

Environmental Studies Program: Ongoing Study

Title	Sandbridge Highly Migratory Species: Fish Distribution on a Dredged Shoal (MM-20-02)
Administered by	Marine Minerals Program
BOEM Contact(s)	Deena Hansen (Deena.Hansen@boem.gov)
Procurement Type(s)	Cooperative Agreement
Conducting Organization(s)	University of Delaware
Total BOEM Cost	\$648,606
Performance Period	FY 2021–2024
Final Report Due	May 2025
Date Revised	July 21, 2021
PICOC Summary	
<i><u>Problem</u></i>	Dredging activities affect the physical and biological features of Sandbridge Shoal, which may in turn affect highly migratory species (HMS) on the shoal.
<i><u>Intervention</u></i>	Improve analyses of dredge impacts, as well as consultations that recommend mitigations.
<i><u>Comparison</u></i>	This study aims to compare HMS use of the shoal relative to other surrounding areas to help identify habitat preferences.
<i><u>Outcome</u></i>	Improve the understanding of shoal use by HMS across seasons and years.
<i><u>Context</u></i>	The study area is Sandbridge Shoal off Virginia, an active borrow area used by multiple stakeholders under BOEM's jurisdiction.

BOEM Information Need(s): Better understanding of fishes' use of sand features in the Mid-Atlantic is important for BOEM's Marine Minerals Program (MMP) to evaluate the use of potential sand borrow areas in federal waters. Sandbridge Shoal is a borrow area off of Virginia that has been used by multiple stakeholders to rebuild beaches. It is also Essential Fish Habitat (EFH) for many fishes, including 12 species of HMS such as tunas, sharks, swordfish, and billfish (NMFS 2017), which are managed by the National Marine Fisheries Service (NMFS). Since habitat for many HMS lifestages are still unknown and dredging is expected to continue at Sandbridge Shoal, research on biological activity and biophysical coupling will improve BOEM's understanding of the potential effects of dredging to HMS and contribute to effective mitigation measures.

Background: In a 2018 consultation on potential impacts to EFH, NMFS emphasized the potential effects to HMS, including spawning and rearing, resulting from dredging Sandbridge Shoal. Many HMS are also important to recreational, charter, and commercial fishing industries. Of the 12 HMS with EFH on Sandbridge Shoal, BOEM identified six "high priority" HMS that may be more vulnerable to dredge impacts.

Objectives: The study will initially review all 12 HMS with EFH at Sandbridge but will focus field efforts on the high priority HMS. Investigations will aim to characterize the reproduction, rearing, and foraging

behaviors of HMS on Sandbridge Shoal, and how environmental conditions may correlate with them. As feasible, additional goals include tracking changes due to dredging, surveying “low priority” HMS, and/or including similar shoal features in the region for comparison.

The overarching hypotheses are that:

- (1) Sandbridge Shoal supports HMS throughout the year, though composition and abundance varies temporally;
- (2) Sandbridge Shoal is a site of reproductive and foraging activity for multiple HMS; and
- (3) HMS distribute according to both biotic (i.e., prey resources) and abiotic (e.g., temperature) factors; these factors change seasonally and annually at Sandbridge Shoal.

Methods: Researchers will first review existing data, information, and sampling methods on all 12 HMS with EFH on Sandbridge Shoal. This includes behavioral information and any factors contributing to HMS distribution. Included in this review will be a summary of relevant fisheries that target these HMS.

Informed by the review, field surveys will be performed every season for three years. Surveys will monitor how high priority HMS and their lifestages distribute around Sandbridge Shoal seasonally, and how environmental factors may drive these distributions. Factors may be abiotic (e.g., currents, temperature, dissolved oxygen) or biotic (e.g., prey distribution). Researchers will partner with the fishing industry whenever possible to leverage expertise while gaining insight into the industry.

These surveys would target multiple HMS lifestages, as well as prey, to gather a more comprehensive understanding of HMS shoal occurrence. Data would then be modeled with abiotic factors to identify any environmental correlations. Sampling of fish distribution, composition, and biomass would occur before, during, and after dredging if feasible. Optional research includes sampling a similar non-dredged shoal, as well as targeting low priority HMS.

Specific Research Question(s):

1. How do highly migratory species (HMS) use Sandbridge Shoal, particularly for reproduction and foraging?
2. Which factors (biological, physical, or chemical) impact species’ distributions most strongly?
3. How might dredging impacts (e.g., turbidity, benthic prey removal, geomorphic shoal changes) affect HMS shoal use?

Current Status: The study has been awarded and kicked off.

Publications Completed: None

Affiliated WWW Sites: None

References:

National Marine Fisheries Service (NMFS). 2017. Final amendment 10 to the 2006 consolidated Atlantic highly migratory species fishery management plan: essential fish habitat and environmental assessment. NOAA Fisheries Office of Sustainable Fisheries, Atlantic Highly Migratory Species Management Division. September 1, 2017. 442 pp.