PROJECT SUMMARY: REGIONAL ASSESSMENT OF SPONGE DYNAMICS AND SPONGE FISHERY IMPACTS

Investigators: **Mark Butler**, Old Dominion University, Norfolk, VA and John Hunt, Florida Fish and Wildlife Commision

Nearshore hard-bottom habitat is a ubiquitous feature of the shallow waters within the Florida Keys ecosystem, yet remarkably little is known about their structure or ecological function, a fact highlighted in recent years by questions about the possible impact of environmental change and resource exploitation on these communities. During the 1990s, hard-bottom community structure in south-central Florida Bay was altered by several sponge die-offs. There are now concerns about the possible impact of Everglades restoration and salinity change on hard-bottom communities in this same region. In addition, the perceived over-exploitation of shallow water sponges by the commercial sponge fishery has prompted a call by some citizens for the closure of the fishery, which sparked a series of public meetings to review the matter. Resolution of this issue, however, is hampered because there has been no stock assessment of sponges in the Florida Keys, the most basic population dynamics for the pertinent sponge species are largely unknown, and the effect of the fishery on commercial sponges and allied species in hard-bottom habitat have never been studied. During a recent review of science and monitoring in the Florida Keys for the EPA and Florida Keys National Marine Sanctuary (FKNMS), the outside science advisory panel stated that the hard-bottom community has been neglected and its ecological significance must be explored. We are poised to do so.

Over the past decade, our research group has actively investigated the ecology of hard-bottom communities in the Florida Keys. We have used rapid assessment methods and stable-isotope analysis to document broad patterns of distribution and community structure in the shallow hard-bottom communities of the Florida Keys. We will soon begin a comprehensive survey of the distribution and structure of shallow hard-bottom communities within the Florida Keys. Here, we propose a series of field studies, laboratory studies, and simulation modeling to better understand commercial sponge population dynamics, to determine the impact of the sponge fishery on sponge communities, and to examine the effect of salinity change on sponge and octocoral survival in shallow hard-bottom habitat within the FKNMS. Specifically, we seek to:

(1) Determine from repeated field measurements of tagged sponges at various sites in FKNMS the necessary site- and size-specific population dynamics information needed for the management and modeling of commercial sponge populations.
(2) Conduct field studies in concert with representatives of the fishing industry to determine the catch efficiency of sponge fishers and the by-catch associated with sponge harvesting.
(3) Conduct laboratory studies that experimentally test the tolerance of selected hard-bottom-dwelling species (e.g., five sponge species and two octocoral species) to different salinities, periods of exposure, and water temperatures.
(4) Incorporate new and existing information in a spatially-explicit simulation model to quantitatively compare the impact of potential management strategies on the sustainability of the sponge fishery and its impact on hard-bottom community structure in the FKNMS.