

## Species Status Assessment

<b>Class:</b>	Actinopterygii
<b>Family:</b>	Acipenseridae
<b>Scientific Name:</b>	<i>Acipenser oxyrinchus</i>
<b>Common Name:</b>	Atlantic Sturgeon

### Species synopsis:

The Atlantic sturgeon, *Acipenser oxyrinchus*, is in the family Acipenseridae which includes 26 species worldwide. Atlantic sturgeon is an anadromous fish that can be found along the entire Atlantic Coast from Labrador, Canada to St. Johns River, Florida. The Atlantic sturgeon is the largest sturgeon found in New York and is found year round within the Hudson River Estuary, Long Island Sound, and the waters of the south shore Long Island. The Hudson River is a vital spawning habitat and nursery for the Atlantic sturgeon. In the United States, the Atlantic sturgeon is currently present in 32 rivers, and spawning occurs in at least 14 of these rivers (Atlantic Sturgeon Status Review Team 1998, NMFS 1998).

This prehistoric fish was once plentiful in the Hudson until the late 1800s through the early 1900s when overfishing depleted the population dramatically. Pollution, sedimentation, and blockage of access to spawning areas by dams also played a role in the population decrease as well as inhibiting population recovery (Gilbert 1989, Burkhead and Jenkins 1991, Marine and Coastal Species Information System 1996). In 1997 the New York State Department of Environmental Conservation passed a statewide moratorium and the Atlantic States Marine Fisheries Commission passed a coast wide moratorium on fishing and possession of Atlantic sturgeon.

**I. Status**

**a. Current and Legal Protected Status**

- i. Federal Endangered Candidate?
- ii. New York Endangered; SGCN

**b. Natural Heritage Program Rank**

- i. Global G3
- ii. New York S1 Tracked by NYNHP? Yes

**Other Rank:**

ICUN Redlist of Threatened Species

**Status Discussion:**

In 1997 the Atlantic States Marine Fishery Commission instituted a coast wide moratorium on the harvest of Atlantic sturgeon in effect until there are at least 20 protected year classes in each spawning stock which could take 40 years. In addition in February of 2012 was listed under the Endangered Species Act by the National Marine Fishery Service. The Hudson River population is one of two populations that are presumed to be the healthiest in the United States (Atlantic Sturgeon Status Review Team 2007) but this stock is at its lowest level in the past 120 years (NYSDEC 2005).

**II. Abundance and Distribution Trends**

**a. North America**

**i. Abundance**

X declining \_\_\_ increasing \_\_\_ stable \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining \_\_\_ increasing X stable \_\_\_ unknown

Time frame considered: Last 50 years

**b. Regional**

**i. Abundance**

  X   declining \_\_\_ increasing \_\_\_ stable \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining \_\_\_ increasing   X   stable \_\_\_ unknown

Regional Unit Considered:           Northeast          

Time Frame Considered:           Last 50 years          

**c. Adjacent States and Provinces**

**CONNECTICUT**                      Not Present \_\_\_                      No data \_\_\_

**i. Abundance**

  X   declining \_\_\_ increasing \_\_\_ stable \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining \_\_\_ increasing   X   stable \_\_\_ unknown

Time frame considered:           Last 50 years          

Listing Status:           Threatened           SGCN?   Yes  

**MASSACHUSETTS**                      Not Present \_\_\_                      No data \_\_\_

**i. Abundance**

  X   declining \_\_\_ increasing \_\_\_ stable \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining \_\_\_ increasing   X   stable \_\_\_ unknown

Time frame considered:           Last 50 years          

Listing Status:           Endangered           SGCN?   Yes

**NEW JERSEY**                      Not Present \_\_\_\_\_                      No data \_\_\_\_\_

**i. Abundance**

  X   declining    \_\_\_ increasing                      \_\_\_ stable                      \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining    \_\_\_ increasing                        X   stable                      \_\_\_ unknown

Time frame considered: \_\_\_\_\_ Last 50 years \_\_\_\_\_

Listing Status: \_\_\_\_\_ Endangered \_\_\_\_\_    SGCN?   Yes  

**PENNSYLVANIA**                      Not Present \_\_\_\_\_                      No data \_\_\_\_\_

**i. Abundance**

  X   declining    \_\_\_ increasing                      \_\_\_ stable                      \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining    \_\_\_ increasing                        X   stable                      \_\_\_ unknown

Time frame considered: \_\_\_\_\_ Last 50 years \_\_\_\_\_

Listing Status: \_\_\_\_\_ Endangered \_\_\_\_\_    SGCN?   Yes  

**QUEBEC**                                      Not Present \_\_\_\_\_                      No data \_\_\_\_\_

**i. Abundance**

\_\_\_ declining    \_\_\_ increasing                        X   stable                      \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining    \_\_\_ increasing                        X   stable                      \_\_\_ unknown

Time frame considered: \_\_\_\_\_ Last 50 years \_\_\_\_\_

Listing Status: \_\_\_\_\_ S3/S4 \_\_\_\_\_

**VERMONT**                                      Not Present   X   \_\_\_\_\_                      No data \_\_\_\_\_

**ONTARIO**                                      Not Present   X   \_\_\_\_\_                      No data \_\_\_\_\_

**d. NEW YORK**

No data \_\_\_\_\_

**i. Abundance**

\_\_\_ declining \_\_\_ increasing  X  stable \_\_\_ unknown

**ii. Distribution:**

\_\_\_ declining \_\_\_ increasing  X  stable \_\_\_ unknown

Time frame considered: \_\_\_\_\_ Last 50 years \_\_\_\_\_

**Monitoring in New York.**

The NYS DEC in collaboration with Hudson River Estuary Program, USFWS, Pew Institute, Hudson River Foundation, and National Fish and Wildlife Foundation sample in the late spring/ early summer each year to capture respawning adult Atlantic sturgeon migrating up the Hudson River estuary. This study includes; tagging all unmarked fish, and attaching satellite tags or pop-off archival tags (PAT) to the fish to learn more about their seasonal ocean movement. With this study they are also able to track the fish to spawning grounds in the estuary. In addition to the adult spawning stock study, the NY DEC Hudson River Fisheries Unit has a juvenile Atlantic sturgeon monitoring program each spring in Haverstraw Bay. The juvenile study uses gill nets to catch the young sturgeon and when they are caught they get equipped; internally with a passive integrated transmitter and externally with an external dart tag.

**Trends Discussion:**

From Atlantic Sturgeon Review Report: Presently, there are only two U.S. populations for which an abundance estimate is available; the Hudson (870 spawning adults/yr) and Altamaha (343 spawning adults/yr) (Schueller and Peterson 2006, Kahnle et al. in press,). The Hudson and Altamaha are presumed to be the healthiest populations within the U.S. Thus, other spawning populations within the U.S. are predicted to have less than 300 adults spawning per year. Atlantic sturgeons in the Hudson River have supported subsistence and commercial fishing since colonial times (Kahnle et al. 1998). No data on abundance of juveniles are available prior to the 1970s; however, catch depletion analysis estimated conservatively that 6,000-6,800 females contributed to the spawning stock during the late 1800s (Secor 2002, Kahnle et al. 2005). Two estimates of immature Atlantic sturgeon have been calculated for the Hudson River stock, one for the 1976 year class and one for the 1994 year class. Dovel and Berggren (1983) marked immature fish from 1976-1978. Estimates for the 1976 year class at age one ranged from 14,500-36,000 individuals (mean of 25,000). In October of 1994, the NY State Department of Environmental Conservation (NYSDEC) stocked 4,929 marked age-0 Atlantic sturgeon, provided by a USFWS hatchery, into the Hudson Estuary at Newburgh Bay. These fish were reared from Hudson River brood stock. In 1995, Cornell

University sampling crews collected 15 stocked and 14 wild age-1 Atlantic sturgeon (Peterson et al. 2000). A Petersen mark-recapture population estimate from these data suggests that there were 9,529 (95% CI = 1,916 - 10,473) age-0 Atlantic sturgeon in the estuary in 1994. Since 4,929 were stocked, 4,600 fish were of wild origin, assuming equal survival for both hatchery and wild fish and that stocking mortality for hatchery fish was zero. Estimates of spawning adults were also calculated by dividing the mean annual harvest from 1985 to 1995 by the exploitation rate ( $u$ ). The mean annual spawning stock size (spawning adults) was 870 (600 males and 270 females) (Kahnle et al. in press).

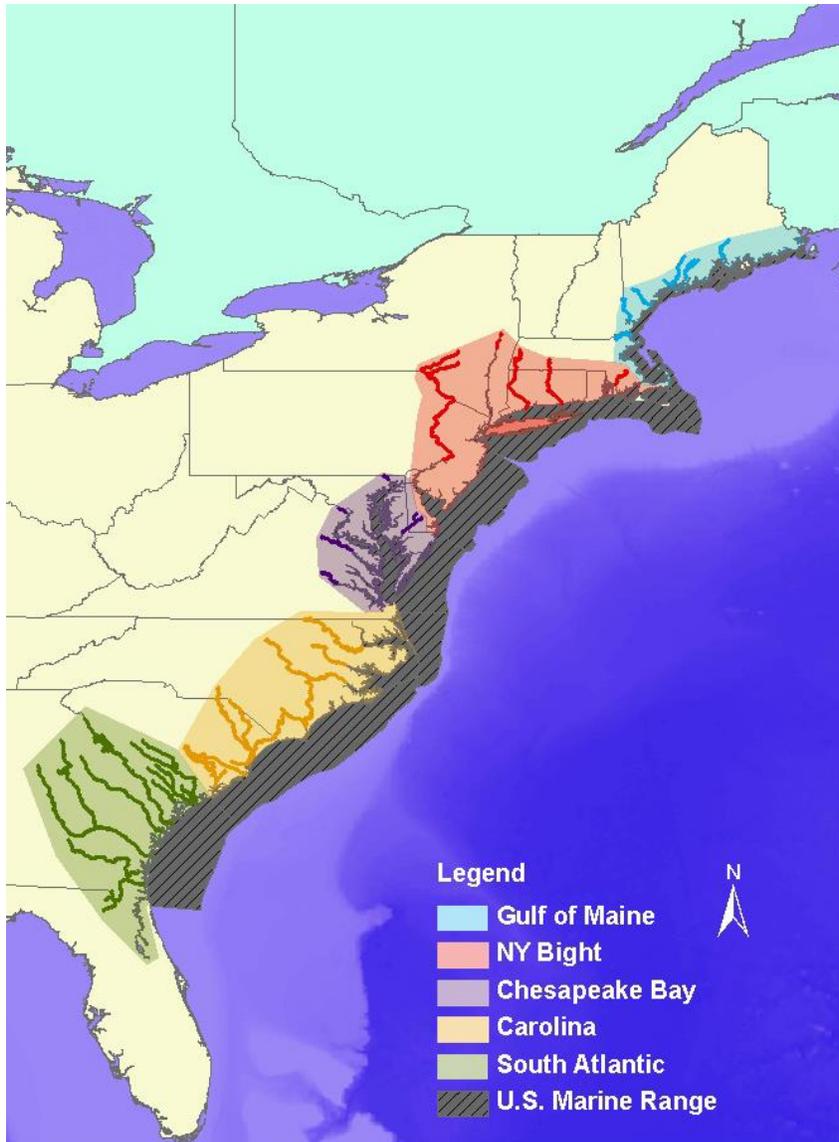


Figure 1: Distribution of Atlantic sturgeon in the United States. *Credit: NOAA*

**U.S. States and Canadian Provinces**

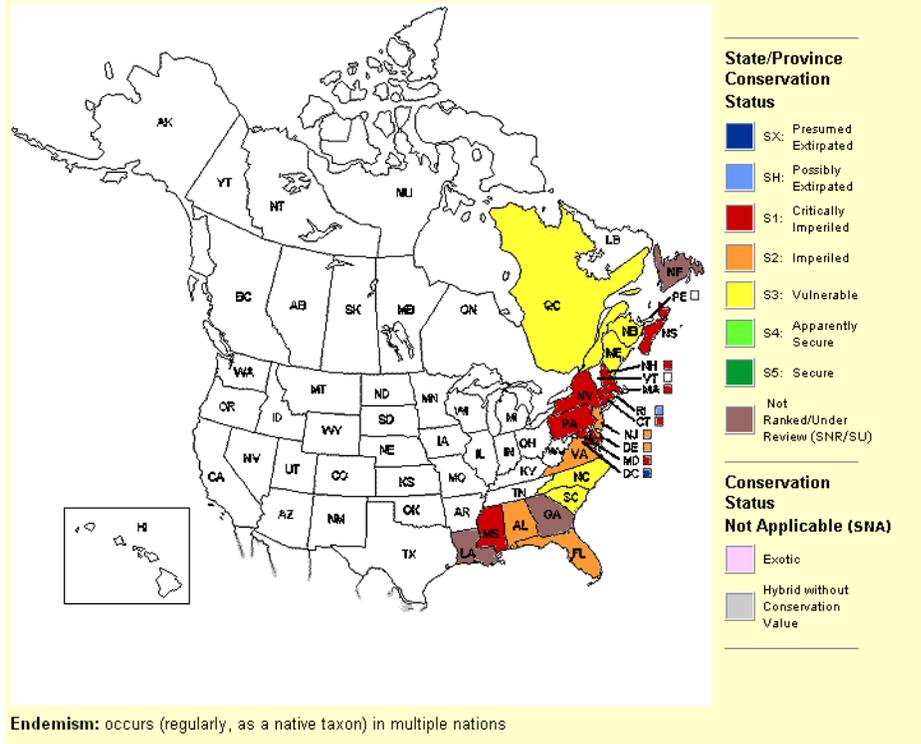
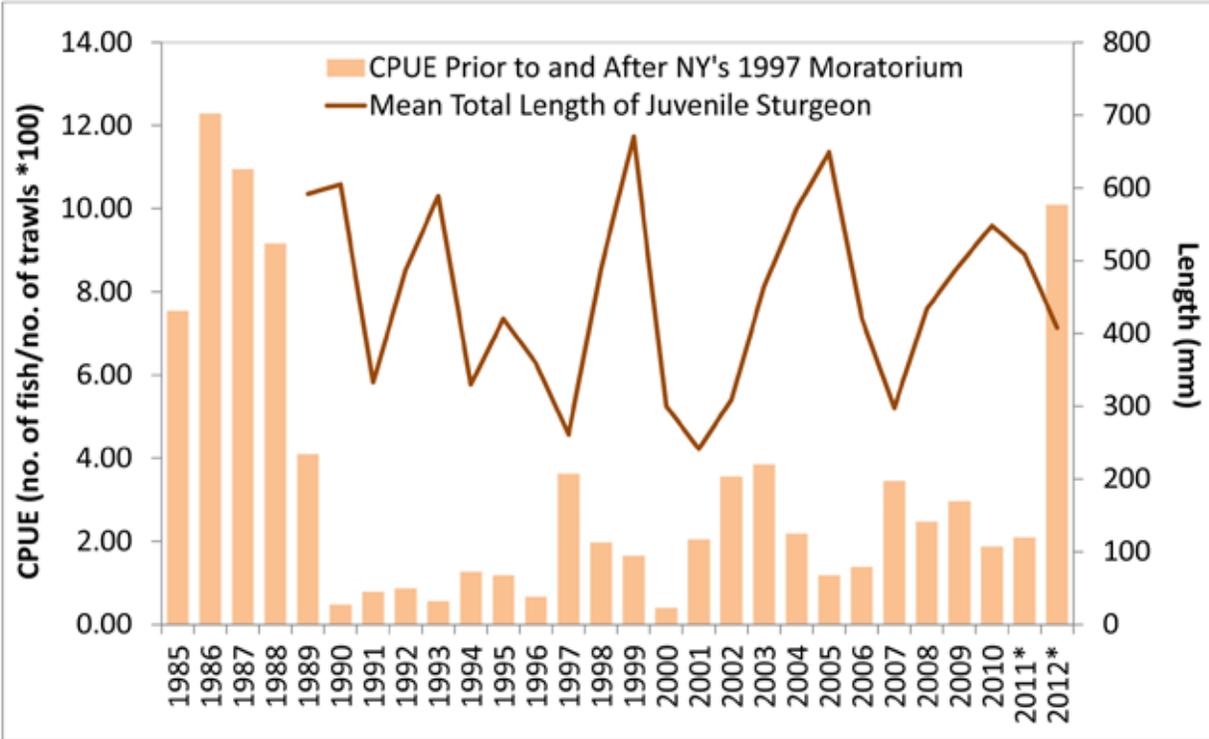


Figure 2: Conservation status of Atlantic sturgeon in North America (NatureServe 2012)



\*2011-2012 values are estimated

Figure 3: Catch Per Unit Effort (CPUE) of juvenile Atlantic Sturgeon in the Hudson River (Data source: NYSDEC survey data collected by Normandeau Associates, Inc., 2012).

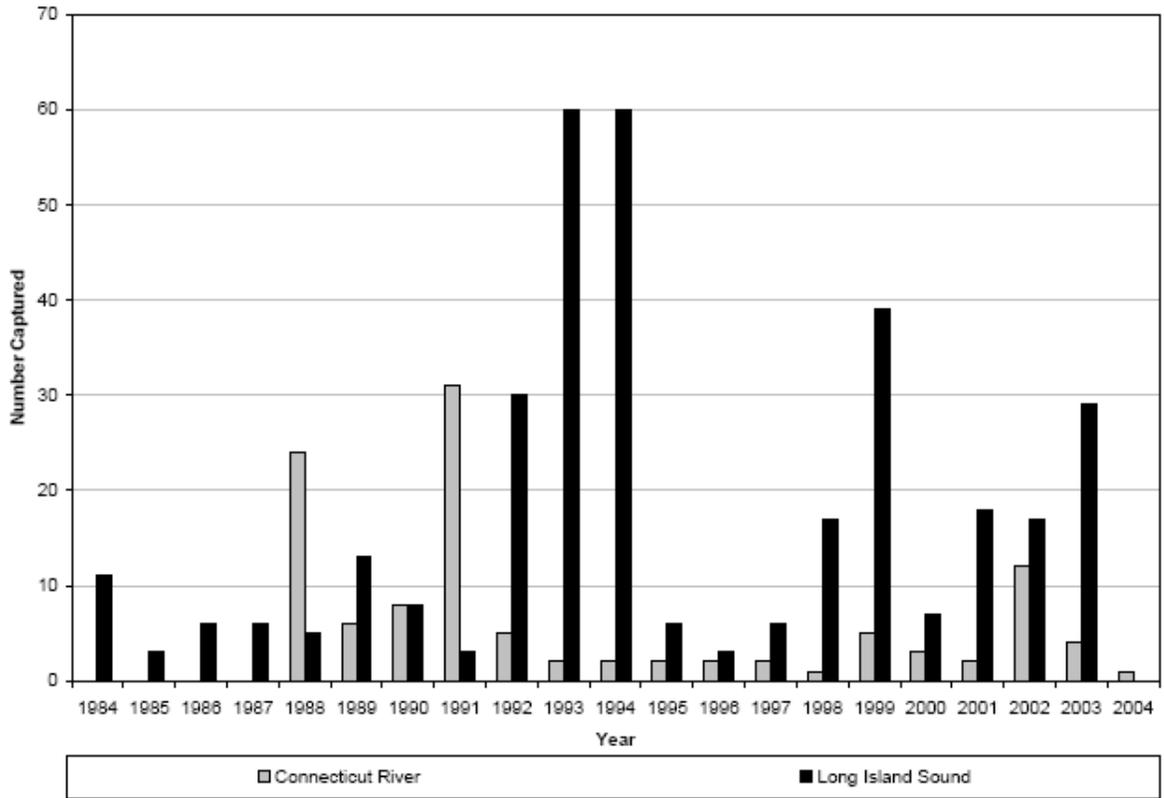


Figure 4: Atlantic sturgeon captures from the Long Island Sound Trawl and Connecticut DEP surveys. These sturgeon are believed to be of Hudson River origin. (Data source: CT DEEP).

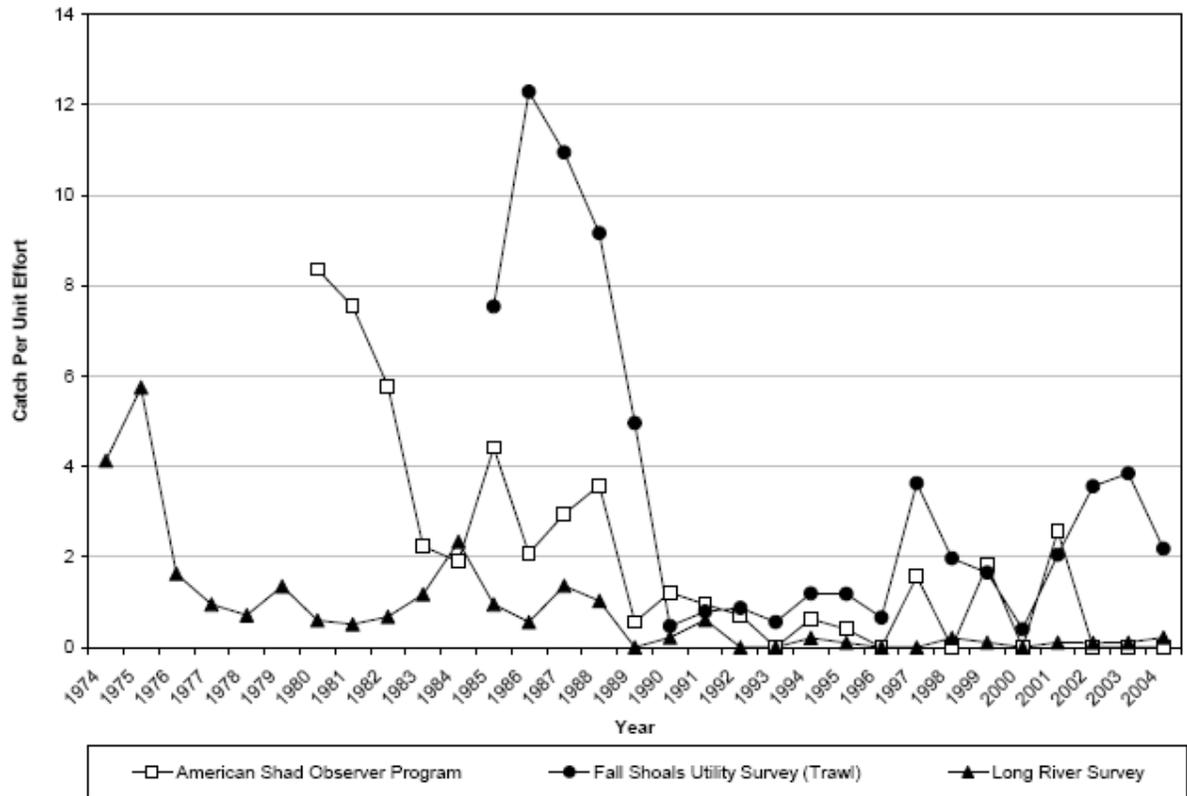


Figure 5: CPUE of Hudson River surveys that captured Atlantic sturgeon by year (1974-2004) and survey (Data source: NYSDEC).

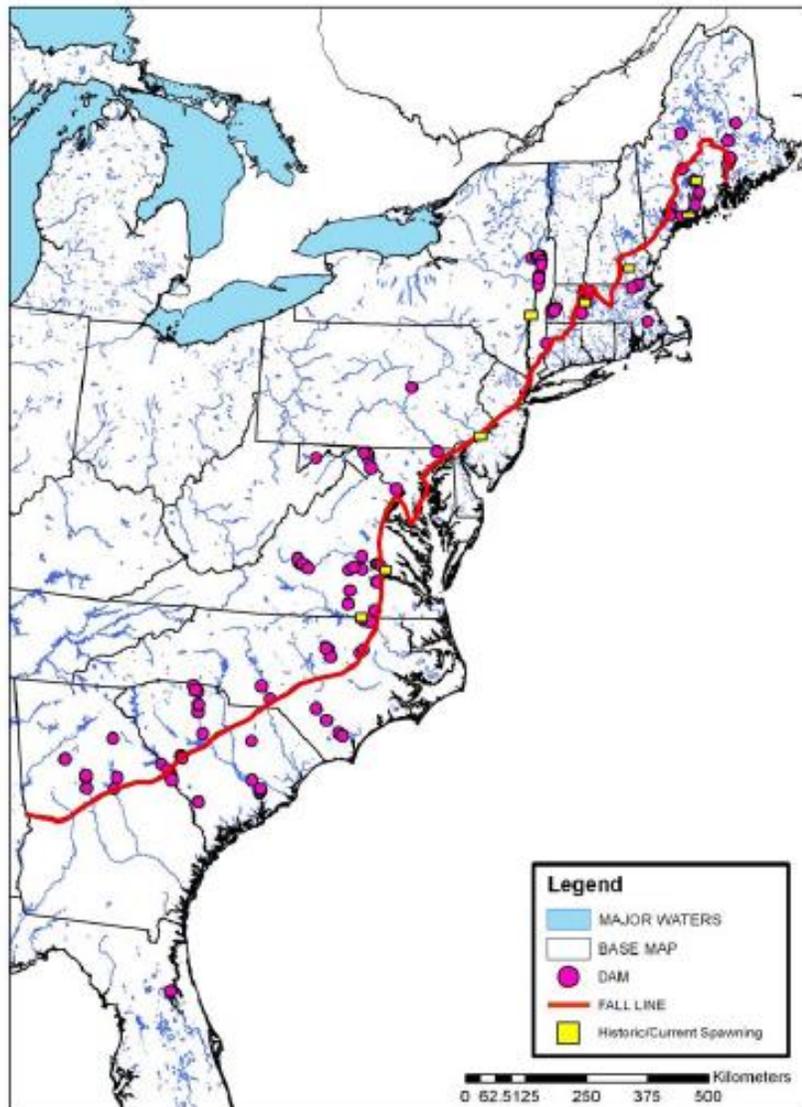


Figure 6: Historic and current spawning locations of Atlantic sturgeon, locations of dams in rivers that have historically supported a spawning population, and their relationship to the fall line. Dam locations were provided by the U.S. Army Corp of Engineers National Inventory of Dams data layer and may be incomplete. (NatureServe 2012).

**III. New York Rarity, if known:**

<b>Historic</b>	<b><u># of Animals</u></b>	<b><u># of Locations</u></b>	<b><u>% of State</u></b>
<b>prior to 1970</b>	_____	_____	_____
<b>prior to 1980</b>	_____	_____	_____
<b>prior to 1990</b>	_____	_____	_____

**Details of historic occurrence:**

Catch depletion analysis estimated conservatively that 6,000-6,800 females contributed to the Hudson River spawning stock during the late 1800s (Secor 2002, Kahnle et al. 2005).

<b>Current</b>	<b><u># of Animals</u></b>	<b><u># of Locations</u></b>	<b><u>% of State</u></b>
	<u>870</u>	_____	_____

**Details of current occurrence:**

Atlantic sturgeon occur in three watersheds. In the Hudson River there is estimated to be a spawning stock size of 870 (600 males and 270 females), which is 80% of the total population (Kahnle et al. in press).

**New York's Contribution to Species North American Range:**

<b>% of NA Range in New York</b>	<b>Classification of New York Range</b>
<u>   </u> 100 (endemic)	<u>  X  </u> Core
<u>   </u> 76-99	<u>   </u> Peripheral
<u>   </u> 51-75	<u>   </u> Disjunct
<u>   </u> 26-50	<b>Distance to core population:</b>
<u>  X  </u> 1-25	_____

**IV. Primary Habitat or Community Type:**

1. Marine, Shallow Subtidal
2. Marine, Deep Subtidal
3. Large/Great River, Low-Moderate Gradient, Assume Moderately Buffered, Warm
4. Estuarine Subtidal, Tidal River
5. Estuarine, Brackish Shallow Subtidal, Benthic Geomorphology, Tidal Creek

**Habitat or Community Type Trend in New York:**

Declining       Stable       Increasing       Unknown

Time frame of decline/increase: last 50 years

Habitat Specialist?                       Yes       No

Indicator Species?                       Yes       No

**Habitat Discussion:**

The Atlantic sturgeons are benthic bottom feeders that utilize both estuary and marine habitats. The Hudson River Estuary is important spawning and nursery habitat for young of year and juveniles up to 6 years old. Juveniles leave the estuary between 1-6 years old and head out into the ocean to spend the rest of their lives only returning to spawn.

From T-4 Grant Progress Report: Results indicate that NY is an important year-round habitat for Atlantic sturgeon and that sturgeon mainly utilizes shallow inshore waters of less than 15 meters. There is a strong seasonal component, with spring and fall having the highest catches of Atlantic sturgeon. Data from the random stratified surveys and the targeting trawling suggest that in particular the Rockaway area Queens County NY represents an area where sturgeon aggregate and may warrant protection as essential habitat.

**V. New York Species Demographics and Life History**

- Breeder in New York**
- Summer Resident**
- Winter Resident**
- Anadromous**
- Non-breeder in New York**
- Summer Resident**
- Winter Resident**
- Catadromous**
- Migratory only**
- Unknown**

**Species Demographics and Life History Discussion:**

Atlantic sturgeons are an anadromous fish. Most juveniles remain in the Hudson River between one to six years before moving out to the ocean until returning to the river as mature adults to spawn (Smith 1985). In the Hudson females become sexual mature at 15-30 years, while males reach maturity at younger ages and smaller sizes than females at 11-20 years in the Hudson River (Dovel 1979, Dovel and Berggren 1983, VanEennaam et al. 1996). VanEennaam et al. (1996) measured fecundity of Atlantic sturgeon in the Hudson River at between 400,000 and 2.6 million eggs. As females age they lay more eggs making older females very valuable to the spawning population. Spawning occurs in flowing water between the salt front and fall line of large rivers. Females spawn every 3-5 years while males spawn every 1-3 years. Males usually begin their spawning migration early and leave after the spawning season, while females make rapid spawning migrations upstream and quickly depart following spawning (Bain 1997). Atlantic sturgeon has been aged to 60 years (Mangin 1964); however, this should be taken as an approximation as the only age validation study conducted to date shows variations of  $\pm 5$  years (Stevenson and Secor 1999).

## VI. Threats:

The Atlantic sturgeon is caught as bycatch in many commercial fishing nets, particularly in shallow waters. In an effort to reduce by catch, regulations are placed on net sizes. The historic spawning range in rivers along entire east coast has been restricted by dams. Dams and pollution along the coast have eliminated spawning in some rivers on the coast reducing the distribution of the Atlantic sturgeon.

Atlantic sturgeon was classified as “extremely vulnerable” to predicted climate change in an assessment of vulnerability conducted by the New York Natural Heritage Program (Schlesinger et al. 2011).

### **Are there regulatory mechanisms that protect the species or its habitat in New York?**

No       Unknown

Yes

The Atlantic sturgeon is on the federal Endangered Species List. Fishing, possessing and harassing Atlantic sturgeon is against the law. No dredging is permitted in known spawning grounds in New York.

### **Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:**

Maintain the U.S. moratorium on harvesting, improve water quality in rivers, restrict habitat alteration, and prohibit dredging in nursery and spawning sites.

## VII. References

Atlantic Sturgeon Status Review Team. 1998. Status review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Report to National Marine Fisheries Service. 126 pp.

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Smith, T. I. J. and J. P. Clungston. 1997. Status and management of Atlantic sturgeon, *Acipenser oxyrinchus*, in North America. Environmental Biology of Fishes 48: 335-346.

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VanEennaam, J.P., S.I. Doroshov, G.P. Moberg, J.G. Watson, D.S. Moore and J. Linares. 1996. Reproductive Conditions of the Atlantic sturgeon (*Acipenser oxyrhynchus*) in the Hudson River. Estuaries 19: 769-777.

Date last revised:           **January 29, 2014**