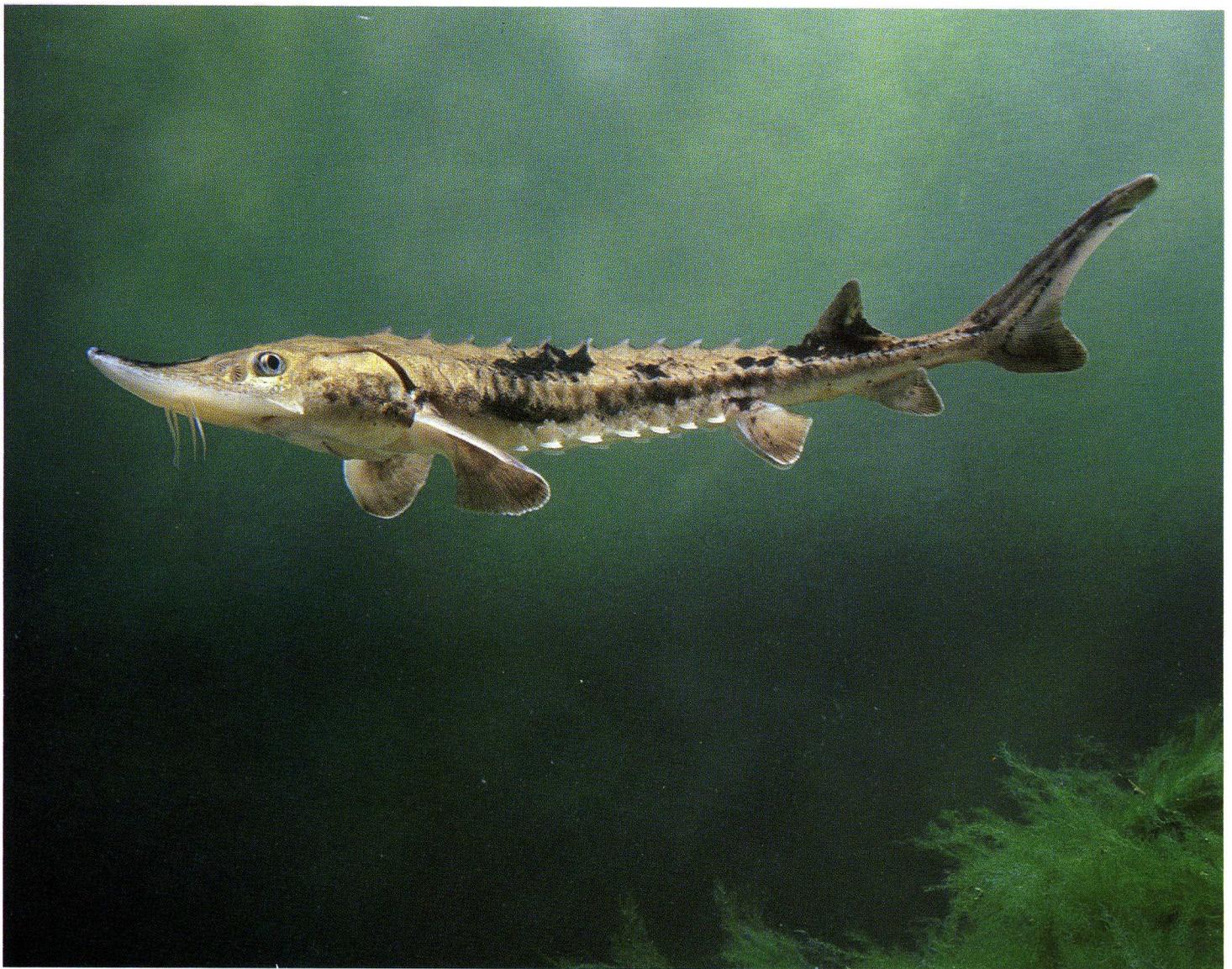


LAKE STURGEON

in the Prairie Provinces

*Life History and
Threats to Habitat*



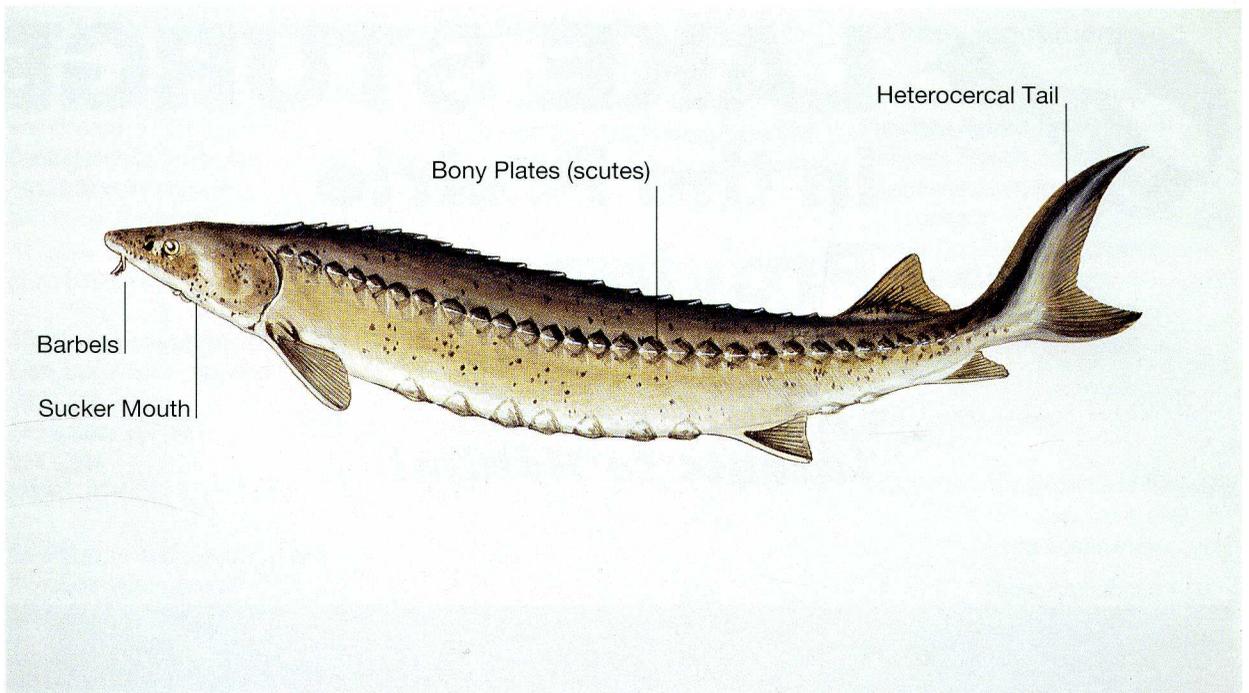
Juvenile Lake Sturgeon



Fisheries
and Oceans

Pêches
et Océans

Canada



'Living fossil' and 'Mishe-Nahma, King of Fishes', are some of the names that have been applied to this freshwater fish.

The Lake Sturgeon

(*Acipenser fulvescens*)

One of the largest freshwater fish in North America, sturgeon may reach a length of 2.5 metres and weigh more than 140 kilograms. A slow-maturing fish that has been known to live more than 150 years, it was once abundant in the large rivers and lakes of central and eastern North America. Today populations are reduced over much of its range from over-fishing and habitat loss.

Survivors from a prehistoric age, sturgeon look much the same as fossils from the Upper Cretaceous period of 100 million years ago. An outer armour of bony plates, bones made of cartilage, and a shark-like tail are vestiges of earlier times. These features have disappeared in most modern-day freshwater fish.

Lake sturgeon belong to the sturgeon family, which includes four other species in Canada: the white sturgeon, the green sturgeon, the shortnose sturgeon, and the Atlantic sturgeon.

Species Notes

Sturgeon are distinguished by five rows of bony plates or 'scutes' that cover most of the body of young fish. The plates, with their slightly hooked spurs, make an unpleasant meal even for voracious walleye and northern pike.

The fish has a long snout that becomes blunt with age, a toothless sucker mouth, and four barbels or fleshy feelers that hang in front of the mouth detecting food as the fish glides along the bottom. The sturgeon's heavy torpedo-shaped body tapers to a shark-like tail with a large upper lobe. The single dorsal fin is positioned far back on the body, as in northern pike.

Adult sturgeon come in several colour variations, from olive-brown or tawny to slate grey and black on their sides and backs, shading to milky white below. The young have large black blotches on their sides, back, and snout which disappear by the time they are 60 centimetres long. As sturgeon grow older, their spots vanish and the bony plates smooth out and become difficult to distinguish.

Late Spawners

Sturgeon are late spring spawners, usually after northern pike and walleye. In May and June when the ice has melted, they swim up streams and rivers searching for places to spawn, often travelling many kilometres and returning to the same area. They favour rocky shorelines of rivers near strong currents where water is 0.6–5 metres deep, and temperatures range from 13–18°C. Sturgeon sometimes spawn on lake-shores where winds and waves create similar conditions for egg survival.

Spawning begins with the arrival of the female in the spawning area. Several males swim up on either side of her, usually against the current, then milt and eggs are released. Females produce from 50 000 to 700 000 eggs in a spawning year. The small dark eggs, about 3 millimetres in diameter, are heavier than water and stick to rocks and logs on the bottom.

Strong currents are needed to disperse the eggs and keep them from clumping, which decreases the hatch rate. The current also supplies oxygen

and removes sediment and metabolic waste that could destroy the eggs.

Spawning frequency and age at sexual maturity are among the most vulnerable aspects of sturgeon biology. Sturgeon have the slowest maturation rate of all our freshwater fish. In the Nelson River, for example, males reach sexual maturity at 15–20 years of age, and females at 25–33. Once sexually mature, males spawn every 1–3 years; females, every 4–6 years. This means that only a very small part of the population spawns in any given year, limiting growth of the population and slowing its recovery from overharvest or habitat impact.

Slow Growers

Sturgeon are slow-growing fish, particularly northern populations. A sturgeon in the cold waters of the Nelson River in northern Manitoba might weigh less than 4 kilograms at age 20. A sturgeon of the same age in Lake Winnibago in Wisconsin might weigh nearly 14 kilograms.

Eggs hatch in 5–8 days into 8 millimetre larval sturgeon. Larvae depend on their yolk sacs for nourishment for the first 18 days, then start foraging for themselves. By the end of the first growing season they are miniature adults, roughly 125 millimetres long.

Age-weight curves show little leveling off of growth. In other words, sturgeon continue to grow throughout their lifetime. Perhaps that is why there are records of many lake sturgeon weighing over 100 kilograms.

Like a tree, the sturgeon lays down annual growth rings on the spines of its pectoral fins. The largest number of rings counted for a sturgeon put some of the oldest fish at more than 150 years of age.

Bottom Feeders

Sturgeon have four barbels or feelers that dangle from the underside of their rubbery snouts. They coast along, dragging their barbels lightly over the bottom to locate their prey. Once they find something, they instantly extend their toothless tube-like mouths and suck it up. Then, clamping the prey in their mouths, they draw in water and strain out debris through their gills.

Sturgeon prefer feeding in water less than 10 metres deep, along the bottoms of streams and lakes where insect larvae and other invertebrates thrive. They also eat leeches, crayfish, and other small fish such as sculpin and sticklebacks. One sturgeon stomach examined as part of a population study contained some 60 000 midge fly larvae. Although sturgeon are usually selective in diet, they have been known to consume coins, tin cans, cigarette packs, and even fish hooks!



Extended, tube-like mouth.

Jumpers

Sturgeon sometimes jump completely out of the water, then fall back with a loud splash. Two girls in a boat on the Ottawa River were surprised one day in 1948 when a 22-kilogram sturgeon jumped into their boat!

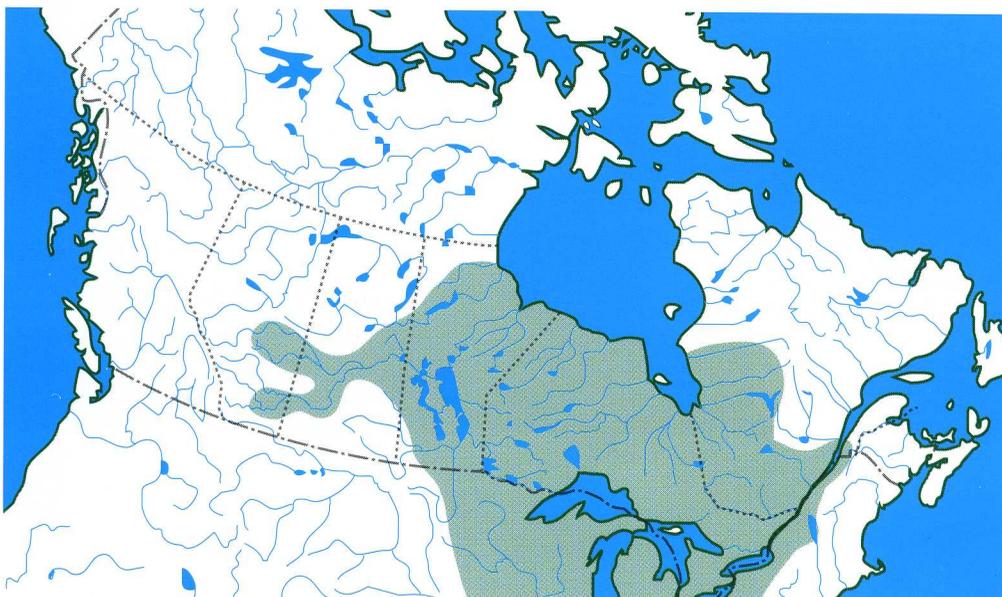
What makes the sturgeon jump? Lamprey scars on many sturgeon have led to speculation that the fish jump to shake off the eel-like parasite. Others believe that jumping is part of their spawning behaviour or pre-spawn conditioning, but sturgeon have been seen jumping at different times of the year.

Sturgeon in the Prairie Provinces

In Alberta sturgeon are found in the North Saskatchewan River as far upstream as Edmonton, and in the South Saskatchewan River as far west as the junction of the Bow and Oldman Rivers. In Saskatchewan they are common to Cumberland Lake and the Saskatchewan and Churchill Rivers. In Manitoba, where sturgeon is a heritage species in recognition of its unique biology and social value, it is found in Lake Winnipeg and in the Nelson, Churchill, Winnipeg, and Saskatchewan Rivers.

Population sizes have been estimated in several sturgeon fisheries on the prairies. A sturgeon study on a 50-kilometre stretch of the Winnipeg River in Manitoba put local populations at 7000–8000 fish—possibly an endangered level. On the South Saskatchewan River in Alberta the population was estimated at 4700 over a 300-kilometre stretch of river where 90% of the province's sturgeon fishing occurs. The low numbers and limited range of sturgeon in Alberta forced closure of the fishery in 1947. Reopened for sport fishing in 1968, the fishery is sustained through a sturgeon tag program.

The lake sturgeon is found in many of the great drainage basins of North America, including Hudson Bay, the Great Lakes, and the Mississippi and St. Lawrence Rivers. It still enjoys one of the widest distributions of freshwater fish in North America.



Limiting the Harvest

Sturgeon have never been able to withstand annual harvests of more than 0.4 kilograms/hectare. In Manitoba, fisheries managers believe sturgeon populations can only sustain an annual harvest of about 0.08 kilograms/hectare. This means that only a dozen average-sized sturgeon could be taken each year from a 1000-hectare lake or stretch of river. In contrast, the same waterbody could potentially sustain removal of more than a thousand walleye.

Alberta issues special tags for sturgeon, limiting the catch to two fish per year per individual. Annual monitoring of the catch through a questionnaire has shown that almost 90% of sturgeon caught are released. A very suc-

cessful form of management, the program has been operating since 1968. Saskatchewan imposes a daily possession limit of one fish. It used to keep track of the harvest through a voluntary diary program where anglers recorded what they caught and where. Manitoba also imposes a daily possession limit of one fish, although the province plans to reduce the limit to zero in 1992 with the inception of a 100% catch-and-release fishery in major sturgeon waters.

Commercial fishing of sturgeon closed in Alberta in 1940, continues in Saskatchewan at low levels, and is being phased out in many areas of Manitoba.

Fisheries biologist hauling in nets for a population study in the Winnipeg River.



Commercial sturgeon catch from the Churchill River in northern Manitoba.



Threats to Sturgeon

Lake sturgeon is not currently on the endangered species list in Canada, partly because it can still be found in most of its historic range and because of the general hardiness of the species. But at current low numbers, major changes in watersheds and habitat could reduce populations to dangerous levels or even remove them from part of their natural range.

Over-fishing

Commercial fishing, which started in 1860, drastically reduced numbers of sturgeon through overharvesting. The Lake Winnipeg fishery peaked in 1900 with a haul of over 445 tonnes, then dropped to 13 tonnes a year until it was closed for the first time in 1910.

Fishermen took larger, older fish first, with the result that the average size of sturgeon rapidly declined. Larger fish are usually female, as evidenced by a study in Wisconsin showing that 97% of sturgeon over 30 years old were females. As they get older and bigger, females produce more eggs per kilogram of body weight and can keep spawning until age 100 or older. The practice of taking the big fish first, removed most of

the reproductive capacity in populations, resulting in permanent declines.

Today, because most populations are low compared to pre-commercial times, even the pressure of sport fishing may be too much for the fishery to sustain.

Habitat Under Siege

Sturgeon habitat continues to decline in the face of development. Obstructions ranging from stock watering weirs to hydroelectric dams prevent sturgeon from reaching their spawning grounds, forcing them to spawn where egg survival is poor. Dams block migration and alter stream flows, destroying eggs and bottom-dwelling organisms that sturgeon eat. Runoff from banks and fields carries sediment into the water, changing water temperature and oxygen levels, limiting places where sturgeon can live. Pollutants such as fertilizers and sewage effluent leach into lakes and rivers, stimulating plant growth. When the plants decay, they consume oxygen, suffocating sturgeon and other species. These and other threats jeopardize the future success of the species.

Looking Ahead

Sturgeon can only withstand the lightest of fishing pressure before their populations begin to decline. Their unique biology and low numbers mean the species must be carefully managed to prevent overharvest. Limiting harvest through tag programs and catch-and-release fishing will help sustain current populations.

Regulating flows at dams to prevent destruction of sturgeon eggs and protecting critical spawning, rearing, and feeding habitats are among the ways we can ensure that sturgeon survive. Preserving shorelines along rivers and lakes helps keep sediment, fertilizers, and chemicals out of the water. These activities are in keeping with the federal fisheries' "No Net Loss" and "Net Gain" policies that help sturgeon by protecting and enhancing all fish habitat.

The waters of the Prairie Provinces may never again boast the numbers of sturgeon that our ancestors saw in the last century. But at least we can take on the challenge of leaving our sturgeon populations in as good or better shape than we find them today.

STURGEON STORIES

BUFFALO OF THE WATER

Sturgeon were highly prized by native peoples who considered them the “buffalo of the water.” A single sturgeon yielded more meat than dozens of smaller species, the oily flesh smoked well, and sturgeon proved easy prey during spawning when they congregated in large numbers. Natives used all parts of the sturgeon, making soup from the cartilaginous ‘backbone’ and using tailbones as arrowheads for small game.

STOKING THE BOILERS

Grand Rapids, in north central Manitoba, once boasted a thriving sturgeon fishery, all but wiped out today. Sturgeon were so plentiful here they were stacked like cordwood on the shore to dry and then used to fuel freighters that once plied the waters of Lake Winnipeg. Records show that in Ontario, sturgeon were stored on the wood dock at Amherstburg for stoking the boilers of steamboats working the Detroit River.

CORDWOOD TO CAVIAR

Early settlers and fishermen scorned the sturgeon as a nuisance fish of little food or commercial value. Sturgeon caught in nets set for ‘valuable fish’ were dumped in the water or piled on shore for pig feed, cordwood, or fertilizer.

Not so across the Atlantic. The food of pigs was the fish of kings, so decreed by King Edward II of England who made the sturgeon a royal fish. Later, lake sturgeon eggs, once fed to hogs, were sought after in Europe as a new source of caviar. The demand transformed sturgeon from a worthless nuisance to the most valuable commercial freshwater fish in North America.

Commercial fishing of sturgeon began in 1860 to meet the market for caviar and later smoked flesh. It led to population crashes, nearly wiping out sturgeon in some areas. Prices for sturgeon soared. Before 1860, a single sturgeon cost about 10 cents. Today, lake sturgeon sell for more than \$6 a kilogram.

ROSEAU RIVER MONSTER

One of the largest lake sturgeon ever taken weighed 184 kilograms and was caught in a pool of the Roseau River in southern Manitoba in 1903. Sandy Waddell, a local farmer, noticed what he thought was a log in the water until it moved. When he realized it was a monster fish, he chased it into shallow water where the sturgeon was unable to escape, and stunned it with an axe. Then he tied a rope around it, dragged it out with his team of horses, and hung it from a tree for photographs.

LAKE OF THE WOODS DECLINE

A disturbing feature of sturgeon populations is the rapid decline in yield following several years of commercial fishing. Wherever sturgeon are fished the results are always the same—a high initial yield followed by a permanent decline to very low numbers. Lake of the Woods in Ontario was once considered the largest sturgeon hole in the world. Commercial catches peaked there at over 800 tonnes annually in 1893 but declined to 90% of this level by 1900 and were almost non-existent by 1930.

IMPRINT OF HANDS

If you angle for sturgeon, releasing it after capture is a good way to conserve this easily overharvested fish. Although the fish are tough, proper handling is essential to survival after catch-and-release.

When a live sturgeon was transferred to an aquarium in Manitoba, the



Monster lake sturgeon taken from the Roseau River at the turn of the century.

effects of handling became graphically clear. The imprint of hands was outlined on the fish by a fungus that had infected the area. Handling had removed protective mucus on the fish’s skin. The infection might not have developed in the wild, but the mere possibility is still a good reason to handle the fish as little as possible.



Sturgeon caught in the Winnipeg River. Some of the largest sturgeon caught on hook and line weighed 56.4-kilograms (Lac du Bonnet in Manitoba, 1984), 55.5 kilograms (South Saskatchewan River in Saskatchewan, 1962), and 47.7-kilograms (South Saskatchewan River in Alberta, 1981).