the Sturgeon's

anatomy
life cycle
threats
significance

it's our responsibility to save the sturgeon

Maritime Aboriginal Peoples Council

Maritime Aboriginal Aquatic Resources Secretariate

ISBN: 978-0-9865052-3-2

To the few of the many involved with this project:
Austin Paul - illustration,
Kristen LaBillois & Marissa Bolger, youth researchers
Shelly Woods - writer & researcher
Nibby Graphics - design, art & production
Dr. Rod Bradford, Dr. M Dadswell, Dr Eric Taylor, Dr. John Post - sharing knowledge, noting areas still under study, & suggesting approaches
Roger Hunka, Barry LaBillios and the MAARS team - editing
Liette Pineo and the Department of Fisheries & Oceans Canada.

Wela'lioq - Thank you all

To order Posters contact MAPC, MAARS

172 Truro Heights Road,Truro Heights, Nova Scotia B6L 1X1
Telephone: 902 895-2982 - Fax: 902 895-3844 - maars@mapcorg.ca

Introduction

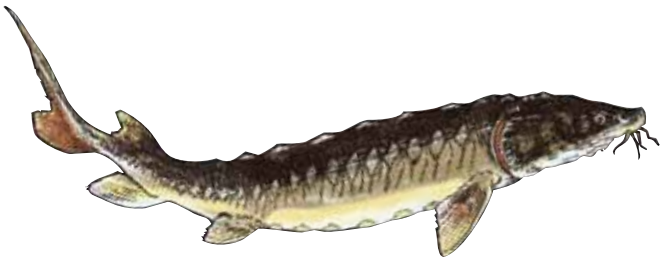
The sturgeon with a two hundred million year history, has a very unique and highly evolved anatomy of which we know very little.

Aboriginal Peoples traditional knowledge of thousands of years, including the current scientific studies on sturgeon, is but a small peek into the life and history of the North American Sturgeon inland and around coasts.

This little sturgeon booklet is produced to accompany the set of four posters which highlight certain facts about the Atlantic Sturgeon and the Shortnose Sturgeon.

Humanity has to adopt a new approach and respect for Earth's bio-diversity and how we use it. We all need to protect and keep the land, air, and water environment healthy.

There is a lot of information published about sturgeon species, the project team selected only a few facts summarized from many documents.



the Sturgeon's anatomy

Kumkatamuj

Sturgeon have small eyes and poor eyesight.

The Sturgeon's snout supports electrosensory organs

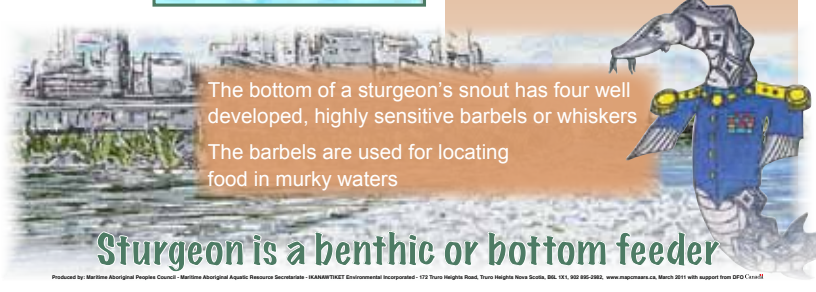
Sturgeon have no teeth and its mouth is under its head

The long, pointy snout of the Atlantic Sturgeon distinguishes it from the Shortnose Sturgeon

The dorsal and anal fins are used to stabilize the fish

The caudal or tail fin is like a boat propeller

- The Sturgeon has a lineage of 200 million years and is a rare and primitive fish with limited habitat ranges
- The Shortnose Sturgeon (*acipenser brevirostrum*) and the Atlantic Sturgeon (*acipenser oxyrinchus*) are two of eight species
- Mature Maritime Atlantic Sturgeon males on average are approximately 5 feet and weigh 90 pounds; females are on average much larger and weigh between 160 - 600 pounds
- Sturgeon have an arched back with five rows of prehistoric armour plates or "scutes" along the length of their bodies



The bottom of a sturgeon's snout has four well developed, highly sensitive barbels or whiskers

The barbels are used for locating food in murky waters

Sturgeon is a benthic or bottom feeder

Produced by: Maritime Aboriginal Peoples Council - Maritime Aboriginal Aquatic Resource Secretariat - IKANAWTIKET Environmental Incorporated - 172 Truro Heights Road, Truro Heights Nova Scotia, B6L 1X1, 902 895-2982, www.mapcnaars.ca, March 2011 with support from DFO Canada

Anatomy

The sturgeon is one of the most primitive species of fish in existence today. Both the Shortnose Sturgeon (*Acipenser brevirostrum*) and the Atlantic Sturgeon (*Acipenser oxyrinchus*) are an extremely unique fish with an ancestral record dating back over 200 million years. It could be said the modern day sturgeon is virtually a living fossil. They have retained many primitive characteristics, suggesting what sturgeon may have looked like prehistorically and which characteristics are important for survival.

Mature male Atlantic Sturgeon are approximately 5 feet in length and weigh on average 90 pounds. While mature female Atlantic Sturgeon are approximately 6 feet and 160 pounds. The largest known specimen of Atlantic Sturgeon was a 4.27-meter (14 feet) long female caught in the Saint John River in New Brunswick, They typically grow to be six to eight feet. One Atlantic Sturgeon weighed over 600 pounds.

Shortnose Sturgeon can be distinguished from the Atlantic Sturgeon by their smaller maximum adult size, and are often mistaken for juvenile Atlantic Sturgeon.

The colour of a sturgeon varies from olive-brown to blue-black on the upper sides, gradually shading to white on the underside.

Sturgeon have an arched back with five rows of bony plates or "*scutes*" along the length of their bodies. Scutes have little hooked spurs that protect young sturgeon from predators by making them hard-to-swallow and unappealing. A variety of predators prey upon sturgeon eggs and young ones, but humans are the main predator for large, adult sturgeon.

Sturgeon are mostly cartilaginous; therefore, typical scales are absent. Instead it is covered by bony scales that are coated with enamel, making a strong and complete armour.

The Shortnose Sturgeon have 19 to 22 fin rays on the bottom-back fins and top fins while Atlantic Sturgeon have 25 to 30 fin rays on the bottom-back fins and 38 to 46 fin rays on the top fins.

The dorsal and anal fins are used to stabilize the sturgeon. Pectoral and pelvic fin

are on the sides of the body, and are used for turning, backing up, stopping and also balancing. The caudal or tail fin is like a boat propeller; it pushes them through the water by moving back and forth. Sturgeon have shark like tails and a large pectoral fin which is armed with a thick spine. This spine has growth rings which can be counted to determine age.

Sturgeon have small eyes and a head which slopes down to an elongated snout supporting electrosensory organs. Their ability to detect electromagnetic fields enable them to detect a living organism. The long, pointy snout of the Atlantic Sturgeon distinguishes it from the Shortnose Sturgeon.

Although sturgeon have poor eyesight, the bottom of their snout has four well developed, highly sensitive barbels or whiskers that are covered with taste-buds. The barbels are used for locating food in murky waters.

Because the sturgeon is a benthic, or a bottom feeder, the mouth is located on the underside of their head. The Shortnose Sturgeon can be distinguished from the Atlantic Sturgeon by having a much broader mouth. Sturgeon have no teeth in their vacuum-like mouth. Only very young sturgeon have teeth, these are lost very early in development. Having no teeth they are unable to seize prey, though larger specimens like a flounder, can be swallowed whole.

With their projecting wedge shaped snout sturgeon stir up the soft bottom, feeding largely on aquatic insects, amphipods, isopods, shrimps, mollusks, and ground fish, which are crushed and pulverized in their muscular stomachs for digestion.

Life Cycle

The Atlantic Sturgeon range is along the Atlantic Coastal regions of North America between Florida and the Strait of Belle Isle on the southern Labrador Coast.

Young and spawning Atlantic Sturgeon are suspected to use 20 to 40 river systems along the Atlantic Coast.

The Canadian population of the Shortnose Sturgeon's only home is in the Saint John River system, while the Atlantic Sturgeon can be found as far north as the coastal waters of Labrador. The Shortnose Sturgeon is the most northern population of its kind and it is also genetically distinct.

Evidence suggests that Shortnose Sturgeon and Atlantic Sturgeon compete for food and habitat, when both are scarce.

Sturgeon are slow growing, late maturing, long lived and spawn intermittently.

Both species of sturgeon are benthic, or bottom feeders and typically feed on benthic invertebrates (e.g. worms, amphipods, isopods, shrimp and mollusks). Juveniles have been observed with stomach contents with as much as 90% non-food items leading to a belief that they randomly vacuum the bottom.

Both species are social, exhibiting schooling behaviour.

A variety of habitats are essential for the different life stages of the sturgeon.

Juvenile and adult Atlantic Sturgeon spend the majority of their life in marine waters, living and feeding on the bottom of the ocean floor. The Canadian Shortnose Sturgeon spends its adult life in the Bay of Fundy.

Sturgeon require fresh, cool, fast moving water over boulders and gravel bottom to spawn. During late winter and early summer mature sturgeon migrate up stream into freshwater rivers. Little is known about spawning, but fertilization occurs externally and the eggs are very adhesive and stick to rocks and plants.

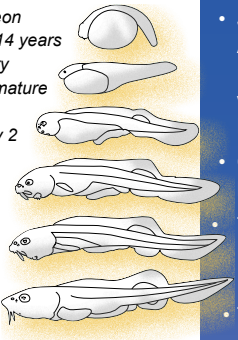
Spawning sturgeon have been observed leaping and splashing. The sturgeon is known for its occasional breaching, when it jumps completely out of the water with such a forceful motion that it can be hazardous to anything unlucky enough to be

the Sturgeon's life cycle

Kumkatamuj

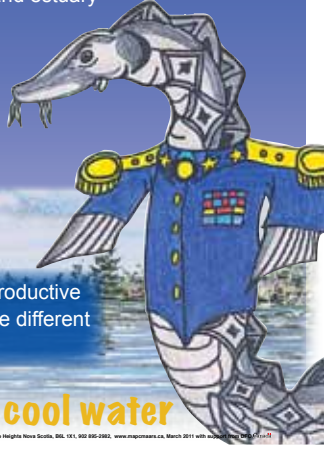
Male Shortnose Sturgeon mature at around 11 - 14 years of age and spawn every second year, females mature later at around 13 - 18 years and spawn every 2 to 6 years

Female Atlantic Sturgeon mature between 20 - 28 years of age and may lay up to 8 million eggs intermittently every 2 - 6 years



- Juvenile and adult Maritime Atlantic Sturgeon spend a majority of their life in marine waters, living and feeding on the bottom of the ocean floor
- On average Atlantic Sturgeon live up to 60 years or more
- The Shortnose Sturgeon is the most northern population of its kind and is genetically distinct
- The Shortnose Sturgeon breeds and lives within the limited range of the Saint John River system and estuary

Young Atlantic Sturgeon range from Labrador to Florida in about 20 - 40 river systems along the Atlantic Coast



Maintaining a healthy, clean, productive water habitat is essential for the different life stages of the sturgeon

Sturgeon need clean, cool water

Produced by: Maritime Aboriginal Peoples Council - Maritime Aboriginal Aquatic Resource Secretariat - IKANAWTIKET Environmental Incorporated - 172 Truro Heights Road, Truro Heights Nova Scotia, B6L 1X1, 902 895-2982, www.mapcnsare.ca, March 2011 with support from Tourism N

struck. There have been accounts of people actually being killed when struck by a breaching sturgeon. It is unknown why sturgeon breach, although it has been suggested that they may be attempting to rid themselves of parasites.

The sturgeon does not feed during the spawning migration, but to regain energy before returning to sea may feed in the freshwater for a short time.

After laying their eggs, females will travel back downstream. Males may remain upstream after spawning until forced to return downstream by the increasingly cold water.

In late spring, baby sturgeon hatch and develop into juveniles far up the river systems. Young Sturgeon under six years of age move up-river when water temperatures rise in the summer and down-river as the river gets cold in the fall. They may be 3 to 5 feet long at this stage. In areas where both Atlantic Sturgeon and Shortnose Sturgeon are present, adult Shortnose Sturgeon have been confused to be immature Atlantic Sturgeon.

Male Shortnose Sturgeon reach maturity at approximately 11 to 14 years of age and spawn every second year. Females mature later at approximately 13 to 18 years of age and spawn intermittently every 2 to 6 years, laying millions of eggs.

Atlantic Sturgeon become sexually mature anywhere between 20 and 28 years, depending on sex and water temperature. The female sturgeon has a very high rate of fecundity and may lay up to 8 million eggs in one year, approximately every two to six years. Male Atlantic Sturgeon spawn between 2 to 6 years.

Atlantic Sturgeon can live up to one hundred years however that is rare in these times. Because of their exceptional life span, sturgeon are a valuable subject for research. The oil rich flesh and eggs of the sturgeon accumulate contaminates such as PCBs and heavy metals. This information can be used as an indicator of environmental change.

Aquaculture and market for sturgeon meat and roe have fuelled efforts to better understand the sturgeon's life cycle and growth.

Threats

Although once abundant, the Atlantic and Shortnose Sturgeon have suffered a drastic population crash, beginning in the mid to late 1800s. The early colonist found sturgeon to be a profitable resource.

By the late 1800s, millions of pounds of sturgeon meat and caviar were caught and exported yearly.

During the 1800s, many coastal area economies thrived on the commercial sturgeon fishery. Sturgeon was processed and shipped by rail and water in great quantities until the sturgeon fishery declined in the early 1900s.

Prior to 1973, commercial fishing records did not differentiate between the Atlantic and Shortnose Sturgeon - both were reported as "common sturgeon", but it is believed based on size that the bulk of the catch was Atlantic Sturgeon.

Unfortunately commercial overexploitation and environmental degradation have caused almost all species of sturgeon to be classified as endangered or threatened. Atlantic Sturgeon are now a threatened species. In 1980 Shortnose Sturgeon were listed as a species of Special Concern in Canada by COSEWIC (Committee on the Status of Endangered Wildlife in Canada).

Atlantic Sturgeon has been listed as Endangered by the Endangered Species Act in the United States since March 1967.

Today, both Atlantic Sturgeon and Shortnose Sturgeon are threatened by poor water quality, injuries from boat propellors, loss of spawning habitat, polluted waters, and death as “by-catch” in the nets of commercial fisheries targeting other species.

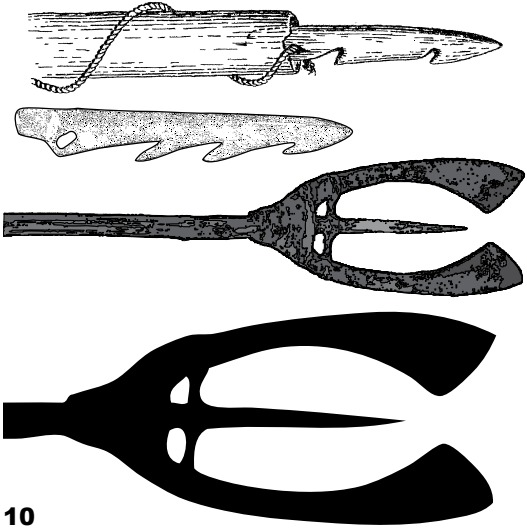
Management of the species is based largely on restrictions to fishing sturgeon. This helps to limit fishing mortality of sturgeon as a by-catch.

While the early fishery removed millions of adult fish, habitat alteration and degradation is destroying traditional spawning grounds. Spawning grounds in many rivers have become inaccessible due to the construction of dams for electrical power generation, flood control, and navigation. Dams limit the movement of sturgeon. Discharge and run-off from pulp and paper mills, agriculture, and sewage

all decrease the amount of oxygen in the water which cause sturgeon to crowd into areas where oxygen is still plentiful thus increasing competition between sturgeon and other fish for limited food and space.

Further habitat problems related to industrialization are increasing sediment and pollution levels on the spawning grounds rendering them unacceptable and unproductive. Since sturgeon are long-lived, bottom dwelling fish and consume prey living in the sediment, they are vulnerable to contaminants in both sediments and prey. Because of the nature of the life cycle and habitat of the sturgeon, populations that have declined due to human impacts are slow to recover.

The majority of threats are old practices where we did not think about a clean environment or the reality that waters, lands and air are used by fish, animals, plants, insects, and birds besides humans. If we want to help the sturgeon to live for another million years we need to adopt practices to have a clean environment where all life forms are respected. That is our challenge today, a plan to rebuild healthy sturgeon populations through healthy and clean water environments.



Significance

There is clear evidence indicating that the Aboriginal Peoples in North America had sturgeon fisheries well before European contact. Barbed harpoons made of bone were produced by the Mi'kmaq as far back as 5000 years ago to fish for large salmon, sea bass and sturgeon.

Among the Aboriginal Nations of Aboriginal Peoples along the Atlantic coast, the Mi'kmaq of the north east coast of North America were dependent on resources from their surrounding environment for subsistence. Fish were abundant. Fish harvest played a crucial role in the day-to-day life of the Mi'kmaq. Atlantic and Shortnose Sturgeon was traditionally a vital resource for many Aboriginal Peoples living along the Atlantic coast, providing meat, oil, roe and leather.

The Mi'kmaq practiced a seasonal round of harvesting which brought them to the estuaries and shore coast in the spring and summer. They returned to inland areas during the fall and winter.

The Mi'kmaq arrived to the coast in the early spring, when the ice was melting and fish were plentiful in rivers, streams, and inshore waters. This allowed them to have access to plentiful stocks of many aquatic species, including the Atlantic Sturgeon and Shortnose Sturgeon. The populations of sturgeon were so abundant that there are accounts of practically being able to walk over the fish in some rivers.

Aboriginal fish harvesting methods included the use of lassos, clubs, weirs and spears and harpoons. A variety of methods were employed. They set loosely woven baskets in rivers and streams to act as nets and also built underwater fences or dams to corral fish. They fished with bone hooks as well as with spears and harpoons in order catch sturgeon, and other large species of fish.

The harpoon was a favourite tool, particularly for harvesting very large salmon and sturgeon. A successful and popular method of fishing, known as "saksegwa" was practiced in the evening with torches. The success of this method relied on the sturgeon's natural curiosity, as they would be drawn to the surface by the firelight. As the harpooner sees the sturgeon, he spears it and the line is then attached to the bow of the canoe and the sturgeon is brought to shore.

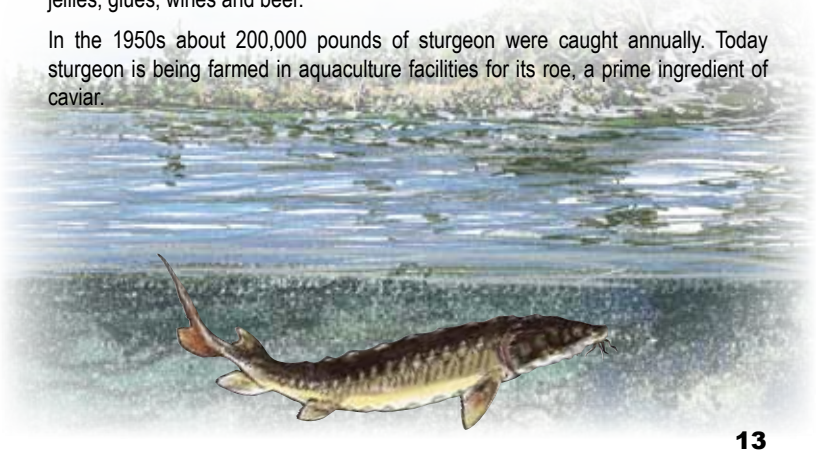
Aboriginal Peoples living along the Atlantic coast were the first to come in contact with the Europeans. After European colonization, the Aboriginal Peoples fisheries were eventually taken over by the colonists. By the early 1800s both the Shortnose Sturgeon and Atlantic Sturgeon were considered to be a valuable commodity.

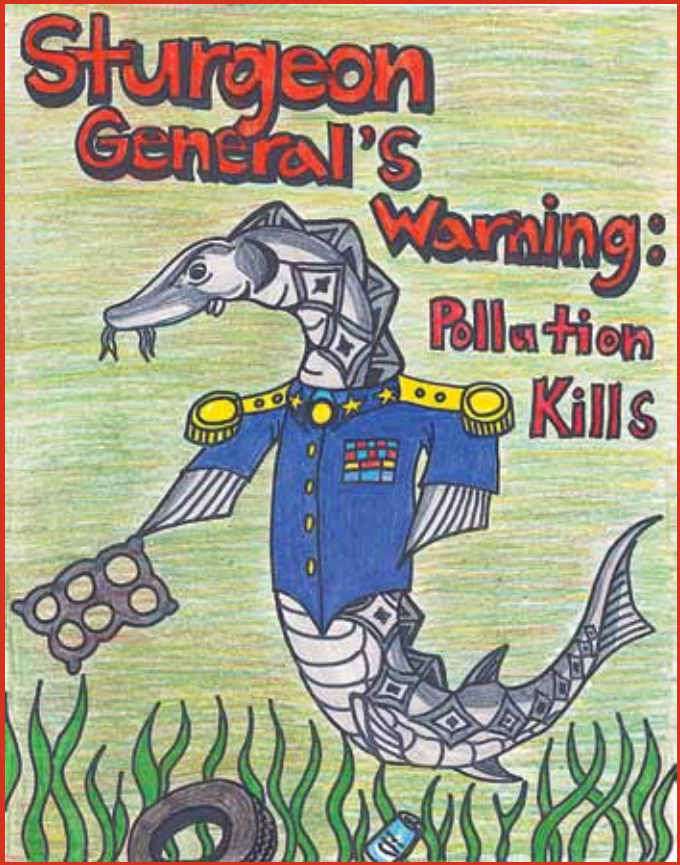
The resulting commercial fishery established is often referred to as the “black gold rush”, termed after the popularity of the black caviar (roe) extracted from the female sturgeon for export to Europe.

Initially, sturgeon were considered a nuisance. Its rough skin would often rip nets, keeping fishermen from catching more profitable fish. However, when products derived from the sturgeon were found, the popularity of fishing for sturgeon quickly rose. News of the abundance of sturgeon along the east coast quickly spread like news of the ‘gold rush’.

Sturgeon were one of the first species of fish harvested in the beginnings of the North American commercial fishery. The colonies found sturgeon to be a profitable resource, second in profit only to salmon. Fisheries along the Atlantic coast caught them for use as food, a leather material used in clothing and bookbinding, and isinglass, a gelatinous substance obtained from the air bladder used in clarifying jellies, glues, wines and beer.

In the 1950s about 200,000 pounds of sturgeon were caught annually. Today sturgeon is being farmed in aquaculture facilities for its roe, a prime ingredient of caviar.





EVERYDAY THINK CLEAN ENVIRONMENT.
MAKE THE RIGHT CHOICES FOR HEALTHY HOMES
FOR ALL FISH, PLANTS, ANIMALS, INSECTS AND BIRDS.