

Navy Sponsored Research Uncovers the Mystery of Atlantic Sturgeon



by J. Carter Watterson

The author prepares to release a female Atlantic sturgeon back into the waters of the Pamunkey River, a tributary of the York River in Virginia.

Photo Credit: Ramsey Noble

The Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) is one of the oldest living fish species in the world, dating back at least 70 million years. It inhabits waters along the Atlantic coast from Labrador, Canada to the east coast of Florida. While once plentiful, years of overfishing, pollution, and habitat loss resulted in the widespread declines of these large and long-lived fish. A dwindling population led the Atlantic States Marine Fisheries Commission and the National Marine Fisheries Service (NMFS) to issue a coast-wide moratorium on the commercial harvest of the species in 1998 and 1999, respectively. When the population continued to decline, NMFS was prompted to list four distinct population segments (New York Blight, Chesapeake Bay, Carolina, and South Atlantic) as endangered, and one (Gulf of Maine) as threatened under the Endangered Species Act in February 2012.

Atlantic sturgeon are anadromous fish—spawning in the upper reaches of rivers, and inhabiting river systems and estuaries as juveniles before eventually moving offshore to spend most of their lives along the continental shelf of the Atlantic Ocean. Although they are now considered rare in the Chesapeake Bay watershed, the animals are known to visit the bay and its freshwater rivers each fall to spawn.

The Navy has numerous installations throughout the lower Chesapeake Bay where training, testing, and maintenance activities regularly occur. Considering the potential impact these activities may have on Atlantic sturgeon, the Navy sought to gain a better understanding of when and how the endangered animals used the bay waters. Since little information was available on the presence of sturgeon outside of the James River in Virginia, the Navy turned to Dr. Christian Hager – a noted researcher with more than a

decade of experience working with the species – for support. Working with Hager and his company, Chesapeake Scientific, the Navy established a large acoustic telemetry array throughout the lower Chesapeake Bay, its tributaries, and the nearshore waters of the Atlantic Ocean. The array consists of more than 70 acoustic telemetry receivers that detect sturgeon that have been tagged with acoustic transmitters. The acoustic transmitters emit a signal with a unique identifier, which the receivers pick up and log to track the movement of individual fish.

The Navy and Chesapeake Scientific partnered with the U.S. Coast Guard, the Chesapeake Bay Bridge and Tunnel Commission, and private landowners to install the receivers to buoys, pilings, and piers throughout the bay and tributaries. The U.S. Fish and Wildlife Service and NMFS contributed additional receivers to the array to improve coverage.

Efforts to monitor the movements of Atlantic sturgeon and other species along the Atlantic coast preceded this effort by more than a decade. Researchers from various federal and state agencies, universities, and research institutions had already fitted close to 1,000 sturgeon with acoustic transmitters by the time the Navy installed its array in December 2012. Most of these researchers belong to the Atlantic Cooperative Telemetry Network, a grassroots effort to facilitate data-sharing between researchers using acoustic telemetry to gain a greater understanding of a wide variety of aquatic species. Joining this network enabled the Navy to immediately begin collecting and sharing valuable data on the species' habitat use and seasonal movement patterns within the lower Chesapeake Bay.

During the first two years, January 2013 through December 2014, the array recorded more than 615,000 detections of 17 different species and 1,100 individual animals. Of those animals,



Researchers examine an Atlantic sturgeon prior to collecting measurements and implanting an acoustic transmitter. Atlantic sturgeon enter a trance-like state when rolled on their back. Photo Credit: Sarah Rider/Naval Facilities Engineering Command

653 were Atlantic sturgeon. Once the groundwork had been laid for gaining a better understanding of the species' presence in the lower Chesapeake Bay, the Navy turned its focus to the bay's rivers.

At the time the project began, the James River was thought to be the only river within the Chesapeake Bay watershed that still maintained a viable spawning population of Atlantic

sturgeon. While few sturgeon had been documented in the York River System over the last several decades, Hager suspected the species still used the river and its tributaries. After reviewing historical records and hydrographic maps of the river system, Hager identified the place where sturgeon were most likely to congregate in the York River System.

With support from NMFS and the Pamunkey Indian Tribe, the Navy and Chesapeake Scientific began fishing the upper reaches of the Pamunkey River – one of two main York River tributaries – in summer 2013. Remarkably, researchers began catching sturgeon as soon as they placed nets in the water—confirmation that the species was still at home in the York River system. The large, adult sturgeon captured on the Pamunkey River expressed both sperm and eggs, indicating the discovery of sturgeons' spawning grounds. Between 2013 and 2014, the team captured, measured, and released more than 80 sturgeon. Of these, the team implanted 56 fish with acoustic transmitters.

Location of the Navy's acoustic telemetry array in the lower Chesapeake Bay, tributaries and nearshore waters of the Atlantic Ocean. Photo Credit: Naval Facilities Engineering Command



Subsequent preliminary genetic analysis, led by Dr. Tim King with the U.S. Geological Survey and Jason Kahn of NMFS, shows that the fish sampled from the York River System are genetically distinct from other known Atlantic sturgeon populations along the Atlantic coast, including the James River. This important finding indicates the possibility that other spawning populations may still exist and are merely waiting to be rediscovered.

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