Species Status Assessment

Class: Osteichthyes
Family: Acipenseridae
Scientific Name: *Acipenser brevirostrum*
Common Name: Shortnose Sturgeon

Species synopsis:

The shortnose sturgeon, the smallest of the five North American species of the genus Acipenser, occurs solely in the Northern hemisphere, inhabiting coastal rivers of eastern North America. Their northern distribution extends to the St. John River, New Brunswick, Canada and their southern distribution to the St. Johns River, Florida (Dadswell et al. 1984). The National Marine Fisheries Service recognizes 19 distinct population segments, each defined as a river/estuarine system in which shortnose sturgeons have been captured in the generation time of the species (30 years) (NMFS 1998). Shortnose sturgeon are considered amphidromous, typically spending their entire life history in their natal rivers, limiting use of marine waters (Bain et al. 1998). In New York, this sturgeon is only found in the Hudson River, where it moves seasonally from New York Harbor to the Troy Dam; only one extant and one historical spawning area are known (NYNHP 2011). Mature spawning adult shortnose sturgeon migrate upstream in the spring to spawn from the Troy Dam south to Coeymans; they migrate southward in the Hudson Riverto feed during the summer. The Hudson population is thought to have increased from the 1970s to the 2000s, while other stocks along the Atlantic Coast remain seriously depressed (Woodland and Secor 2007).

I. Status

a. Current and Legal Protected Status

i. Federal _____ Endangered _____ **Candidate?** ___No___

ii. New York _____ Endangered; SGCN _____

b. Natural Heritage Program Rank

i. Global _____ G3 _____

ii. New York _____ S1 _____ **Tracked by NYNHP?** ___Yes____

Other Rank:
NatureServe Status: G3
U.S. Endangered Species Act (USESA): LE: Listed endangered (11Mar1967)
Canadian Species at Risk Act (SARA) Schedule 1/Annexe 1 Status: SC (05Mar2009)
Committee on the Status of Endangered Wildlife in Canada (COSEWIC): Special Concern (05May2005)
Convention on International Trade in Endangered Species Protection Status (CITES): Appendix I
IUCN Red List Category: VU - Vulnerable
American Fisheries Society Status: Endangered (01Aug2008)

Status Discussion:
Shortnose sturgeons in the Hudson River are becoming more common since being placed on the Endangered Species List in 1967. The Hudson River population is currently considered stable at a high level and is in a stable habitat with an excellent estimated viability (Bain et al. 2008). The single occurrence in New York will continue to face some threats, and the New York Natural Heritage Program states that the S1 rank is still appropriate (NYNHP 2011). Woodland and Secor (2007) indicated that high recruitments from 1986 through 1992 are likely contributing to the increase in Hudson River shortnose sturgeon.

II. Abundance and Distribution Trends

a. North America

i. Abundance

____ declining _____ increasing __X__ stable ____unknown

ii. Distribution:

____ declining ____increasing __X__ stable ____unknown

Time frame considered: _____1967-2007_____

b. Regional

i. Abundance

____ declining ___increasing __X__ stable _____unknown

ii. Distribution:

____ declining ____increasing __X__ stable _____unknown

Regional Unit Considered: ____Northeast_____
Time Frame Considered: _____1970s-present_____

c. Adjacent States and Provinces

CONNECTICUT Not Present _____ No data _____

i. Abundance

____ declining ____ increasing __X__ stable ____unknown

ii. Distribution:

___ declining ____ increasing __X__ stable ____unknown

Time frame considered: __1976-2003_____
Listing Status: _____S1-critically imperiled_____ SGCN? ___Yes___

MASSACHUSETTS **Not Present _____** **No data _____**

i. Abundance

__X__ declining ____ increasing ____ stable ___unknown

ii. Distribution:

____ declining ____ increasing __X__ stable ____unknown

Time frame considered: ____1989-1990_____
Listing Status: _____S1- Endangered_____ SGCN? ___Yes__

NEW JERSEY **Not Present _____** **No data _____**

i. Abundance

____ declining ____ increasing __X__ stable ____unknown

ii. Distribution:

___ declining ____ increasing __X__ stable ____unknown

Time frame considered: ___1981-2004_____
Listing Status: _____S1- Endangered_____ SGCN? __Yes__

ONTARIO **Not Present ___X____** **No data _____**

PENNSYLVANIA **Not Present _____** **No data _____**

i. Abundance

____ declining ____increasing __X__ stable ____unknown

ii. Distribution:

____ declining ____increasing __X__ stable ____unknown

Time frame considered: ____1981-2004_____
Listing Status: _Endangered, S1-Immediate concern_____ SGCN? __Yes____

QUEBEC **Not Present ___X____** **No data _____**

VERMONT **Not Present ___X____** **No data _____**

d. NEW YORK **No data _____**

i. Abundance

____ declining __X__ increasing ____ stable _____ unknown

ii. Distribution:

____ declining ____ increasing __X__ stable _____ unknown

Time frame considered: _____1967-2007_____

Monitoring in New York.
Cornell University completed studies from 1993-1997 and the New York Natural Heritage Program(NYNHP) currently tracks shortnose sturgeon. Spawning shortnose sturgeon were last surveyed by Woodland and Secor (2007) in 2003-2004. NYSDEC conducts a juvenile Atlantic sturgeon abundance survey early each spring; shortnose sturgeon are regularly caught as incidental bycatch. NYSDEC initiated a sonic tracking survey of shortnose in 2012 and will continue to tag fish in 2013 (K. Hattala, personal communication).

Trends Discussion:

The Hudson River population was first estimated by a mark-and-recapture study performed in 1979 and 1980, with an adult spawning population estimated at 13,000 fish (Dovel et al. 1992). Assuming that females spawn once every three years, the total spawning population was estimated to be 30,311 (NMFS 2010). In 1998, Bain et al. (1998a) estimated that the spawning population consisted of about 38,000 adults. Bain et al. (2007) estimated the entire population to be at 61,057 shortnose sturgeon 1 year or older based on data collected from 1994 through 1997. This riverwide population abundance level is twice as high as the total population estimated in the 1970s. Bain et al. (2007) also suggested there were about 4,349 juveniles in the population during the study, about 4% of the population, but there was no evidence to suggest that this population dominated by adults is abnormal.

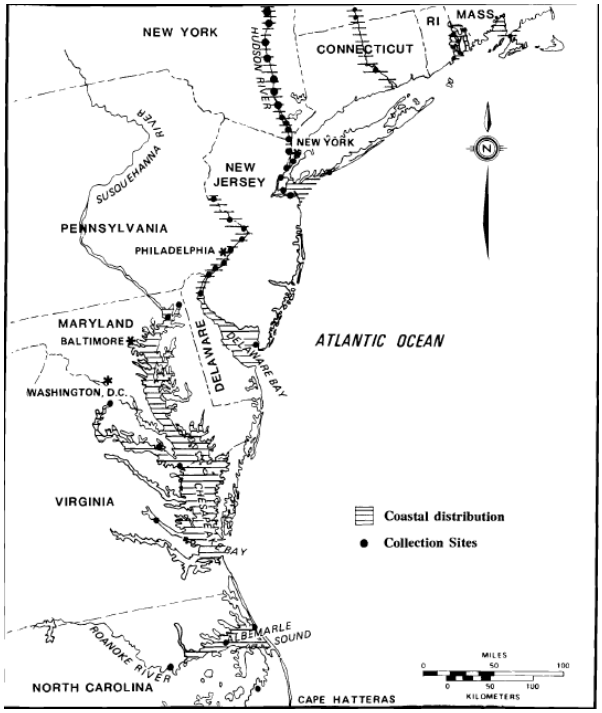

Figure 1. Coastal distribution of shortnose sturgeon in the Mid-Atlantic Bight (Gilbert 1989).

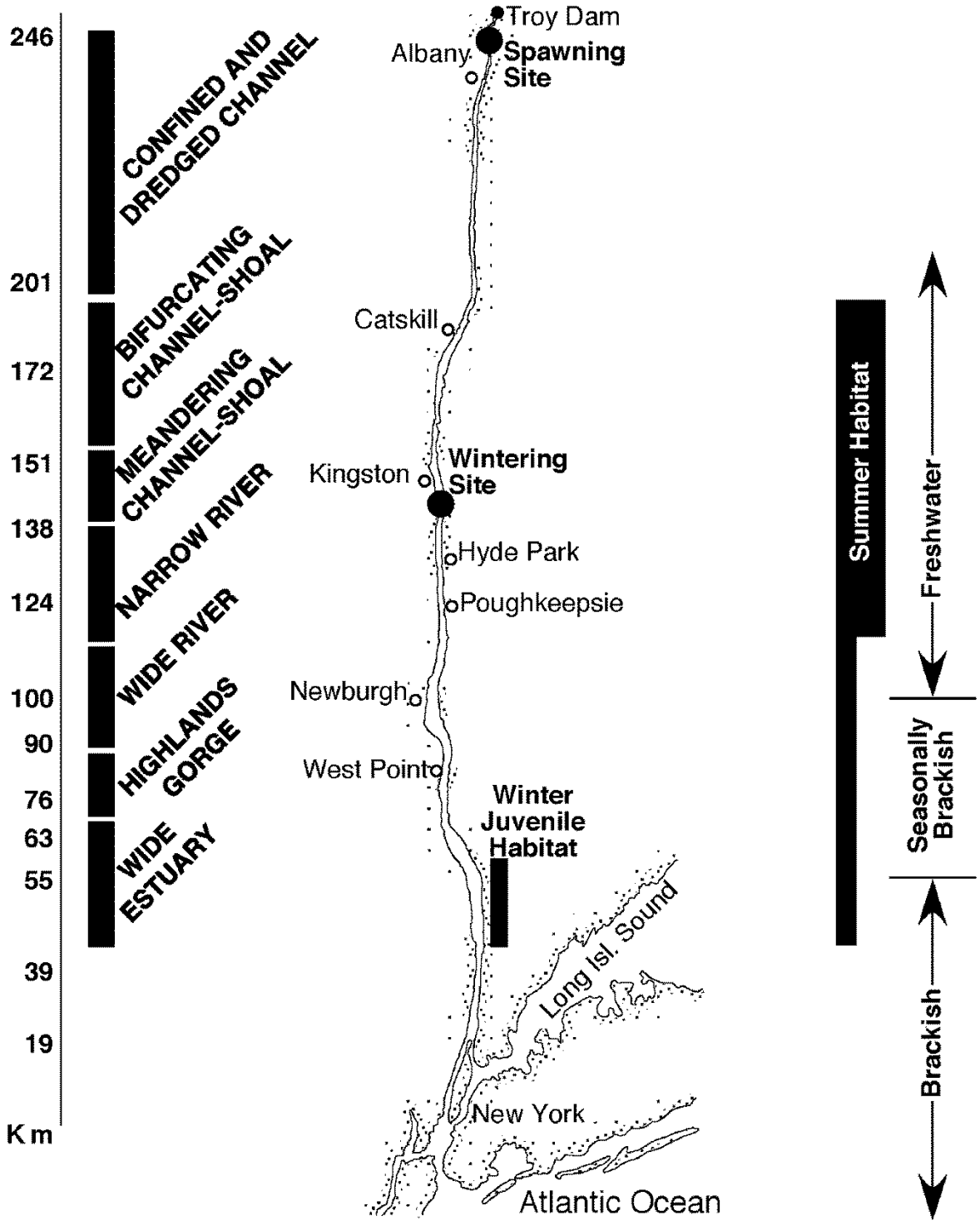

Figure 2. Map of the Hudson River estuary with key habitats and the salinity zones of the system (Bain et al. 2007).

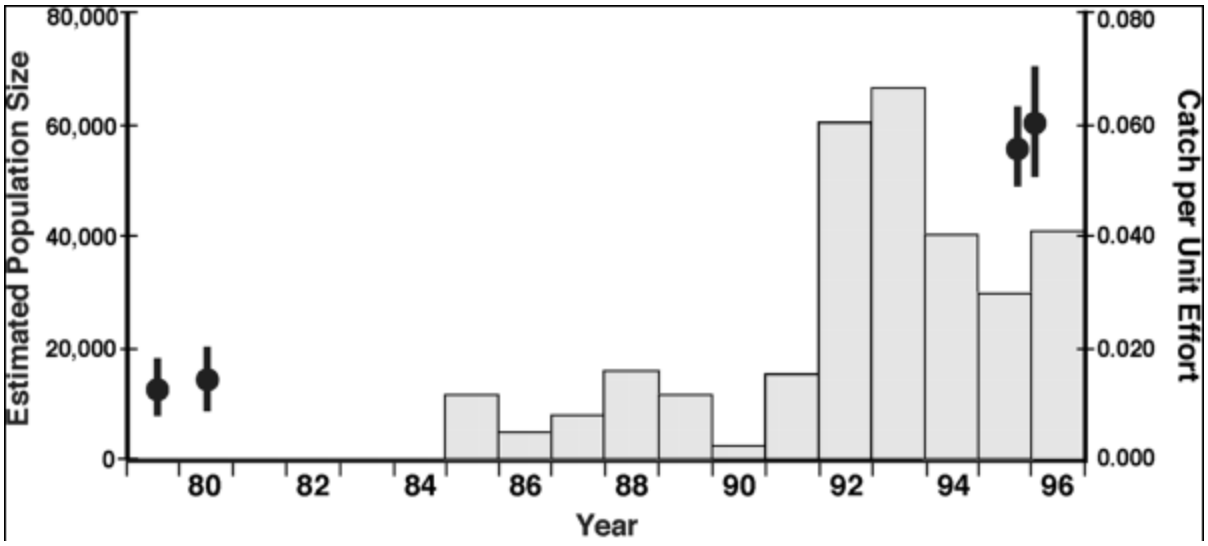

Figure 3. Stock estimates and abundance trend for Hudson River shortnose sturgeon population in the 1980s and 1990s. The paired symbols of circles (means) show the results of population estimates. The catch per unit effort histogram bars are the average catch of shortnose sturgeon per trawl haul in a riverwide fish survey conducted annually by the Hudson River electric utilities (Bain et al. 2007).

III. New York Rarity, if known:

Historic	**# of Animals**	**# of Locations**	**% of State**
prior to 1970	_____	_____	_____
prior to 1980	13,000*	1	_____
prior to 1990	_____	_____	_____

*spawning population

Details of historic occurrence:

Shortnose sturgeon formerly occurred as far north as Cohoes Falls at the mouth of the Mohawk (NYNHP 2011). This species was present in the Hudson when Dutch settlers first explored the River, but it wasn't until the 1930s that an effort was made to understand the life history of the shortnose sturgeon (Dovel et al. 1992, NOAA 2013). Only one extant and one historical spawning area are known (NYNHP 2011).

Current	**# of Animals**	**# of Locations**	**% of State**
	61,057*	1	_____

*total population

Details of current occurrence:

Shortnose sturgeon currently occur solely in the Hudson River, with one known spawning site (downstream of the Troy Dam) and two wintering sites (near Kingston and Haverstraw Bay) (Dovel et al. 1992).

New York's Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
____ 100 (endemic)	**__X__ Core**
____ 76-99	**____ Peripheral**
____ 51-75	**____ Disjunct**
____ 26-50	**Distance to core population:**
__X__ 1-25	**_____**

IV. Primary Habitat or Community Type:

1. Large/Great River
2. Estuarine Subtidal, Tidal River
3. Estuarine, Brackish Shallow Subtidal
4. Estuarine, Brackish Deep Subtidal

Habitat or Community Type Trend in New York:

___ Declining __X__ Stable ____ Increasing ____Unknown

Time frame of decline/increase: _____

Habitat Specialist? __X__ Yes _____ No

Indicator Species? _____ Yes ___X__ No

Habitat Discussion:

New York's shortnose sturgeon population inhabits the entire Hudson River estuary, below the Federal Dam at Troy, consisting of 245 kilometers of tidal freshwater river and brackish estuary habitats. Captures in coastal marine waters and non-natal rivers are rare, but have occurred (Bain et al. 2007). From late spring to early fall, shortnose sturgeon are dispersed throughout the channel habitats of this river-estuary. Both adults and juvenile fish tend to overwinter near the fresh/brackish water interface in the Haverstraw Bay region while mostly adults aggregate near Kingston (river kilometer 139) (Bain et al. 1998). Spawning occurs in between Coeymans and the Troy Dam in late April-May. Once eggs hatch, larvae disperse downstream; juvenile use much of the Hudson River estuary, commonly associated with deep waters and strong currents (Bain et al. 2007). Summer habitat for all life stages is dispersed throughout much of the estuary in the mid-river region. See Figure 2 for the best known overwintering, spawning, and summer sites in the Hudson River.

New York Species Demographics and Life History

__X__ Breeder in New York

__X__ Summer Resident

__X__ Winter Resident

__X__ Amphidromous

_____ Non-breeder in New York

_____ Summer Resident

_____ Winter Resident

_____ Catadromous

_____ Migratory only

_____Unknown

Species Demographics and Life History Discussion:

The shortnose sturgeon is a long lived species, with the oldest female recorded at 67 years and the oldest known male at 32 years. Age of maturation depends on sex of the fish and latitude, with first spawning estimated at 3-4 years for males and 6-8 years for females in the Hudson River (Dadswell et al. 1984, Gilbert 1989). Adults of both sexes spawn intermittently, although some males in the Hudson may spawn annually (Dovel et al. 1992). Males seem to spawn every other year and females every three to five years, substantially curtailing reproductive rates compared to annual spawners. Females lay between 40,000-200,000 eggs which hatch in approximately 13 days (Gilbert 1989). Eggs adhere to solid objects on the river bottom; newly hatched fry are poor swimmers, drifting with the currents along the bottom. As they grow and mature, they disperse downriver to juvenile nursery habitats in more brackish parts of the lower Hudson (Bain et al. 1998). Adult sturgeon migrate upriver from their overwintering sites to freshwater spawning sites from the Troy Dam to Coeymans in late April-May (see Figure 2 for best known locations of overwintering and spawning sites).

V. Threats:

When the shortnose sturgeon was listed as endangered in 1967, pollution, habitat loss from damming, and commercial exploitation data were the main causes of declining populations along the Atlantic Coast (U.S. Fish and Wildlife Service 2003, Carlson 1986). Although probably not threatened at current population levels in New York, this species remains vulnerable due to low reproductive rates, the introduction of exotic species, and potential new pollution problems (NYNHP 2011). Portions of foraging and spawning habitat are subject to periodic dredging to maintain navigation from the New York Harbor to the Port of Albany, but these Army Corps Of Engineers dredging activities are limited to windows when shortnose sturgeon are least likely to be present in the particular river reaches (NMFS 2011). The Hudson has long had a history of water pollution and PCB sediments are found the entire length of the estuary to New York harbor (NMFS 2011). Discharge from sewage treatment plants and pollution from other sources are potential threats that could lead to reduced immunity due to fin rot (Dovel et al. 1992). Their long life span and benthic predator lifestyle predisposes shortnose sturgeons to the effects of bioaccumulation of pollutants (NMFS 2010). Dams cut off upriver spawning areas and alter stream flow and temperature while dredging of channels can harm populations directly by sucking fish into the drag-arms and impeller pumps and potentially destroy feeding and spawning areas by removing benthic substrates (NMFS 2010).

Shortnose 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

__X__ Yes

The shortnose sturgeon is listed as an endangered species in New York and is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a take of a species listed as Threatened or Endangered, including, but not limited to, actions that may kill or harm individual animals or result in the adverse modification, degradation or destruction of habitat occupied by the listed species. It is also protected as a federally-listed endangered species and due to their federal listing, there are no legal fisheries or by-catch allowances in U.S. waters.

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

A recovery plan was developed in 1998 by the National Marine Fisheries Service to guide states and federal agencies in the restoration of this species to prevent extinction and make the loss of genetic diversity unlikely so they no longer require protection under the ESA (Friedland and Kynard 2004). Recovery priorities vary among the population because not all segments experience the same problems or receive the same level of research. The plan mentions assessments of growth, reproductive success and anthropogenic impacts as needed research for the Hudson River population.

Studies should be done periodically in the Hudson River to estimate adult population size and annual indices of relative abundance to maintain stock at current high levels of abundance. A shortnose sturgeon population consisting of 10,000 spawning adults is considered large enough to be at a low risk of extinction by the NOAA and adequate for delisting under the Endangered Species Act. Recent population estimates exceed this level by a wide margin, indicating recovery of the Hudson River shortnose sturgeon population, therefore some researchers suggest considering delisting for the Hudson population (Bain et al. 2007). Dredge projects or any other development projects in the Hudson River estuary should be monitored for potential impacts. Protecting water quality, maintaining depth, and preventing dredge spoil dumping are also recommended by the National Marine Fisheries Service (NMFS)(2010).

VI. References

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