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Atlantic and Shortnose sturgeons

Acipenser oxyrinchus (Atlantic)

Acipenser brevirostrum (Shortnose)

by

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Distribution, Biology and Management

The Atlantic sturgeon, *Acipenser oxyrinchus*, and the shortnose sturgeon, *Acipenser brevirostrum*, are demersal, anadromous species distributed along the Atlantic coast of North America (Figure 42.1). Both species occur between Florida and New Brunswick, but the distribution of the Atlantic sturgeon extends further north to Labrador. Both species migrate from the marine environment to freshwater to spawn during late winter-early summer, with these migrations occurring later in the year at higher latitudes. In water where the species co-occur, the shortnose sturgeon tends to begin its migration earlier than the Atlantic sturgeon. Spawning generally occurs in the lower sections of rivers, below the fall line. Eggs are deposited on hard surfaces on the bottom where they adhere for 4 to 6 days until hatching. Juvenile sturgeon remain in freshwater for their first summer before migrating to estuaries in winter. Juveniles remain in the freshwater-estuary system for 3 to 5 years before migrating to the near-shore marine environment as adults. Migration into the marine environment has only recently been documented for the shortnose sturgeon. Tagging studies indicate that Atlantic sturgeon migrate extensively in the marine environment; fish tagged in the Hudson and Delaware Rivers have been recaptured as far north as coastal Maine and south to North Carolina. Sturgeons from southern systems have more restricted marine migrations, remaining closer to their natal rivers.

Sturgeons are considered to be among the most primitive bony fishes, with origins dating back 120 million years. Sturgeons are characterized by 5 rows of bony plates or scutes along the back rather than scales and have prominent barbells under their snout used as sensory organs. Juveniles and adults of both species are benthic (or bottom) feeders, consuming a variety of crustaceans, bivalves, worms, plants and occasionally small fish. Shortnose are smaller than Atlantic sturgeon and may attain maximum sizes of

approximately 100 cm (40 in.) and 23 kg (50 lbs) whereas Atlantic sturgeon reach maximum sizes of 430 cm (170 in) and 363 kg (800 lbs). Both species are long lived potentially reaching ages in excess of 60 years for females and about 30 for males. Maturity occurs in female shortnose sturgeon between the age of 7 and 15, with maturity at younger ages at the southern end of the distributional range. Atlantic sturgeon exhibit a similar latitudinal pattern in female age at maturity with southern fish maturing between age 7 to 19 compared to sturgeon in the St. Lawrence River, Canada reaching maturity in 27 to 29 years. Both species are highly fecund, with total egg production increasing proportional to body size with individual fish spawning once every 3 to 5 years.

Management of both species is conducted under the auspices of the Atlantic States Marine Fisheries Commission (ASMFC). An Interstate Fishery Management Plan (FMP) was implemented in 1990 which implemented strict state regulations on sturgeon fisheries. The Plan was amended in 1998 in response to a marked decline in sturgeon population abundance. Fishing is now prohibited in all participating states' waters, and a moratorium has been in effect in the EEZ since 1999 under provisions of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA). The goal of the FMP is to restore sturgeon spawning biomass to provide for a sustainable fishery. Management now requires at least 20 protected year classes of females to be present in any river stock of sturgeon before considering allowing a fishery on that stock. The FMP also emphasizes research programs to evaluate stock status of Atlantic sturgeon.

The National Marine Fisheries Service and U.S. Fish and Wildlife Service received a petition to list Atlantic sturgeon as endangered, which was reviewed in 1998. The endangered status was denied but the species remained as a 'species of concern'. The status of Atlantic sturgeon is currently being re-evaluated. During the 20th century, shortnose sturgeon declined throughout its historic range and in 1967 it was listed as endangered and has since remained in this status.

The Fishery

Atlantic and shortnose sturgeon fisheries began with native American Indians prior to the arrival of European settlers into North America. Colonists records indicate exports of sturgeons to Europe as early as 1628. A substantial Atlantic sturgeon fishery existed into the late 1800s, with landings as high as 3500 mt. However, overfishing, habitat degradation and reduced demand contributed to population decline so that only incidental landings occurred during 1900 to 1950. Landings increased during the 1950s to 1980s, particularly in the Carolinas and ranged between 45 mt and 115 mt per year (Figure 42.2). Increased landings in the early 1990s were due to increased catches in ocean fisheries off New York and New Jersey (Table 42.1). As part of the FMP implemented by the Atlantic States Marine Fisheries Commission, a moratorium was established in 1998 which prohibited the harvest of wild Atlantic sturgeon. Shortnose sturgeon were rarely the target of commercial fisheries and were taken primarily as incidental bycatch in other fisheries. Possession of shortnose sturgeon is prohibited due to its endangered species status.

Research Vessel Survey Indices

Atlantic sturgeon are taken only incidentally in the NMFS bottom trawl surveys. No shortnose have been taken in the survey. The information from these surveys is therefore inadequate to determine any population trends. State surveys that capture both juvenile and adult Atlantic sturgeon are conducted in rivers, estuaries and coastal waters throughout the range and are used to determine stock status. In addition, tag release/recovery programs are underway in the Delaware River and the Chesapeake Bay and tributaries. Shortnose sturgeon are also sampled by state agencies between Maine and Florida.

Assessment Results

Each river system in which Atlantic and shortnose sturgeon occur is considered to contain a unique stock despite the mixing of individuals in coastal waters. A review of Atlantic sturgeon stock status in 1998 by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service concluded that although the abundance of sturgeon had declined significantly, adequate spawning stock still remained for the persistence of the population and for juvenile production. Habitat improvements and fisheries conservation were recommended to improve the likelihood of full population recovery.

Shortnose sturgeon were listed in 1967 as an endangered species but in some systems abundance may be increasing to levels that would allow reconsideration of their endangered status. The shortnose population in the Saint John River, New Brunswick Canada is among the largest in North America, and the Hudson and Delaware Rivers also support significant numbers of shortnose sturgeon.

Biological Reference Points

The Atlantic sturgeon recovery plan requires is that at least 20 protected year classes of female fish must be present in a river system stock before a fishery can be allowed. Upon recovery, the target fishing mortality of Atlantic sturgeon in the Hudson River will be 0.03, the rate that maintains eggs per recruit (EPR) at 50% of the EPR as $F=0.0$.

The long term objective of the shortnose sturgeon recovery plan is to restore populations to levels that will maintain genetic diversity and avoid extinction. The short term goal is to rebuild populations throughout the range and remove the species from the Endangered Species list.

Summary

Stock abundance of Atlantic and shortnose sturgeons steadily declined throughout the 20th century as a result of overfishing and habitat destruction. Fisheries for Atlantic sturgeon existed until 1997 when a moratorium was declared from Maine to Florida. Shortnose sturgeon was declared an endangered in 1967 under authority of the Endangered Species Act of 1966. Research into the biology, habitat requirements and

stock status of both of sturgeons continues, with the goal of restoring both species to sustainable levels of abundance.

Table 42.1 Recreational and commercial landings for the Atlantic sturgen (thousand metric tons).

Category	1986-95 Average	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
U. S. Recreational	-	-	-	-	-	-	-	-	-	-	-
Commercial											
United States	54	3	<1	<1	0	0	0	0	0	0	0
Canada	168	61	66	47	47	42	51	51	46	0	0
Other	-	-	-	-	-	-	-	-	-	-	-
Total Nominal Catch	222	64	66	47	47	42	51	51	46	0	0

For further information

ASMFC. 1998. Atlantic sturgeon stock assessment: peer review report. March, 1998. Washington, D. C.

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Dadswell, M.J., B.D. Taubert, T.S. Squiers, D. Marchette, and J. Buckley. 1984. Synopsis of biological data on shortnose sturgeon, *Acipenser brevirostrum* LeSueur 1818. NOAA Tech. Rep. NMFS-14, FAO Fisheries synopsis No. 140, 45 p.

Gilbert, C.R. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Mid-Atlantic Bight) Atlantic and shortnose sturgeons. *U.S. Fish. Wildl. Serv., Biol. Rept.* 82(11.122); *U.S. Army Corps of Engineers* TR EL-82-4.

NMFS. 1998. Final Recovery Plan for the shortnose sturgeon *Acipenser brevirostrum*; Prepared by the Shortnose Sturgeon Recovery Team. December 1998. Washington, D.C.

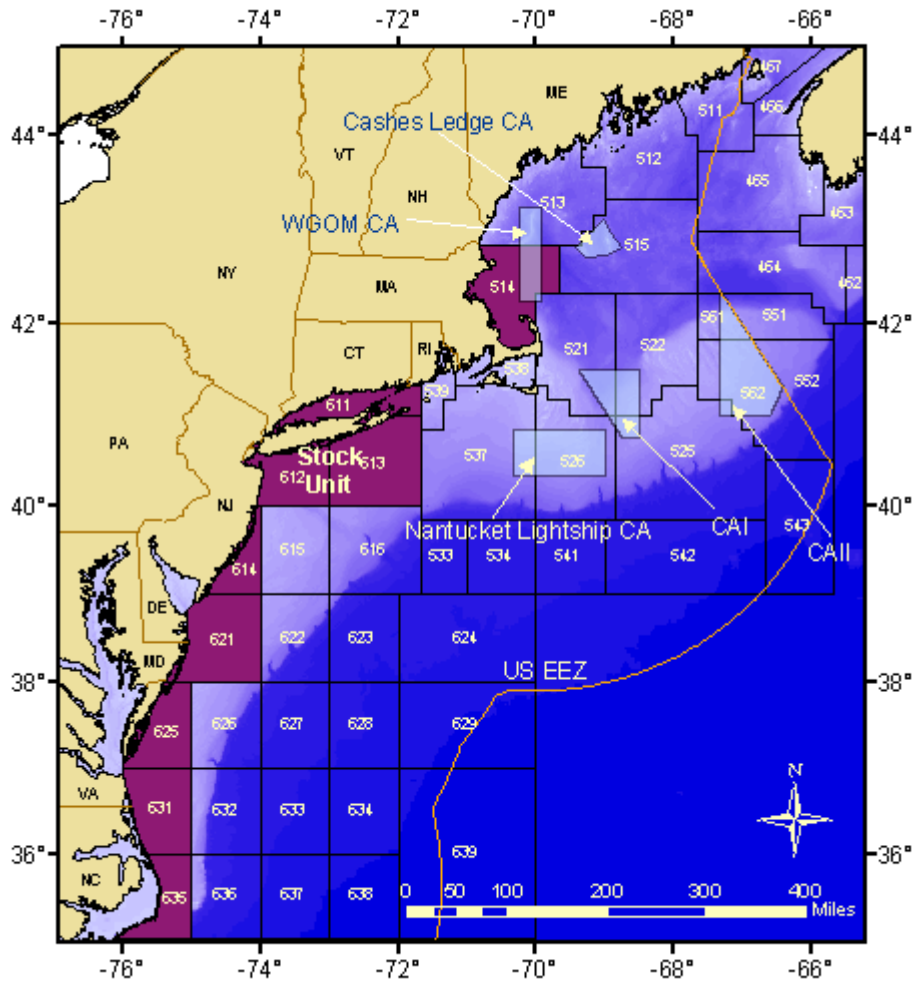


Figure 42.1. Statistical areas used to define the Atlantic sturgeon stock.

Atlantic Sturgeon Total Commercial Landings

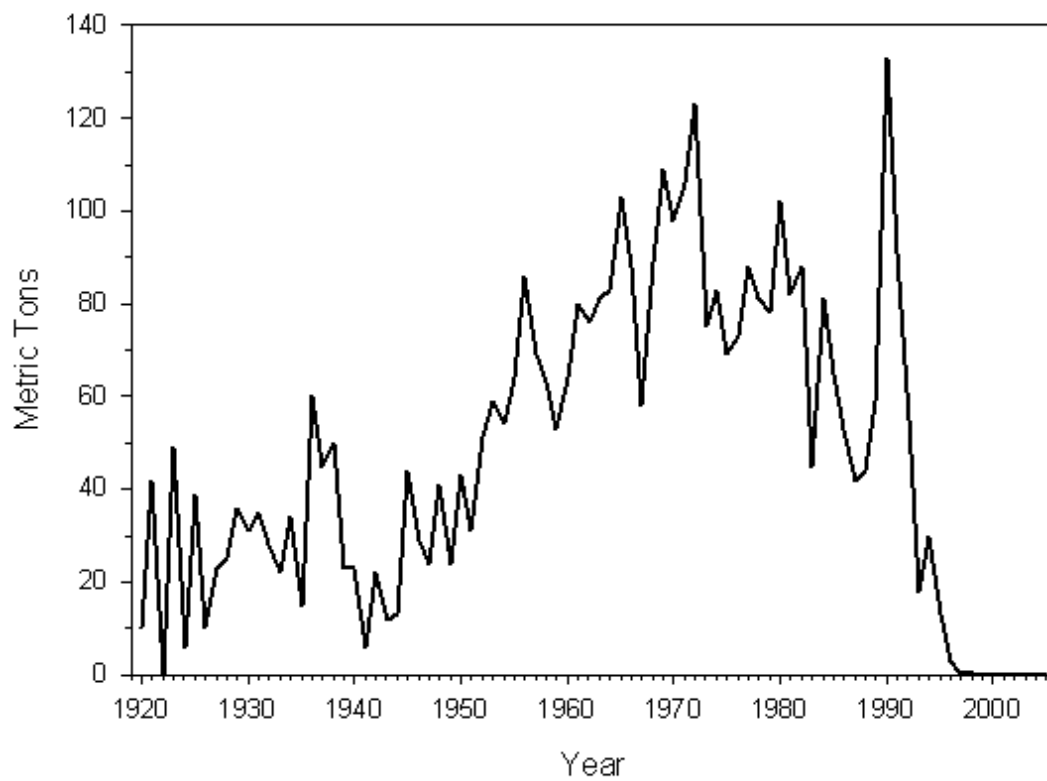


Figure 42.2. Total U.S. commercial landings (mt) of Atlantic sturgeon.