NOAA'S NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE (NCCOS)
FY21 REGIONAL ECOSYSTEM RESEARCH PROGRAM AWARDS

Understanding Species' Habitat Usage and Connectivity in and around Marine Protected Areas

Integrating reef-seagrass functional connectivity into MPA management and design

Institution(s): Florida International University

Project Period: September 2021–August 2025

Location: Florida Keys

FY21 Funding: $764,044

Total Funding: $1,916,914

Project Summary: Tropical marine ecosystems are made up of a mosaic of habitats, and many fish species move across this complex seascape on a variety of spatial and temporal scales. In the Florida Keys National Marine Sanctuary (FKNMS), Sanctuary Preservation Areas (SPAs) are explicitly designed to protect fish populations, yet, they contain only a small area of seagrass . Currently managers have very little data on how much seagrass is required to support different foraging fishes. This project will collect a variety of field and laboratory data to provide clear guidance to managers on seagrass requirements for four model fish species with differing foraging modes (white grunt, *Haemulon plumierii*, bar jack, *Caranx ruber*, mutton snapper, *Lutjanus analis*, and great barracuda, *Sphyraena barracuda*). The goal of the project is to produce a user-friendly online tool that allows managers to estimate the seagrass area needed within a SPA to support foraging reef fishes under current and future habitat scenarios anywhere in the FKNMS.

Habitat requirements and ecosystem connectivity of reef-associated fishes in the Gulf of Mexico

Institution(s): Texas A&M University Galveston, Louisiana State University, Mississippi State University, University of Florida, University of Texas Rio Grande Valley, Flower Garden Banks National Marine Sanctuary, National Marine Fisheries Service's Southeast Fisheries Science Center

Project Period: September 2021–August 2025

Location: Flower Garden Banks National Marine Sanctuary, off Texas and Louisiana

FY21 Funding: $740,629

Total Funding: $1,985,014

Project Summary: An improved understanding of species' habitat requirements and ecosystem connectivity is needed to effectively protect critical habitats, manage sustainable fishing, and preserve ecosystem services in the Flower Garden Banks National Marine Sanctuary (FGBNMS). At present, the use of habitats and dispersal/movement across the network of reefs in the FGBNMS are unknown for associated fauna, compromising the ability of resource managers to implement measures to effectively protect vulnerable habitats and species that depend on these reefs for their survival. This project will apply novel technological approaches to comprehensively investigate the migration ecology and habitat requirements of reef-associated fishes that use this network of reefs in the northern Gulf of Mexico. To fill critical data gaps, species under investigation will include a wide range of fishes including 1) key native (snapper-grouper complex, greater amberjack) and invasive (lionfish) mesopredators, 2) foundational reef fishes (bicolor damselfish, stoplight parrotfish, Atlantic creolefish), and 3) demersal/pelagic fishes that form aggregations (cubera snapper, marbled grouper, scamp, scalloped hammerhead sharks, wahoo). Using telemetry, bioacoustics, and biophysical modeling, the project will evaluate habitat use and ecological connectivity of reef-associated species.

Cross-taxa assessment of habitat use and connectivity relative to marine protected areas in the Gulf of Maine: Implications for management

Institution(s): National Marine Fisheries Service's Northeast Fisheries Science Center, Stellwagen Bank National Marine Sanctuary, Integrated Statistics, Massachusetts Division of Marine Fisheries

Project Period: June 2021–September 2026

Location: Gulf of Maine, Massachusetts, Rhode Island, New York

FY21 Funding: $163,000

Total Funding: $1,996,379

Project Summary: This project seeks to improve the ability of managers to evaluate the temporal and spatial placement of existing marine protected areas (MPAs) and how these might be optimized to benefit highly migratory and protected species facing a number of anthropogenic threats and climatic changes. Multispecies connectivity maps, overlaid with areas of human use and anthropogenic risk, will provide managers with the data and tools to determine whether the size, location, regulations, and zonings for a network of New England MPAs (Stellwagen Bank National Marine Sanctuary, five MPAs surrounding the coast of Massachusetts, and the Northeast Canyons and Seamounts Marine National Monument), as well as the southern New England Bureau of Ocean and Energy Management wind area lease sites, are sufficient to ensure or enhance species' persistence. The project will collect telemetry and biological data on priority species that have not been the focus of previous dedicated studies. Species under investigation include fin and sei whales (*Balaenoptera physalus*, *B. borealis*), gray and

harbor seals (*Halichoerus grypus*, *Phoca vitulina*), leatherback (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempii*), and green sea turtles (*Chelonia mydas*), great shearwaters (*Ardenna gravis*), sooty shearwaters (*A. grisea*), northern gannets (*Morus bassanus*), and a variety of fishes, including striped bass (*Morone saxatilis*), white, sandbar, and sand tiger sharks (*Carcharodon carcharias, C. plumbeus, C. taurus*), and black sea bass (*Centropristis striata*), and opportunistic sampling of loggerhead sea turtles (*Caretta caretta*) and Atlantic white-sided dolphins (*Lagenorhynchus acutus*).