algae flourish in warm shallow water that has received fertilizer in runoff from surrounding farmland.

This lake in southern Manitoba once again overwinters sport fish. Aerators were installed to boost oxygen levels that were lowered as a result of nutrient overloading.

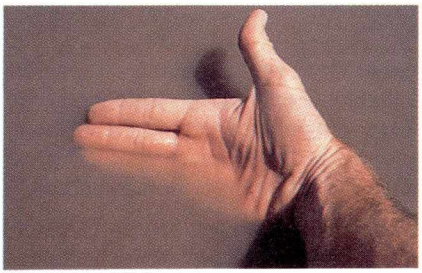
Sediment

Sediment is silt, clay, and other minerals and organic material that is picked up and suspended in water moving over land and through stream and river channels. It comes from fields, forests, shorelines, and stream banks and beds.

The flow of sediment is a natural process, as evidenced by many naturally silty rivers in the prairies, but it is greatly accelerated by many land-use activities. The South Saskatchewan River carries on average almost 10 000 tonnes of sediment a day. At this rate, a 1 000-hectare lake, with an average depth of 5 metres, would be filled in 15 years.

Water laden with suspended sediment drops its load where the current slows at the mouths of streams and rivers, and in pools below riffles and rapids. The sediment settles to the bottom, covering fish spawning habitat and suffocating incubating eggs. Trout, for example, require clean stream bottoms - 70% gravel - to successfully spawn.

Murky water can also delay or block fish migrations, confuse homing behaviour, and even interfere with feeding as in the case of trout and northern pike, which are largely dependent on sight to capture their prey. Suspended sediment screens out sunlight, the source of energy for the aquatic food chain, and ultimately cuts down on the production of food for fish.

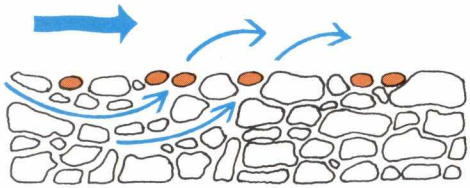


Sediment is probably the number one threat to fish habitat because of the large volumes filling our waterbodies.

Sedimentation can also change feeding habitat. Fish that depend on organisms such as stonefly nymphs and caddisfly larvae will find that their prey have died or moved on, to be replaced by organisms favouring silty muck bottoms.

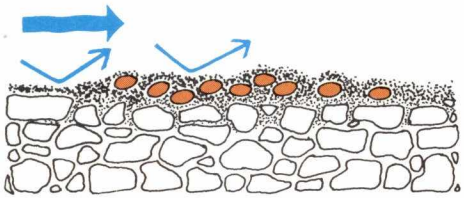
Only a few species such as carp, bullheads, suckers, and fathead minnows have adapted to life in sediment-filled waters. Species such as trout cannot tolerate turbid water, in part because suspended sediment interferes with respiration and damages their gills, making them susceptible to disease and parasites.

Sediment loads increase in cleared areas where flows are fast and there are few obstructions to allow water to seep into the ground or sediment to settle. Drainage channels also increase the rate and volume of flow. High flows swell streams and rivers that in turn erode more sediment from



Clean spawning bed

Sediment smothers eggs by covering them, and fills spaces between stones on gravel and cobble bottoms, preventing water from percolating around the eggs to supply oxygen and remove wastes.



Sediment covered spawning bed

This gun-barrel-straight drainage ditch, built to get water off farmland faster, encourages erosion and eliminates the diversity of habitat necessary to support many fish species.

Washed out culverts on a forestry road crossing of Broad Creek in Alberta.

their banks and beds. When flows drop, sediment builds up, reducing stream capacities and causing more frequent flooding and erosion of fields, which adds more sediment to streams. These processes are responsible for annually dumping about half a million tonnes of sediment into Dauphin Lake, which receives the drainage from a large agricultural watershed in Manitoba.

Shoreline activities also accelerate natural erosion. Livestock on the range or in feedlots and corrals along rivers trample the banks, leaving them vulnerable to erosion from rainfall and high water. Trampling and grazing by livestock are some of the most serious threats to trout habitat in the eastern slopes area of Alberta.

Roads built for forestry and other resource development activities are often sediment factories. Forestry roads are generally constructed on temporary rights-of-way along stream and river valleys. A crossing that is improperly constructed and maintained can release tonnes of silt and sediment, before eventually washing out. Ditches constructed beside roads are often left to revegetate on their own. Exposed to wind and rain, they erode and release sediment into the water for several growing seasons.

When streams and watercourses are straightened, erosion of stream banks and channels increases dramatically as flows accelerate. Dredging is often required to clear the channels once the sediment settles, adding more sediment to the water.

Channelized streams offer spartan habitat for only a few organisms compared to natural streams. Nature tries to correct our mistakes by returning straightened streams to a natural meander pattern that dissipates the energy of flowing water.

Protecting shorelines with buffer strips of trees and shrubs can greatly reduce the amount of silt and fertilizers entering the water by anchoring soil and filtering out sediment and nutrients in runoff.

A buffer strip of trees and shrubs between agricultural fields and the river protects the banks from erosion and prevents sediment from entering the water.

Loss of Cover

Shoreline vegetation and plants in the water protect fish from sunlight and predators. Clearing of shorelines and inshore vegetation increases water temperature and removes productive feeding, spawning, and nursery habitat.

Trees and shrubs overhanging a stream or lakeshore help moderate water temperature – a critical habitat parameter for fish. Because fish are cold-blooded, water temperature controls their body temperature. If the water gets too warm, fish start to die from heat stress. Trout can rarely tolerate water warmer than 22°C.

Warm water holds less oxygen than cold – which is especially significant in waters already depleted of oxygen from pollution. The combined effect of heat stress and decreasing oxygen levels can rapidly kill fish.

Overhanging vegetation is home to many insects that fall into the water and become food for fish. Leaf litter, twigs, and other organic matter act as a source of nutrients for the food chain.

Cover provided by vegetation is not restricted to banks and shorelines. Cattails, bulrushes, and submerged plants like coontail and pondweed, help shelter and feed many fish. Aquatic insects grow and reproduce in the vegetation, providing fish with an excellent source of food. Aquatic plants, boulders, and undercut stream banks also create hiding places where fish can escape predators.

Bulldozed shoreline on Jackfish Lake, Saskatchewan. The destruction of shoreline vegetation encourages erosion and removes a source of cover that harbours insect life important to fish.

In streams, logs, trees, and boulders provide cover that slows the current creating rest areas for fish. Many species such as walleye require these rest areas near their spawning grounds.

Overhanging vegetation shades this stream, and boulders provide instream cover and habitat diversity. Teeming with life, vegetated shorelines and near-shore areas are dynamic food webs, the richest form of habitat.

Pollution

Fish are vulnerable to a variety of pollutants, from herbicides and insecticides to mercury and heavy metals. Some of these pollutants accumulate in fish and can affect the health of people who eat them.

Heavy metals in mine tailings and effluent from pulp and paper mills and mining operations add zinc, cadmium, and lead to surface water. They accumulate in sediments and move through the food chain. Effects on fish range from slow growth and poor reproduction to genetic defects and death. Tailing piles from mining operations have completely filled in some lakes. The tailings, a source of acid in the water, are toxic to fish and aquatic organisms.

Mercury, which is naturally present in soils, is released by flooding new land behind dams. Bacteria convert it to methyl mercury which is soluble in water and easily absorbed by fish. The amount of mercury available to fish increases with the area of land flooded. Mercury contamination of fish led to temporary closure of the large commercial fishery on Lake Winnipeg.

Ammonia from wastewater treatment plants and livestock wastes is extremely toxic to fish. Only a few parts per million of un-ionized ammonia is enough to kill many fish. Wastewater released by some prairie cities still regularly exceeds water quality objectives for ammonia in surface water.

Herbicides and insecticides used in ditches, utility corridors, gardens, forests, and on farms, add long-lasting toxic chemicals to surface waters. 2,4-D has been found in toxic concentrations in sewage effluent from cities and towns. It gets into wastewater systems after rainfall has washed chemical residues off treated urban parks, golf courses, and lawns. Storm sewers carry the chemical directly into the river or through sewage treatment plants that do not remove it.

Widespread use of chemicals in crop production has led to surface water pollution. Pesticides can kill fish and the aquatic vegetation that provides food and cover. Chemicals cling to soil particles that wind and water erosion carry into surface waters. Spraying for vegetation control too close to the water's edge increases suspended sediment in the water by killing vegetation that prevents erosion of banks and shorelines.

In Ontario a study found that 48% of farm ponds and 60% of wells were contaminated with phenoxy herbicides, a common class of farm chemicals. Filling and cleaning of sprayer equipment were believed to be the primary causes. These operations represent the greatest risk to aquatic life: a 20-litre pail of concentrated toxic chemical spilled directly into a waterway could cause major fish mortality and habitat damage.

Leachate from mine tailings can add toxic pollutants to the water.

Barriers

Culverts, hydroelectric dams, and water supply weirs can prevent fish from reaching critical upstream feeding and spawning areas.

Culverts are often installed with little concern for fish passage, sometimes because there is no visible evidence of fish when the crossing is built. Fish heading upstream may not be able to swim through a culvert because the water is flowing too fast. The pipe may be set at too steep an angle or be too small to carry peak flows.

Properly designed culverts take into account a fish's swimming ability, time of migration, and peak flow rate. Bridges are usually preferred because they leave stream beds and slopes in their natural state.

Today, across the prairie provinces, regulations and guidelines are in force to help engineers and developers design and build new stream crossings, or modify old ones, to limit damage to fish and fish habitat.

Dams for stock watering and irrigation, common in agricultural areas, seldom make allowances for fish passage. If the dam is low and conditions favourable, fish can sometimes leap it. But when flows drop, the downstream side may become too shallow or even dry out, blocking fish migration. Notches in dams can allow fish passage and provide stream flow.

Most dams do not have fishways. In Manitoba there are 522 dams, for generating electricity, supplying and controlling water, enhancing waterfowl habitat, and serving private needs. Only nine of the dams are equipped to allow fish passage. Given that 98% of known dams block fish, it is obvious that dams in the province are a major bottleneck in migration and habitat access for Manitoba's fish.

Beavers are a growing problem. The decline in fur markets has led to the proliferation of the animals and their dams which block streams and often change good upstream habitat for fish.

Hydroelectric dams on major rivers, from Alberta to Manitoba, have drastically altered habitat in thousands of square kilometres of lakes and along hundreds of kilometres of rivers. Flooding upstream drowns vegetation that in turn consumes oxygen as it decays, suffocating fish and their food supply. It erodes shorelines and undercuts banks, releasing silt that coats spawning sites and disrupts migration patterns. Dams also change water quality, quantity, and flow regime downstream.

Dams can sometimes improve fish habitat. Water stored behind a structure can be released at a slower rate, adding more water to a stream or river. Supplementing water flows creates new wintering habitat and prevents fishkills in summer.

This culvert installed at Trapper Cabin Creek in Saskatchewan prevents fish passage by creating a waterfall. Culverts with high velocity flows also present a barrier to fish.

Weir near Caddy Lake in Manitoba. It acts as a wall, blocking fish movement to upstream spawning areas.

Changing Flows

The indiscriminate release of water from dams can cause a range of problems, from displacing fish spawn to suffocating fish with oxygen-starved water.

Stream flow determines a waterbody's ability to support aquatic life. Stable streams with year-round flows provide the best habitat for fish. But intermittent streams that flow only during snowmelt or after large rainfalls offer habitat for critical stages in a fish's life cycle such as spawning and rearing.

Studies show that during spring spawning, more young fish are produced in years when runoff and water levels are high than when they are low. High water creates more spawning habitat and makes it easier for fish to pass obstructions when swimming upstream.

Compared to natural seasonal variations in flows, daily changes caused by large dams can take a toll on fish and fish habitat. Sudden increases in flow dislodge fish eggs and deposit them in places less suitable for survival. Reductions in flow may lower water levels in areas that half an hour earlier were good spawning and incubation habitat. A study in Manitoba noted both effects in the waters below a control structure.

Regulated flows, unless carefully calculated to accommodate the seasonal needs of fish, can limit habitat and block access during spawning and other critical life stages. They can also limit fish migration as rapids and falls become impassable at lower water levels.

Stagnant surface water that often builds up behind large dams is sometimes released to clear the upstream reservoir of algae. The slug of oxygen-starved water envelops unsuspecting fish downstream, often killing them. Oxygen deficient water can also be released from the bottom of reservoirs through the submerged intakes of hydroelectric turbines, with the same effect. Releasing cold bottom water from reservoirs can also cause thermal shock in fish.

Water diverted for irrigation can seriously reduce instream flows – disastrous in low-flow years and during dry summers. Fish run out of good habitat as pollutants build up, temperatures rise, oxygen levels drop, and waters become stagnant.

Clearing land and building drainage works often leads to higher peak flows in spring, as well as flow changes over the rest of the year. With increased peak flows and runoff in spring, flows recede quickly, stranding adult spawning fish, dewatering spawning beds, and reducing rearing and incubation habitat for newly hatched fish.

Invader Species

Invader species upset the natural ecological balance of water and shorelines and have few predators or competitors to control their populations. The prairie provinces are vulnerable to invaders, being on the receiving end of drainage from other provinces and the United States.

Zebra Mussel

This is probably the most feared of the invaders because of its explosive population growth, few predators, and competition for plankton, a major link in the aquatic food chain. Mussels in large numbers consume tremendous amounts of plankton, out-competing other aquatic organisms that are food for fish. The hard-shelled, clam-like creatures do not become replacements for the food organisms lost.

The mussels attach to just about anything in the water, including fish spawning grounds. They form colonies up to 1.5 metres thick, containing up to 700 000 mussels per square metre. Zebra mussels are now in the Great Lakes and the Upper Mississippi River. No zebra mussels were found in Manitoba in 1991 after extensive searching and testing. However, it is only a matter of time before a boat or float plane transports them into the Hudson Bay drainage basin.

New Fish

New species of fish can make life difficult for resident populations by competing for food and habitat, killing resident fish, and introducing disease or parasites. They can even change the environment, as was the case with carp, first reported in Manitoba in 1938, which stirs up sediment with its rooting behavior.

The grass carp has been introduced on a research basis in Alberta. Zander, a close European cousin of the walleye, has been introduced in North Dakota. Both species pose a threat to resident fish populations because of their potential to move through the Hudson Bay drainage system which covers approximately 70% of the prairie provinces.

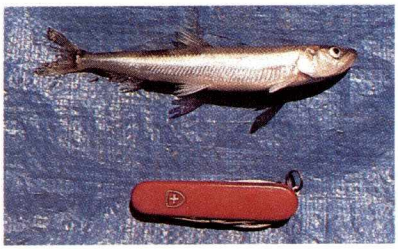
Rainbow smelt threaten commercial walleye and whitefish stocks in Lake Winnipeg. They compete for food and space with many fish. Humans are mainly responsible for the spread of rainbow smelt, either by deliberate introductions as a forage species for trout, or by accidental transfer of the fish as live bait. Eight specimens have been caught in Lake Winnipeg since 1990.

New Aquatic Plants

Eurasian milfoil is an aquatic weed that could spread along waterways into the prairies from several directions, including British Columbia, southern Ontario, and the United States. The weed, which clogs waterways and interferes with boat passage, could be introduced from the bilges, bait wells, or propellers of boats.

Purple loosestrife or *Lithrum* has already invaded wetlands and major waterways of the prairies. It out-competes many other shoreline and wetland plants, filling in open water areas and reducing the diversity of habitat.

The prolific zebra mussel is poised to infest lakes and streams across the prairies.



Rainbow smelt have arrived in the Hudson Bay drainage from the east, and are expected to compete with whitefish, ciscoe, and other commercially important fish stocks.

Manitoba

Weir to Rebuild Cross Lake Fishery

Hydroelectric development on the Nelson River in northern Manitoba reduced summer water levels in Cross Lake by half, destroying fish habitat and populations.

Low water levels and flows damaged spawning sites for whitefish, walleye, and many other species, and kept fish from reaching spawning habitats in tributary streams.

In 1991 Manitoba Hydro completed a weir at the downstream end of the lake, at a cost of $9.5 million. The weir is designed to raise water levels, flood lost shoreline habitat, and reopen the mouths of inaccessible streams. Ten million whitefish fry will be stocked in the lake in 1992 to stimulate recovery of stocks.

The weir may even restore a fishery that once served as a source of food and income for many local residents.

Walleye Spawning Habitat Recreated on Mink Creek

In the 1950s, channelization of Mink Creek to improve agricultural drainage destroyed natural spawning habitat for walleye. Habitat loss in the creek and other tributaries of Dauphin Lake led to critical declines in local walleye populations.

Rock weirs were placed at 70- to 80-metre intervals, creating pools and riffles that duplicated natural stream habitat. Annual monitoring of the project has confirmed that this approach is working. Walleye egg counts and fry catches show that spawning success in the creek has increased dramatically.

The project is helping replenish walleye stocks in Dauphin Lake which was once regarded as the most productive commercial walleye fishery in Manitoba.

Rock weirs on channelized reach of Mink Creek are providing spawning habitat for walleye and reducing sediment input to Lake Dauphin.

Saskatchewan

Fish Return to the North Saskatchewan

In the 1950s, water along much of the North Saskatchewan River, from Edmonton to Prince Albert, could not support fish during the winter for lack of dissolved oxygen.

Municipal and industrial effluents dumped in the river without treatment were adding nutrients that stimulated the growth of algae and other water plants, consuming oxygen and suffocating fish along hundreds of kilometres of the river.

Beginning in the 1960s improvements were made in treating all wastewater discharging into the river. By the mid 1980s, oxygen levels were well above those needed to support wintering fish populations. Winter flows were also improved as a result of dam construction and flow control in Alberta, providing more living space for fish.

Numbers of fish species now occupying the river have more than doubled, from 12 in 1957 to 27 today. Pike, walleye, sauger, and goldeye are again plentiful, and the river is now an excellent sport fishery, sometimes yielding walleye over 5 kilograms.

Crossing of South Saskatchewan River Spares Fish

A pipeline crossing of the South Saskatchewan River in 1977 used a variety of strategies to protect fish. The crossing required dredging a trench across the river to bury a gas pipeline, an operation that can add tonnes of sediment to the water.

Dredging was timed for low flows in late summer and autumn to minimize the impacts of sediment on fish spawning and migration.

Two pipelines were laid across the river, even though the extra pipe was not needed at the time, to avoid trenching for a second pipe when demand for gas increases.

Before and after shots, taken one year apart, of a pipeline crossing of the South Saskatchewan River.

Following construction the trench was levelled and river banks were stabilized with sandbags to discourage erosion. A year later evidence of construction had virtually disappeared!

Alberta

Landowners Help Restore Trout Habitat

Cattle trampling stream banks and grazing to the water's edge pose a serious threat to fish habitat in Alberta. They increase erosion and sediment loads in streams, and reduce cover and food organisms for fish. Their activities often lead to wider shallower streams with higher water temperatures and silt-covered bottoms.

In 1975, the Alberta Fish and Wildlife Division began a riparian fencing program that has seen 242 kilometres of fence installed to protect 145 kilometres of stream. Almost 80% of the fencing was installed on private land under cooperative agreements with landowners.

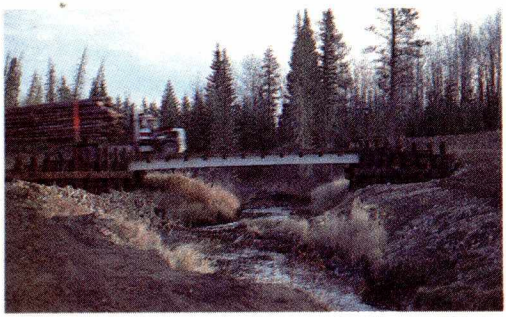
Results have been dramatic. Tests on the North Raven River show that good trout habitat has more than doubled in sections of the river fenced eight to ten years ago. During the same period, good trout habitat in an unfenced section decreased by 80%.

Bridges Spare Fish Habitat

In the eastern slopes area of Alberta, bridges are replacing culverts in stream crossings for forestry and oil and gas operations. In the late 1970s many crossings consisted of undersized and poorly installed culverts that blocked fish migration and frequently washed out, depositing sediment in streams.

The switch to portable steel and timber bridges in recent times has saved and reopened much fish habitat. Cranes and helicopters were used to install and later remove the bridges, to prevent damage to stream beds and banks and reduce erosion and sedimentation.

Where culverts are still used, they have to be designed and installed to allow fish passage. Slope and size are adjusted at every location to ensure fish can swim upstream through the pipe. In some culverts, baffles provide fish with steps to swim upstream.



Stream crossing on a logging road in Alberta. This well-designed crossing left the stream in a natural condition.

Looking Ahead

The prairie provinces each support a range of programs that will continue to improve - and even add to - the habitat that we have.

Alberta

Alberta's Buck For Wildlife Program, supported by fish and wildlife licences and private donations, has spent $9.1 million since 1973 to improve 40 500 hectares of lake habitat and enhance 947 kilometres of trout stream habitat. Buck For Wildlife has also granted $3.6 million to organizations for their own enhancement projects.

Alberta Fish and Wildlife Division runs a habitat program that works with landowners and developers in a cooperative effort to minimize impacts to fish habitat.

Saskatchewan

Saskatchewan established a Fish and Wildlife Development Fund in 1984. Funded from fish licence fees, it has an annual budget of $850,000. To date 115 projects have been developed with the involvement of 70 cooperators. Projects range from stream habitat improvement in the Cypress Hills to lake habitat restoration for walleye and lake trout in central Saskatchewan.

Manitoba

Two programs in Manitoba, the Special Conservation Fund and Manitoba Habitat Heritage, have developed 100 projects since 1984. By the end of 1990 the programs had spent almost a million dollars to enhance and protect fish habitat. Representative projects include: rehabilitating five channelized streams to improve walleye spawning; aerating 15 lakes; and enhancing habitat at a Winnipeg nature and education centre.

Federal Policies

Several federal policies are designed to improve the management of fish habitat. The 'No Net Loss' policy protects fish habitat from development by ensuring that habitat which cannot be protected by mitigation is replaced. The 'Net Gain' policy strives to rehabilitate and enhance fish habitat so that our future fisheries will be more productive than they are today.

Need More Information?

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