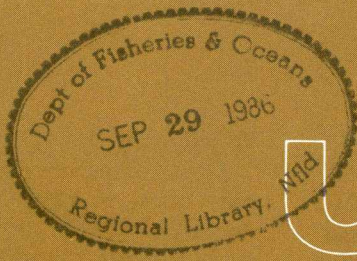


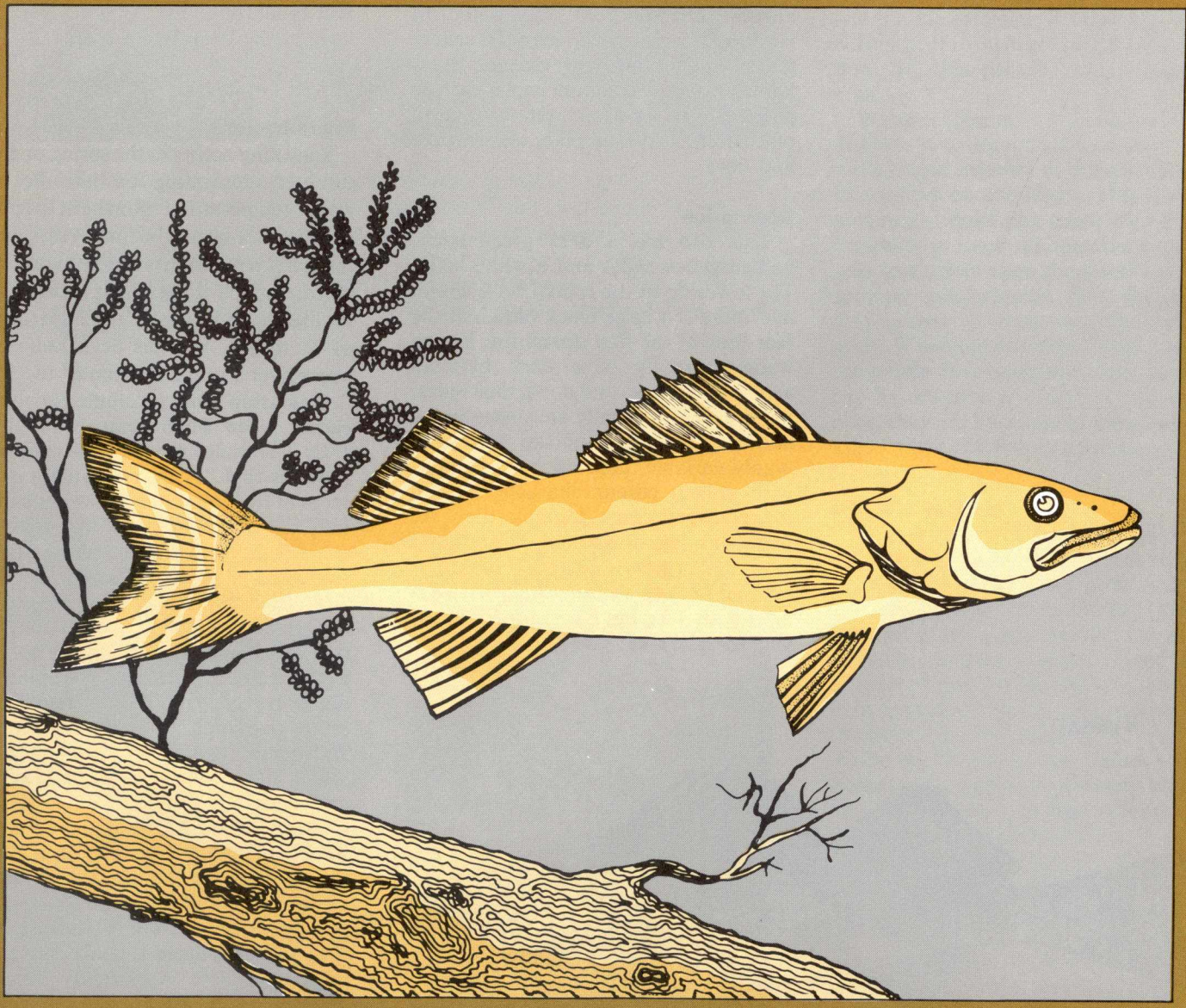
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# Underwater World

## The Walleye



## The Walleye

The walleye, the highly esteemed member of the perch family, gets its name from the large eye with its light-reflecting retina which gives the fish its walleyed appearance. This fish is probably the most economically valuable species in Canada's inland waters. It is a major commercial and sport fish in Ontario and the Prairie Provinces, and a major sport fish in Quebec. An angler survey in Ontario showed that the walleye was the game species most often fished and was the second in abundance in anglers' catches.

The perch family is a large one, with about 140 species in North America alone. The walleye (*Stizostedion vitreum*) is a close relative of the yellow perch, sauger and the darters. It is known by many common names such as pickerel, yellow pickerel, yellow walleye, pike perch, wall-eyed pike, walleye pike and doré.

### Description

This fish has a dark green back, golden yellow sides and a white belly. The lower tip of the caudal fin is white, and there is a large black blotch at the rear base of the first dorsal fin. Young walleye usually have dark blotches across their backs and down their sides, patterns which usually are absent in the adults. The colour of the walleye is highly variable, depending on habitat, with golden colour characteristics in many populations. Usually they are paler with less obvious black markings in turbid waters and more strikingly marked in clear waters. Adult fish average about 1 kg but the record is in the vicinity of 11 kg.

### Distribution

Most commonly found in fresh and only rarely brackish waters of North America, walleye in Canada inhabit tributaries of the St. Lawrence River downstream to the Manicouagan River, north to its tributary to the east coast of James Bay; northwest from the Hudson Bay coast in Ontario and Manitoba to Athabasca, Great Slave and Great Bear lakes down to the Mackenzie River's delta; south through the Peace River drainage of northeastern British Columbia; and south, east of the Rocky Mountain foothills, to southern Alberta. Walleye form a dominant part of the fish fauna of central Canada, particularly in the boreal forest zone.

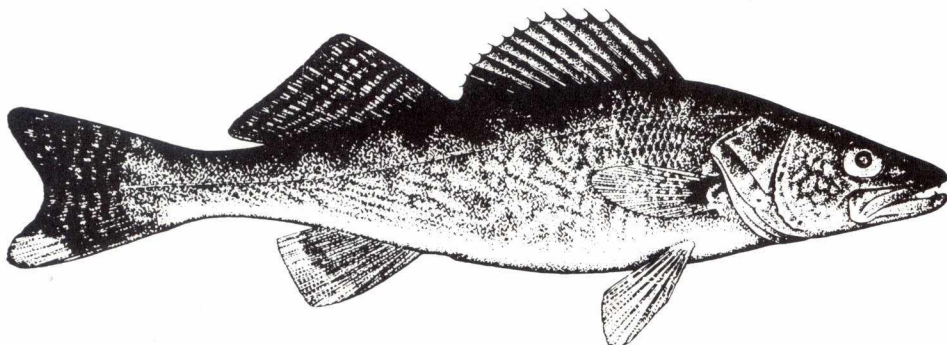
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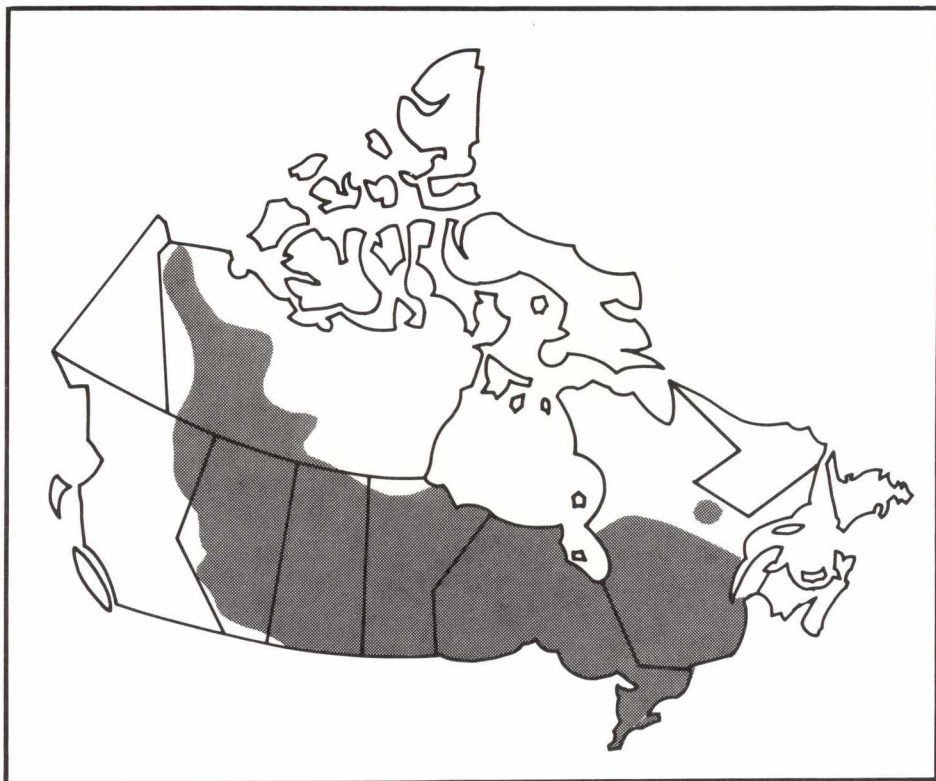
Spawning occurs in the spring or early summer, depending on latitude and water temperature. Northern populations do not spawn in some years when the water temperature is not favourable. Normally, spawning begins shortly after ice breaks up in a lake, at temperatures of 7° to 9°C but has been known to occur over a range of from 6° to 11°C.

Courtship may commence much earlier when water temperature is at 1°C. The males move to the spawning grounds first. These are usually rocky areas in flowing water below impassible falls and dams in rivers and streams, coarse-gravel shoals, or along rubble shores of lakes at depths of less than 2 m. The walleye may move into tributary rivers immediately after they are free of ice and while the lakes are still ice covered. Spawning takes place at night, in groups of one large female and one or two smaller males or two females and numerous males.

The male walleye is not territorial, and does not build a nest. Prior to spawning, there is a lot of pursuit, pushing, circular swimming, and fin erection. Finally, the spawning group rushes upward into shallow water, stops, the females roll on their sides, release their eggs and simultaneously milt is released by the males. Apparently females deposit most of their eggs in one night of spawning. The fertilized eggs are heavier than the water and fall into

Fig. 1 Walleye.





*Fig. 2 Distribution of walleye in Canada.*

*Fig. 3 Walleye are usually found in groups close to the lake bottom and at various depths, depending on the water temperature.*



crevices in the stream or lake bottom where they stick to stones and debris. The maximum number of eggs released by one female has been estimated at 612,000.

The eggs hatch in 12 to 18 days on the spawning grounds and by 10 to 15 days after hatching the young have dispersed into the upper levels of open water. By the latter part of the summer, young-of-the-year move toward the bottom. Growth is fairly rapid in the south, but slower in more northerly latitudes. Females grow more quickly than males.

### Food

The diet of walleye shifts very rapidly, from invertebrates to fishes, as the walleye increase in size. This is partly a reflection of their change in habitat from surface to bottom waters. During the first six weeks of life their diet consists mostly of copepods, crustaceans, and very small fish. They can be cannibalistic, especially if small yellow perch or other forage fish are not readily available. Some populations, even as adults, feed almost exclusively on emerging larval or adult mayflies for part of the year. The relative amounts of the various species of fish that walleye feed on apparently is determined by their availability. Yellow perch and cyprinids are particularly favoured when these species are present. Other food such as crayfish, snails, frogs, mudpuppies, and rarely small mammals may be taken, but usually only when forage fish and insects are scarce.

### Habits

Walleye caught by anglers are usually 0.5 to 1.5 kg in weight and more than three years of age. The present angling record is a walleye taken in Old Hickory Lake, Tennessee, in 1960, which was 104.1 cm long and weighed 11.3 kg. The previous long-standing record was a walleye of 10.1 kg caught near Fort Erie, Ontario, in 1943. Male walleye generally mature at two to four years of age and females at three to six years of age. Maximum age varies from 10 to 12 years in the south to possibly more than 20 years in the north.



Fig. 4 Not particularly known for their fighting qualities, walleye are nonetheless highly-prized as trophies or as delectable meals.

The special layer in the retina of the eye *tapetum lucidum*, being extremely sensitive to bright daylight intensities, restricts feeding to twilight or dark periods. Walleye are tolerant of a great range of environmental situations, but appear to reach greatest abundance in large, shallow, turbid lakes. Large streams or rivers, provided they are deep or turbid enough to provide shelter in daylight, are also preferred habitat of the walleye. They use sunken trees, boulder shoals, weed beds, or thicker layers of ice and snow as a shield from the sun.

In clear lakes the walleye often lie in contact with the bottom, seemingly resting. In these lakes, they usually feed from top to bottom at night. In more turbid water they are more active during the day, swimming slowly in schools close to the bottom. Walleye frequently are associated with other species such as yellow perch, northern pike, white suckers and smallmouth bass. White suckers, for example, orient themselves in walleye schools and behave as part of them. During the winter the walleye do not change their habitat except to avoid strong currents.

In the spring, the fish have a spawning run to shallow shoals, inshore areas, or tributary rivers, while at other times they move up and down in response to light intensity. They also move daily or seasonally in response to temperature or food availability. For the most part, walleye seem to remain in loose but discrete schools with separate spawning grounds and summer territories. There is evidence, as well, to suggest that populations of walleye home to the same spawning area each year.

#### Enemies

Northern pike is probably the dominant predator of the walleye over much of its range. The muskellunge also preys on the walleye in more restricted areas, but the northern pike may also be an important competitor because it is the only other major, shallow-water predator in the north. Adult perch, other walleye, and the sauger prey on young walleye. Many fish-eating birds and mammals also take young walleye from time to time.

Yellow perch, sauger and smallmouth bass are the walleye's main competitors for food. But more important in con-



Fig. 5 & 6 Federal biologists retrieve a seine net used to harvest walleye fingerlings in one of various enhancement projects. Ponds, seeded with eyed eggs in the spring, yield fingerlings in the fall which are then stocked into lakes in efforts to rehabilitate the fisheries. There are no predators in the ponds so that there is about a 30 per cent return as compared to one per cent in natural situations. And, as fingerlings, the fish have a better chance of survival than do the smaller larvae when stocked in lakes.



trolling populations are water temperature, stream flow and wind at spawning time, and interference from other species which spawn over the walleye eggs. The major controlling factor of walleye populations appears to be mortality during the egg and fry stage.

The walleye is host to a wide variety of parasites. Some of these include protozoans, trematodes, cestodes, nematodes, acanthocephalans, leeches, molluscs and crustaceans. In certain areas of Saskatchewan and Alberta walleye are infected with a broad tapeworm (*Diphyllobothrium latum*). This parasite regularly infected sled dogs fed raw fish, and human infection is known to have occurred. If the fish are properly cooked however, this parasite will not infect man.

Walleye dermal sarcoma, a viral disease, sometimes occurs on spawning walleye and appears as a pink, tumor-like lesion on the body. This disease apparently does not cause significant mortality in natural populations and is seen less often when the water reaches summer temperatures. The species is also subject to black-spot and yellow grub. While these two parasites render the whole fish unsightly, they usually can be removed by filleting and skinning; they are harmless to man and are killed when the fish is cooked.

#### Relation to Man

Most walleye are caught by still fishing with live minnows and earth worms as bait or with artificial lures such as spinners, spoons, plugs and jigs. Drifting and trolling are usually the most effective methods used to seek out schools of moving walleye and the twilight periods of sunset and sunrise are the best times for catching the species. While not a spectacular fighter when hooked, the walleye is a steady battler that tends to bore to the bottom.

Canadian commercial fisheries have been harvesting about 4,000 to 5,000 metric tons (t) of walleye annually. The years 1941 to 1980 saw considerable fluctuations in catch. Catches peaked at almost 10,000 t in 1956 but in recent years they averaged approximately 4,000 t with a landed value of about \$8 million. There has been a steady decline in walleye stocks since 1956.

**Further Reading:**

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