ATLANTIC STURGEON

Acipenser oxyrinchus

Life History and Habitat Needs

Geographic Range:
Atlantic sturgeon range in the Atlantic Ocean from the Hamilton and George rivers, Ungava Bay, Labrador, to the St. Johns River in Florida. In the winter, they range south to Port Canaveral and Hutchison Island, Florida. Historically, Atlantic sturgeon were found in every major river system on the Canadian and U.S. East Coast, but now of the 37 documented historic spawning populations, only 21 are known to survive. The remainder have either been extirpated, or remain at historically low levels.

Movement/Migration:
Sub-adults and adults are known to make long distance migrations along the Atlantic coast, moving north in the late winter and south in fall and early winter to overwintering grounds. Likely cued by temperature, mature fish move up-estuary to freshwater rivers during spring (or in some rivers, fall) spawning migrations. After hatching, larval sturgeon migrate down-estuary and develop tolerance to salinity as they reach estuaries. Migration occurs at night at first; eventually, juveniles become active during both the day and night. Migrations out to coastal areas occur between one and six years of age and are seasonal in response to temperature changes. Inter-estuarine migrations have been documented. Some Atlantic sturgeon may occupy freshwater habitats for two or more years, while others move downstream to brackish waters when the water temperature drops.

Spawning:
Spawning may occur in flowing, tidal freshwater regions of large estuaries, or far upstream in inland freshwater, in waters where the temperatures range from 13.2 – 26°C. Sturgeon eggs are highly adhesive and are deposited on the bottom substrate, usually on hard surfaces. Within rivers, the areas of cobble gravel, coarse sand, and bedrock outcrops, which occur in rapids, may be prime habitat. This habitat provides Atlantic sturgeon with well-oxygenated water, clean substrates for egg adhesion, crevices that serve as shelter for post-hatch larvae, and macroinvertebrates for food. In northern rivers, these areas are nearer to the salt wedge than in southern rivers.

Habitat Use:
Atlantic sturgeon are anadromous, migrating from the ocean into coastal estuaries and inland rivers to spawn. Substrate is a key habitat parameter for Atlantic sturgeon, as hard bottom is required for successful egg attachment and incubation, and protects larvae from predators. Reported spawning substrates include small rubble and gravel, hard clay, and limestone substrate. Sturgeon lay eggs in flowing water ranging from 46 – 76 cm/s and in regions well upstream of the salt front but usually below the fall line (although historically they spawned further upstream when flow conditions permitted).

Juveniles have been found mostly over sand substrates, but also over rocks, cobble, and mud. Juveniles tend to congregate in deep waters, particularly in the summertime. Young sturgeon primarily use brackish water habitats and large juveniles are found in areas where the salinity exceeds 3. Dissolved oxygen is very important for Atlantic sturgeon because they show unusually high susceptibility to low oxygen. While at sea, adult Atlantic sturgeon have been documented using shallow nearshore habitats over sand and gravel substrates, and over silt, sand, clay and gravel, as well as offshore reefs (i.e., Grays Reef National Marine Sanctuary; historically Bermuda).

Threats to Habitat

- River blockages
- Loss of spawning substrate, especially loss of hard substrate from sedimentation and siltation
- Water quality deterioration, especially in summer/nursery habitat
- Dredging
- Water contamination, particularly polychlorinated biphenyls (PCBs), cadmium, mercury and lead

ASMFC Fish Habitats of Concern

Important habitats for Atlantic sturgeon include spawning sites, nursery areas, inlets that act as migration corridors to and from freshwater spawning habitat and estuarine nursery grounds, and wintering grounds for adult and older juveniles that include nearshore areas off the Atlantic coast from the Gulf of Maine south to at least Cape Lookout, North Carolina, and probably beyond.

Recommendations to Improve Habitat Quality

- Determine effects of temperature, salinity, and pH changes on each life stage of Atlantic sturgeon, and use this information to forecast impacts of climate change on this species and to scope mitigation measures.
- Document the concentrations at which contaminants impact the various life stages of Atlantic sturgeon.
- Determine the unknown optima and tolerance ranges for depth, temperature, salinity, dissolved oxygen, pH, substrate, current velocity, and suspended solids.
- Restore Atlantic sturgeon habitat, including vegetated buffer zones along streams and wetlands, and implement measures to enhance acid-neutralizing capacity.

Habitat Research Needs

- Assess indicators of suitable habitat, using watershed and stream-reach metrics.
- Conduct studies on the effects of land use change, especially wetland alteration, on Atlantic sturgeon population size, density, distribution, health, and sustainability.
- Examine how Atlantic sturgeon are impacted by deviation from the natural flow regimes, focusing on key parameters, such as rates of flow change (increase and decrease), seasonal peak flow, and seasonal base flow.

Additional Information

Atlantic sturgeon were previously managed by the Atlantic States Marine Fisheries Commission (ASMFC) under Amendment 1 (1998) and Addendum IV (2012) to the Fishery Management Plan for Atlantic Sturgeon. They are presently managed by the National Marine Fisheries Service since they were federally listed as threatened (Gulf of Maine), or endangered (all remaining populations) in 2012. Additional information is contained in the ASMFC's Diadromous Fish Habitat document (ASMFC Habitat Management Series No. 9). These documents can be found on the ASMFC website at www.asmfc.org or by contacting the ASMFC Habitat Program Coordinator at 703.842.0740. Critical Habitat designations can be found here: *https://s3.amazonaws.com/public-inspection.federalregister.gov/2017-17207.pdf.*

Atlantic States Marine Fisheries Commission www.asmfc.org