



Determining Marine Migration Patterns and Behavior of Gulf Sturgeon in the Gulf of Mexico off Eglin Air Force Base, Florida

Project # 10-428

Background:

The Gulf sturgeon, *Acipenser oxyrinchus desotoi*, is a federally listed Threatened anadromous fish occurring in riverine, estuarine, and nearshore marine environments of coastal states along the Gulf of Mexico, from Louisiana to Florida. Critical habitat has been designated for this species which includes areas in the Gulf of Mexico from the shoreline out to one nautical mile. Compliance with the Endangered Species Act requires the Department of Defense (DoD) to ensure that its actions are not likely to jeopardize the continued existence of Gulf sturgeon or result in the destruction or adverse modification of critical habitat by conducting Section 7 consultations with the National Marine Fisheries Service (NMFS) or U.S. Fish and Wildlife Service (USFWS). Although occurrence patterns in riverine habitats are generally understood, little has historically been known of the occurrence, spatial distribution, and movement patterns of Gulf sturgeon in marine environments, resulting in a scarcity of scientific data available for use during Section 7 consultations for DoD activities in the Gulf.

Objective:

The purpose of this Legacy-funded project was to document the timing of Gulf sturgeon migrations into and out of the Gulf of Mexico and to determine the geographic distribution in the Gulf during the winter. The study area for this project included water bodies surrounding Eglin AFB that fall within Gulf sturgeon critical habitat, as well as Gulf of Mexico areas where military activities typically occur within the Eglin Gulf Test and Training Range (EGTTR). By identifying Gulf sturgeon movement patterns in these areas, DoD activities can be planned to avoid impacts to Gulf sturgeon and Section 7 consultations can be completed more efficiently with accurate scientific data.

Summary of Approach:

Between 2008 and 2010, 120 adult Gulf sturgeon were tagged with Vemco V16 acoustic transmitters from four different rivers surrounding Eglin AFB, including the Choctawhatchee River, Yellow River, Blackwater River, and Escambia River. Vemco VR2W receivers were deployed near the river mouths, in the Pensacola Bay, Santa Rosa Sound, and in the Gulf of Mexico offshore of Eglin's Santa Rosa Island Training Complex to track their movement patterns from October through May. In 2010, the USFWS deployed a separate array of VR2Ws in the Gulf from Lake Pontchartrain, LA to Cedar Key, FL. Since they used the same acoustic technology, data from this array was used in the analysis to capture the eastern and western range of Gulf sturgeon movement in the Gulf of Mexico during the winter.

Range testing and performance of the VR2Ws deployed in the Gulf of Mexico was also conducted as part of this project. A separate sentinel tag was deployed at the bottom of the Gulf between two VR2Ws to simulate a stationary fish emitting a transmission once every 15 minutes. One

VR2W was 350 meters (m) away and one was 500 m away. Rate of detection success from each receiver was compared with weather data to determine what wind speeds would compromise the receiver's ability to detect a transmission from a nearby tag.

Benefit:

The results from this project provides a greater understanding of Gulf sturgeon seasonal movements and spatial distribution in areas utilized by the DoD for military testing, training, and construction activities. As a result, environmental managers can use this information for mission planning and when conducting Section 7 consultations. The scientific data gathered over the last three years has filled a gap in knowledge that will not only help with planning DoD activities, but will also aid in conservation efforts for this federally listed species.

Accomplishments:

This multi-year investigation has provided invaluable knowledge on a federally threatened species not well-studied in its marine habitat. It has been confirmed that sturgeon begin their fall outmigration in October and have completely left the rivers by November, occupying estuarine areas such as Pensacola Bay and Santa Rosa Sound. The first detections of tagged sturgeon on Gulf receivers occurred between November and December. Most of the tagged sturgeon entered the Gulf either through the Pensacola Pass or East Pass. Some fish remained in Santa Rosa Sound throughout the winter and did not enter the Gulf at all. Most sturgeon detected near Eglin's property were tagged in the Choctawhatchee River. Data from the 2010 USFWS array documented higher levels of sturgeon activity in areas west of Eglin during the winter when compared to the Eglin study area, suggesting that the EGTTR habitat may not be the optimal location for Gulf sturgeon to overwinter. However, it is evident that Gulf sturgeon indeed occupy the nearshore waters of the EGTTR to some extent throughout the entire winter.

The two-year range testing also provided much insight as to the performance of the acoustic technology in a harsh marine environment. The average detection rate over both years was estimated to be approximately 68 percent, suggesting that these results may underestimate the actual level of sturgeon activity in the Gulf. Furthermore, the receiver deployed 350 m from the sentinel tag was found to be more reliable in detecting transmissions when compared to the receiver deployed 500 m away, even during adverse weather conditions.

Contact Information:

Bruce Hagedorn
Supervisory Biologist
Eglin AFB Natural Resources Section
107 Highway 85 North
Niceville, FL 32578
(850) 882-8421
hagedorn@eglin.af.mil

