

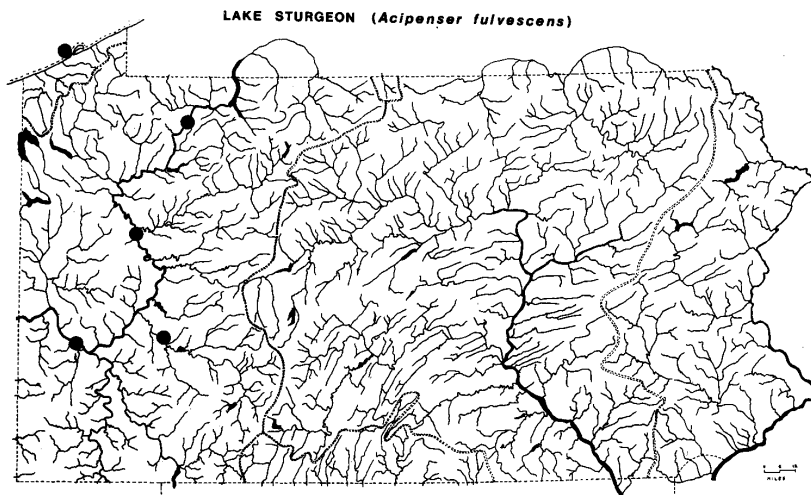
**Endangered****LAKE STURGEON***Acipenser fulvescens* Rafinesque

Family Acipenseridae

Order Acipenseriformes

**OTHER NAMES:** Freshwater sturgeon, rock sturgeon, red sturgeon.**DESCRIPTION:** Adult lake sturgeon are pentagonal in cross section, generally 0.9 to 1.5 m in length with weights up to 36 kg. Males are usually smaller than females. There are five rows of pointed bony plates (one dorsal, two lateral, two ventral), which gradually become worn with age, along the length of the body. It has a protrusible mouth posterior to

the eyes preceded by four barbels. Teeth, branchiostegal rays, and opercula are absent. This sturgeon has a large simple gas bladder, rectum with spiral valve, and numerous pyloric caeca. It differs from the shortnose sturgeon by having 33 short, blunt gill rakers (range 25 to 40) and the mouth width more than 62 percent of the interorbital width. The lake sturgeon differs from the shovelnose sturgeon in having a spiracle and an incompletely mailed caudal peduncle. Adult lake sturgeon are olive brown to gray on the sides and back, with a white belly. The peritoneum is clear to lightly speckled. Young lake sturgeon less than 300 mm in length have two large black spots on the upper surface of the snout which disappear with age. There are many smaller black spots on the body.

**RANGE:** Saskatchewan River in Alberta and Saskatchewan east to southern Quebec, south along the Appalachian mountains through western Pennsylvania, and the Mississippi River Valley to northern Alabama and Mississippi. North through the midwest, all of the Great Lakes, eastern Nebraska, and the eastern part of the Dakotas. Vladykov and Greeley (1963) indicate that it may be found in Labrador. Historical records for Pennsylvania include the Ohio River Basin in Allegheny, Clarion, Indiana, and Warren counties and Lake Erie in Erie County.**HABITAT:** It generally inhabits quiet water of large rivers and lakes with rock, pebble, or sand bottom. Less often found where bottom is mud. A sea-res-



idence stage has not been found although lake sturgeon do inhabit brackish water.

**LIFE HISTORY AND ECOLOGY:** Spawning extends from early May to late June, at an optimum water temperature between 13 and 18°C. Males migrate to the spawning grounds before the females, as early as ice-out. Spawning sites are sandy or rocky areas of rivers in swift water or rapids at 0.6 to 5 m depth. Spawning has been reported in wave action over rocky ledges and off rocky islands. Females in spawning condition may produce up to 885,000 eggs (extrapolation based on body weight indicates a maximum of 3 million) although not all eggs are shed at one time. Spawning probably occurs over a few days. Eggs are adhesive and are laid indiscriminately, adhering to bottom debris. There is no nest construction or parental care. Ripe eggs are black, 2.7–3.5 mm in diameter, and hatch in 5–8 days at 15.6–17.8°C. The larvae are 8 mm total length and have a large yolk sac that is utilized for 9 to 18 days. Feeding begins at about 16 days at which time the young resemble the adults. Early growth is rapid; the young may reach 123 mm total length during September of their first year. Sexual maturity is attained at an average of 18 years. Females spawn at intervals of 4 to 6 years and males at intervals of 2 to 3 years.

Using cross sections of pectoral rays for age determination, lake sturgeon in the Lake Winnebago region of Wisconsin reached 13 kg in 20 years and 35 kg in 40 years. Females can live 25 years longer than males, and the greatest age is reached in slower-growing, northern populations. The oldest lake sturgeon from the Lake Winnebago region was 82 years old. A 94 kg specimen from Lake of the Woods was 154 years old. Larger sturgeon have been reported—106 kg from Lake of the Woods, Ontario in 1965; 141 kg, apparently the largest on record, from Batchewana Bay, Lake Superior in 1922. The lake sturgeon is a bottom feeder, consuming crayfish, clams, snails, invertebrates, insect larvae, and some plants. Only a small proportion of its diet is fish eggs. Mussels, clams, and snails are important foods in Ohio Rivers. Tenedipedid larvae are important in Lake Winnebago and mayflies and aquatic sow bugs in small lakes. Feeding ceases during the spawning period.

**SPECIALIZED OR UNIQUE CHARACTERISTICS:** The slow growth rate and lengthy maturation period of lake sturgeon are important in view of management practices. Spawning intervals of more than 2 years create conditions that require special regulations.

**BASIS OF STATUS CLASSIFICATION:** The lake sturgeon catch in Lake Erie was 5 million pounds in 1885, but had declined to one million pounds in 1895. A similar decline occurred in Lake of the Woods, which at one time provided 20 percent of the total landings. In recent years, total landings have declined from 194,638 pounds (1961) to 85,723 pounds (1966). There is no recent record of lake sturgeon in Pennsylvania. It was listed as threatened by Deacon et al. (1979) over its range in North America.

**RECOMMENDATIONS:** Overfishing in the late 1880's combined with modification of spawning habitat by dams, pollution, and siltation have undoubtedly reduced the lake sturgeon population. Strict adherence to fishing regulations and continued improvement of aquatic habitats is needed to insure future successful spawning.

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**Extirpated****MUD SUNFISH***Acantharchus pomotis* (Baird)

Family Centrarchidae

Order Perciformes

**OTHER NAMES:** Bass sunfish.

**DESCRIPTION:** The mud sunfish is a stout fish, a maximum of 203 mm in length, with an oblong body that is more similar to the basses than other sunfish. The caudal fin is rounded. There are five gill rakers in the upper limb and two in the lower limb. It is the only centrarchid with cycloid scales. The color is olive green with three to six lateral bands of gold, green, and bronze. These bands are particularly noticeable during spawning. Lateral line scales number 43. Fins: D. XI–XII, 10–12. A. IV–VI, 9–12.

**RANGE:** The mud sunfish occurs from southeastern New York to northern Florida along the Atlantic Coastal Plain. Pennsylvania records are Delaware River in Bucks County (Fowler, 1938).

**HABITAT:** This fish is found in tidal and non-tidal lowland streams (most often freshwater) in sluggish, turbid water.

**LIFE HISTORY AND ECOLOGY:** Little is known of the habits of the mud sunfish. It appears to be nocturnal and remains hidden for most of the time in aquatic grasses and under banks that have submerged roots. Spawning occurs in May and June in Delaware and perhaps in late April. The male guards the nest, which is saucer-shaped and about 300 mm in diameter. The mud sunfish is reported to produce an audible grunting sound, either by grating the pharyngeal teeth or by vibrating muscles in the gas bladder. In light of its nocturnal habits, the grunting may

have a reproductive significance. Age and growth have had little study. In Maryland (from 13 specimens) it reached 25 mm total length at age I, 90 mm at age III, and 160 mm at age VII, the oldest fish found. The Maryland fish required 4 years to reach 70 g in weight and 7 years to reach 140 g. The Maryland population apparently grew faster than a comparable New York population after the third year.

**SPECIAL OR UNIQUE CHARACTERISTICS:**

The life history and habits are largely unknown because of the secretive and nocturnal behavior of the mud sunfish.

**BASIS OF STATUS CLASSIFICATION:** It is listed as endangered by Miller (1972) over its range although Wang and Kernehan (1979) do not agree with the designation for Delaware. The last known collection of mud sunfish in Pennsylvania was in 1938.

**RECOMMENDATIONS:** An intensive survey of the remaining areas of Bucks County, Pennsylvania, that afford suitable habitat should be undertaken to more closely define the status.

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**DESCRIPTION:** The walleye and blue pike are similar in all respects except for the following characteristics of blue pike given by Hubbs (1926): smaller in size (908 g); a slower rate of growth; and larger, more closely set eyes. The size of the eyes differentiates blue pike from walleye: in blue pike, the interorbital width is 1.4 or more times in eye length; in walleye, the interorbital width is 1.4 or less times in eye length. This characteristic is illustrated by Hubbs (1926) and Trautman (1957). The color of the blue pike is gray blue on the body without mottling (no trace of yellow) and whitish-blue on the pelvic fins.

**RANGE:** The blue pike was originally believed to be found only in Lake Erie (not in tributaries), but apparently is also present in Lake Ontario. Confusion occurs concerning the range because of the supposed intergradation between the walleye and blue pike. Each of these has also been reported to hybridize with sauger. The gray blue walleye of Lake Nipissing, Ontario, has been considered by some to be blue pike.

**HABITAT:** The blue pike originally occurred in the deep clear waters of lakes Erie and Ontario. There appears to be an annual movement into shallower water in fall and winter. The largest population in Lake Erie is in the eastern two-thirds of the lake.

**LIFE HISTORY AND ECOLOGY:** The blue pike is said to spawn in deeper water than the walleye but nothing else is known of the early life history. Blue pike reach 50.8–127 mm total length in October of their first year and adults are 229–406 mm in length. Maximum size and age is uncertain because of intergradation with walleye. The intergrades (gray-pike) have a maximum weight of 3,178 g. Young blue pike feed on cladocerans and invertebrates. Adults eat fish, particularly yellow perch and freshwater drum. Some adult populations are reported to feed solely on emerging insects during part of the year.

**SPECIALIZED OR UNIQUE CHARACTERISTICS:** Much discussion has occurred concerning the specific or subspecific status of the blue pike. In some geographical areas, its characteristics appear to be consistent, whereas in other areas there is a profusion of intergrades with the walleye. In addition, many color variations of the walleye, some resembling the blue pike, are abundant in the Ohio

Extirpated  
BLUE PIKE

*Stizostedion vitreum glaucum* Hubbs

Family Percidae  
Order Perciformes

**OTHER NAMES:** Blue walleye.

drainage where the blue pike historically is not found. Bluish-colored walleyes with no trace of yellow are found in Lake Erie. These specimens have been 3,632 g or more which is too large for blue pike.

**BASIS OF STATUS CLASSIFICATION:** Once abundant in Lake Erie and economically important since 1850, it has been rarely seen in the past thirty years.

**RECOMMENDATIONS:** A study of the meristic and morphometric characters combined with protein isolation would help determine the specific status.

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