

Environmental Studies Program: Ongoing Studies

Study Area(s): Atlantic OCS

Administered By: Marine Minerals Program

Title: Glider-based fish tracking along sand shoals off Cape Canaveral, Florida - Tagging and Operations

BOEM Information Need(s) to be Addressed: This study proposes to leverage an existing three year collaborative effort between BOEM and the U.S. Navy (Navy), with support from Kennedy Space Center Ecological Program, to investigate the long-term recovery of fish communities following dredging of a borrow area off east-central Florida using autonomous glider-based fish tracking. Monitoring is underway at the Canaveral Shoals complex (including control site shoals) and a significant BOEM investment has already been made. The addition of a wave glider to this monitoring effort could significantly increase the utility of the data obtained from BOEM's acoustic array infrastructure. The existing fixed acoustic array relies on the passage of fishes within a receiver's range of detection (typically 300-1000 meters). The addition of a glider would allow fish relocations to be an active process and increase the number and extent of detections. These detections would add to a long-term dataset tracking recovery and natural movements in offshore habitats. The examination of long-term recovery is necessary for improved regional management of offshore habitat availability for federally managed fish species. Results of this effort would be applicable to the Marine Minerals Program (MMP) as well as the Office of Renewable Energy Programs. These results will improve effects analyses in National Environmental Policy Act (NEPA) documents, and will greatly focus and improve the outcomes of Essential Fish Habitat (EFH) consultations.

Total Cost: (in thousands) \$328

Period of Performance: FY 2016-2021

Conducting Organization(s): U.S. Navy

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Description:

Background: Longer term environmental monitoring is important to document disturbances and recovery within sand shoal habitats and the fish communities. These monitoring needs include an improved understanding of: the localized movements of federally managed (EFH) or "keystone" fish species, the degree to which sand shoals serve in the life history of important coastal fishes, and the site fidelity and behavior of small-bodied benthic fish species following dredging events.

Following Hurricane Sandy, the MMP used Disaster Relief Appropriations Act (DRAA) funds to initiate a comprehensive recovery study at Canaveral Shoals, FL. The Navy portion of this partnership commenced in Fall 2013. Though DRAA funds only support three years of data collection, the comprehensive study design, existing project infrastructure (i.e. acoustic arrays, existing tagged fish, developed eco-path models,

etc.), and established partnerships (Navy, NASA, BOEM) make it well suited to support long term analysis of recovery and/or resiliency through additional investments. Additional funding would support continued monitoring of tagged fish (1-10 years of remaining battery life) and expansion of our receiving technology through the use of a wave glider. The receivers at the borrow and control sites have detected many species of fish tagged through these previous efforts (spot, croaker, red drum). However, it has also led to the realization that many of the fish thought to be fairly sedentary make use of a wider home range than previously documented. The use of a glider to expand the acoustic monitoring footprint would enrich this existing data and help provide answers into the natural movement, habitat associations, residency, and recovery for tagged fishes. Additionally, the use of shoal habitat by federally managed species during migrations will be documented.

Other benefits of procurement of the wave glider are the ability to outfit the platform with additional instrumentation to collect habitat information such as water temperature, salinity, turbidity, etc. Additionally, the glider can be deployed at other BOEM borrow areas in the future to collect scientific or animal movement information. Finally, the glider may be shared amongst program areas and utilized to collect data for the Renewable Energy and/or Oil and Gas programs.

Objectives: The objectives of this study are to expand the detection range of the current FACT acoustic array at Cape Canaveral to better resolve fish movements and habitat preferences within the OCS borrow area and associated shoal complexes.

Questions BOEM would like to address include:

- What is the residency of fishes within habitats adjacent to the borrow site?
- Do reestablished sites fill the same trophic function as the original communities?
- What proportion of the shoal complexes (including depth and sediment types) are used by BOEM target species?
- How can we further interpret the data we currently receive from our fixed array with increased detections between receivers?
- Can we validate trends in mobility of fish observed from the fixed array?
- Where else do the target fishes associate in the Cape Canaveral region and OCS? Expanded coverage would enable us to examine fish usage of other adjacent habitat types (reef vs. shoal), other shoal features within the area, and hardbottom habitats further offshore.
- What is the effectiveness of detections from gliders on the periphery of shoal complexes?

Methods: The proposed study sites include existing borrow area and control sites located off Cape Canaveral, Florida. These sites are the location of a portion of the existing FACT array. Ongoing collaboration between the Navy and Kennedy Space Center Ecological Program allows for data sharing, use of the existing 300+ FACT array receivers, and additional information on large-bodied predatory fish (NASA-funded work). In addition, the utilization of a wave glider fitted with a VEMCO Mobile Transceiver would assist the study in meeting the outlined objectives. Observations will be analyzed via basic statistical procedures along with more complex statistical analyses and comparisons of spatial and temporal patterns of movement as well as community

structure. All of these data will be further utilized in an ongoing BOEM study that will incorporate the data into Ecopath modeling.

Current Status: An eight-day deployment of the BOEM Wave Glider was conducted 20-28 July 2020. As part of this effort we also deployed two fixed station LS-1 recorders. The primary purpose of this mission was to evaluate the performance of an integrated passive acoustic recorder for mapping ocean ‘soundscapes’ including ambient sounds, fish and marine mammal vocalizations, and manmade noise. Sound files were successfully recovered and are now being processed. A second passive acoustic survey is planned for inclusion in the Supplemental Report due in July 2021.

The Wave Glider was also used to recover four acoustic receivers whose moorings were displaced up to 5.5 km due to Hurricane Dorian and a winter storm in February 2020. The moorings had integrated beacons allowing the Wave Glider to detect their new location. More broadly, this unplanned event demonstrated the potential of surface gliders for relocating lost equipment in open ocean settings.

Final Report Due: July 2021.

Publications Completed: N/A

Affiliated WWW Sites: N/A

Revised Date: March 24, 2021