

Paddlefish

Polyodon spathula



commercially prepared foods. These advances in culture technology, and the high demand for paddlefish as a source of caviar and smoked flesh, has increased interest in the private aquaculture community for the species.

Human Uses: Commercial paddlefish harvest has fluctuated since the late 1800's, varying with demand for eggs and smoked flesh. These factors have caused paddlefish fisheries to experience "boom and bust" cycles which include overexploitation followed by abandonment due to the unprofitability of fishing. Stocks are then left to recover - a process that sometimes takes decades. Such a recovery began in the middle part of the 20th century, but since the 1980's, demand for caviar has increased as has fishing pressure. Recent prices for unprocessed paddlefish eggs have fluctuated from \$30-90 per lb, with a potential value of \$250-700 per fish. This high value has led to illegal fishing which has seriously damaged paddlefish fisheries in several reservoirs in the Midwest and Southeastern states. Recent demand for paddlefish eggs as a caviar substitute has been spurred by the virtual collapse of eastern European sturgeon populations brought on by overfishing in the aftermath of the dissolution of the Soviet Union. Because endangered sturgeon species are at risk, international caviar production and marketing are now closely monitored by the U.S. Fish and Wildlife Service under the Convention on the International Trade of Endangered Species (CITES). DNA analyses have been used to differentiate between paddlefish and sturgeon eggs. In some cases paddlefish eggs have been found to be mixed with sturgeon eggs and sold as pure sturgeon caviar. In other instances paddlefish eggs have been directly marketed as pure caviar. In most cases, paddlefish eggs have been legally collected and exported from the U.S. only to return as a foreign caviar import. In addition to their commercial value, paddlefish are also an important sport fish in several Midwestern and Southeastern states. In these states paddlefish fisheries are managed by seasons and bag limits to ensure sustained harvests. However, in some states such as Wisconsin and Minnesota paddlefish are protected from all forms of harvest, and it is illegal to snag or possess a paddlefish.

What is being done to protect paddlefish? The key to survival of this ancient species is to better understand paddlefish biology and habitat requirements. In this interest, telemetry or "tracking" studies, using radio transmitters have been used to learn more about paddlefish movement and habitat use in selected areas. On a much larger scale, the Mississippi River Basin states, cooperating through a 28-state organization called the Mississippi Interstate Cooperative Resource Association (MICRA), are tagging paddlefish with miniature, stainless steel, coded wire tags to gather information on distribution, movement, condition, and exploitation. This large scale, unprecedented effort, rivaling salmon studies on the west coast, is the largest such study ever conducted on a nonanadromous freshwater fish species. Twenty-two of the basin states and several federal agencies and universities are cooperating. U.S. Fish and Wildlife Service biologists in Illinois and Missouri are managing the database for this important project. Such cooperation between management agencies and the public is essential to ensure survival of the paddlefish.

What can you do? Purchase appropriate state fishing licenses, as well as habitat and special program stamps for riverine management and protection when available from local, state and federal natural resource agencies. Become informed about pollution and river management issues by consulting with state and federal agencies, conservation groups and the media. Support regulations designed to prevent the illegal sale and trade in paddlefish roe as caviar. Inform appropriate decision makers of your support for issues related to the protection and management of rivers for the maintenance of healthy ecosystems and fish populations. If we all work together we can help to ensure that this ancient species can live along side of thriving economies and human populations!

For More Information Contact:

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Description: Paddlefish are characterized by a long paddle-like snout or rostrum extending to about one-third of their body length. Coloration of their scaleless, torpedo-shaped body is blue-grey to black along the back and dark grey to white on the underside. Paddlefish grow to over 5 ft. in length and commonly weigh more than 60 lbs. They can live beyond 30 yrs of age and have been known to reach weights of up to 198 lbs. Their skeletal system is composed primarily of cartilage and the jaws of adults have no teeth. Instead, comblike structures, called gill rakers (attached to the

gills) are used to filter zooplankton (microscopic animals), their primary food, from the water as they swim along with their mouths open.

Biology: In the Midwest, females usually do not reach sexual maturity until at least 10 yrs of age at weights of 28-30 lbs. Males mature at about 8 yrs of age and weights of 15-20 lbs. In the south, female paddlefish can reach maturity in 7-8 yrs of age and 18-20 lbs in



weight, while males reach this stage at about 5-6 yrs of age and 11-15 lbs in weight. Paddlefish generally grow faster in reservoirs than in rivers, presumably because of the increased abundance and availability of food. In the right setting they can easily gain 5-6 lbs of weight per year. Precise timing of water temperature, photoperiod and flow are necessary for successful reproduction. Paddlefish spawn over gravel substrates in the flowing waters of large rivers. Photoperiod and water temperature (50-61°F) control the timing of spawning, but an increase in water flow is the triggering mechanism necessary to stimulate spawning. When conditions are right both males and females gather in flowing waters over spawning beds. Eggs and sperm are released at this time and fertilized eggs settle to the bottom, where they adhere to the gravel. Fast moving water over the gravel bed provides oxygen and prevents silt from suffocating the developing embryos. Upon hatching (about 7 days)



“Larval Paddlefish”

paddlefish larvae begin an up and down swimming motion allowing the current to carry them downstream into deeper pools where they develop further and begin feeding. At hatching, paddlefish do not have a long rostrum. This develops over time, and is thought to be used as a hydrofoil-type mechanism for maintaining position in the current. The rostrum is also a highly developed sensory organ used for locating food and avoiding underwater objects as they swim along. Paddlefish feed in large open water areas of rivers and

lakes and can travel over long distances. Recent studies have documented paddlefish movements over hundreds of miles, between major tributaries (Mississippi, Ohio, Missouri, Tennessee and Red rivers), and to, from and between the coastal rivers of Texas and the Gulf of Mexico.

Historic and Present Range: Under the relatively natural, unaltered conditions, existing prior to the early 1900’s, paddlefish commonly inhabited and moved freely within the large, free-flowing rivers, braided channels, backwaters, and oxbow lakes of the entire Mississippi River Drainage Basin, the adjacent Gulf of



Historic Range and Distribution of Paddlefish.

Mexico drainages, and some areas in the Great Lakes (see map). Those areas provided ideal habitat for spawning and feeding. Extensive dam building in the mid 1900’s significantly reduced the extent of these movements, but adult paddlefish tagged and released in recent years in Oklahoma waters of the Arkansas River have been recaptured as far away as Tennessee in the Tennessee River. However today, significant declines in major paddlefish stocks have occurred over their entire natural range. A relict population has also been lost from the Great Lakes.

Reasons for Decline: One of the primary reasons for the decline in paddlefish populations is the loss of spawning and rearing habitat due to environmental alteration. Dam construction has eliminated spawning sites, interrupted natural spawning migrations, altered water flow, and eliminated backwaters that were important as nursery and feeding areas. Industrial contaminants, illegal fishing, and overexploitation by

commercial and recreational anglers have also contributed to the decline. Unfortunately, population problems are not always immediately recognized because paddlefish are long-lived and highly mobile, and their presence is sometimes construed as an indication that the species has not been



Dams (hydropower, flood control and navigation) located throughout the Mississippi River Basin block upstream paddlefish movements.

adversely affected. However, in the Upper Mississippi River, paddlefish are largely isolated into small, localized subpopulations (primarily from pools 4 to 13) by the system of navigation dams which occur upstream from St. Louis, Missouri. The future survival of paddlefish will require effective management that entails an improved awareness of how environmental factors affect them, and a better understanding of their life history and basic biological requirements.

Artificial Propagation: Techniques for artificial spawning and culture of paddlefish were developed in the late 1960’s in Missouri as part of a mitigation agreement with the U.S. Army, Corps of Engineers for construction of Truman Dam on the Osage River. These methods have been modified and improved during recent years, and paddlefish fingerlings are now reared both intensively (in raceways and in circular tanks) and extensively (in ponds); and techniques have been developed to train paddlefish to accept