Northeast Consortium Annual Report - December 2007

Project Title: Effects of the Western Gulf of Maine Closure Area on Groundfish Populations in Rocky Habitats

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Northeast Consortium
The University of New Hampshire • Woods Hole Oceanographic Institution
The University of Maine • Massachusetts Institute of Technology

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Objectives: The overall goal of this project is to provide information useful to managers on the role of rocky habitats in the WGOM closure area with respect to groundfish stock re-building. The major objectives are: (1) determine the effects of the WGOM closure area on fish use of rocky habitats; (2) characterize fish use by species and size classes in major rocky habitat types; and (3) initiate an assessment of gill nets as sampling tools for rocky habitat by identifying variables that may affect their effectiveness.

Methods and work plan: The overall study design is based on a "control-impact" approach with sites chosen inside and outside the closed area, and compared using an "in vs. out" assessment. Sampling sites will be chosen along approximately the full length of Jeffreys Ledge inside the closure, and at comparable sites west of the closure (Fig. 1). This will allow an assessment of rocky habitats encompassing the entire northern half of the WGOM closure area, compared to similar sites outside. Sites will be chosen based on major habitat features that contribute to essential fish habitat (EFH) designations so that comparisons can be made between those sites that differ only or mainly with respect to their location inside or outside the closed area.

The sampling design is stratified random in blocks of three (one for each habitat type: low, medium, and high vertical relief). The overall study area is Jeffreys Ledge and adjacent rocky areas within and outside the WGOM closure, divided into three habitat strata. This design will randomize the sampling within each of the three habitat types but insure that all three habitats are chosen every three days of sampling. On each sampling day, one site will be sampled inside the WGOM closure area and one site of the same habitat type will be sampled outside the area.

All fish sampling is done with 300-ft long gillnets, each consisting of three 100-ft panels (one with 2-inch stretched mesh, another with 4-inch mesh, and the third with 8-inch). Nets are set in early morning and allowed to soak for approximately 24 hours. Latitude/longitude, water depth, and bottom type (one of three; see above) are recorded at each site. All fish captured are measured (total length), counted, and weighed by species.

An underwater videography system is being developed to provide imagery of each study site. The primary purpose of the video will be to verify that the nets have been set in the appropriate general habitat type, but other information on habitat characteristics potentially useful in explaining differences in fish catch will be obtained. A 5-minute tow/drift will be made near the set gillnets with all imagery recorded and latitude/longitude recorded at the start and end points for each video survey. The following habitat features will be determined for each survey: relative amounts of major sediment types (soft sediment, gravel, small bolders, large bolders), and relative abundances of dominant epifauna (identified to lowest practical taxonomic level).

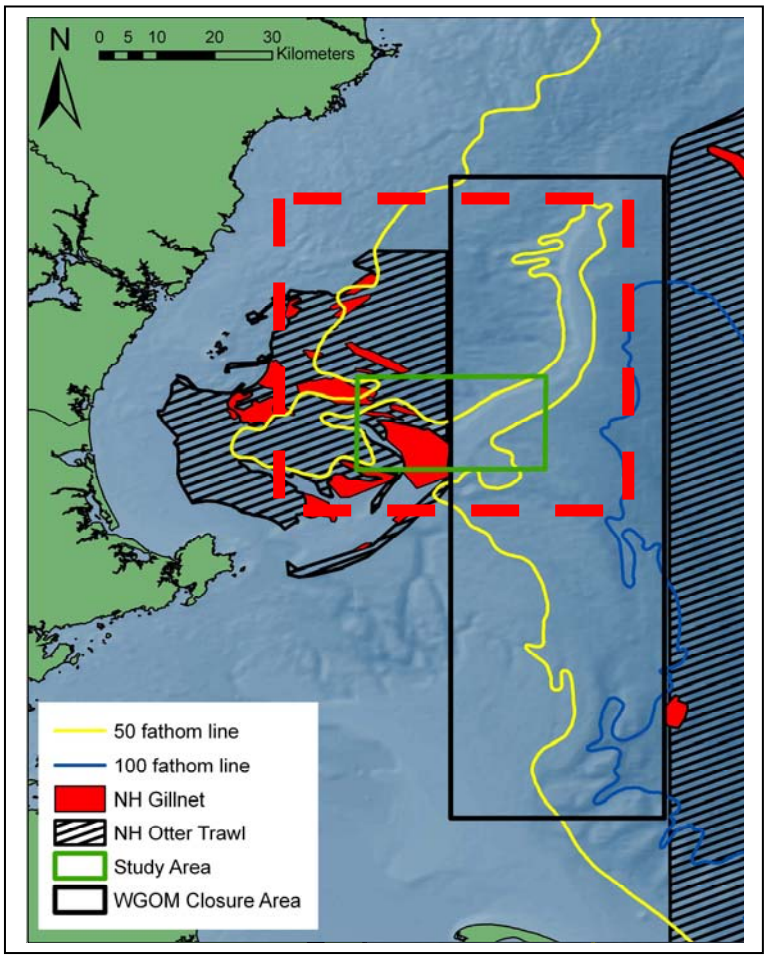

Fig. 1. Study area for present project (red dashed line box) on base map showing WGOM closure area (black box), 2002-05 NEC funded study area (green box), and areas where gill nets and otter trawls are predominantly used (gear use data from http://web.mit.edu/SEAGRANT/aqua/cfer/GearMapping/GearMapping.html.)

Work completed to date: A total of 15 cruises were completed in 2007, with the first on 21 August and the last on 2 November. The underwater video system was developed, tested, and modified, and should be fully operational in 2008.

Results to date: Of the 15 cruises, 12 yielded useful data. Preliminary analysis of the data indicates that total catches of groundfish species (mainly cod, haddock, pollock, and hake) were higher and the largest fish were caught at sites inside the closure compared to sites outside. This finding is similar to what was found during preliminary sampling in fall 2005 in an NEC development project (see below). Spiny dogfish were also very abundant in most samples, averaging about 5 times the total weight of all other species combined over the three sampling months.

Data: No data from this project have been submitted to NEC.

Impacts and applications: The project is designed to provide new information useful for management of the WGOM closure area as well as sampling methods for rocky habitats. No standard protocol exists for sampling fish populations in rocky habitats with large vertical relief. Based on the substantial differences between rocky habitats inside the WGOM closure compared to outside shown in our previous studies, further development of such a protocol could be important for adequately assessing the effectiveness of marine closures such as the WGOM in protecting groundfish nursery habitat.

Related projects: This project was a direct result of findings and funding from two earlier NEC projects: "Intensive study of the Western Gulf of Maine closure area" (which was co-funded by UNH Cooperative Institute for New England Mariculture and Fisheries; CINEMAR), and “Developing a protocol for sampling juvenile groundfish in rocky habitat” (an NEC development award).

Partnerships: This project is the result of extensive collaboration between scientists and fishermen. It would not have been possible without the knowledge of fishing methods and the study area by Mike Leary.

Presentations: None

Student participation: None

Published reports and papers: None

Images: None