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NURC/UNCW
Management Information System

Project Summary Report

PI Surname: **Fisher** **Project #: SEGM-2002-09A** **Region: GOM**

Title of Project: Structure of Cold Seep Communities in the Gulf of Mexico: Temporal Change and Biogeographic Diversity

Start Date: 6/01/02 **End Date:** 6/01/04 **Year** **1 of 2**

Principal Investigator:

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Co-Principal Investigator: *same as PI*

Other Investigators: *same as PI*

Cooperating Institutions: *other institutions involved in the mission that are not shown above*
Louisiana State University, University of Oregon, University of Missouri, University of Virginia, Texas A&M University, American University

Number of Participants: *total number of science participants* _16_____

OPERATIONAL INFORMATION

System	for extended ops only		Weather Days	Other (e.g. mech. prob.)	OPS Days	Total Dives [1]	Total Bottom Time [2]
	Port Days	Transit Days					
SCUBA (air)							
SCUBA (nitrox)							
Aquarius							
ROV							
SUB	**1**	**2**	**4.5**	**1**	**7.5**	**16**	**51.5**
Center Facilities: lodging • dockage • shore lab • small boats •							
Center Equipment: CTD • Video camera(s) • still camera(s) • Other:							
Support Vessel(s) used: R/V Seward Johnson II							

1. *For SCUBA, SCUBN or Aquarius = man dives or excursions; for ROV/SUB = system dives*
2. *Bottom Time = surface to surface interval (hours)*

Operating Depth Range*(Meters):* _530-655_____

Project Location(s): *geographic name = area of research, e.g., Hatteras slope or Conch Reef; latitude and longitude = center of area; no more than four areas*

Site	Geographic Name	Latitude (dd-mm.m N)	Longitude (ddd-mm.m W)
1	**Upper Louisiana Slope, GC234**	**27-44.7 N**	**091-13.3 W**
2	**Upper Louisiana Slope, GC232**	**27-44.5 N**	**091-19.1 W**
3	**Upper Louisiana Slope, Bush Hill**	**27-47.0 N**	**091-30.5 W**
4	**Upper Louisiana Slope, GB535**	**27-25.7 N**	**093-36.3 W**

COST INFORMATION

NURC/UNCW Support (*input by Center*):

Variable Costs = *direct costs, including supplies, equipment, services, subcontracts provided by the Center for this project* **$_NURC input_____**

Fixed Costs = *value of Center system support based on estimated day rate for the system times number of operations days* **$_____**

Total = $_____

Co-funding Support (*input by PI*):

Agency	Status (Approved, Submitted)	Period (dates)	$ Amount
NOAA Ocean Exploration	**Approved**	**5/02 – 12/03**	**$Sub. Costs (˜$160k+)**
NSF OCE	**Approved**	**9/01 – 9/05**	**$Ship Costs (˜$240k+ yr 1)**
NSF OCE	**Approved**	**9/01 – 9/05**	**$107,000 yr 1****
**** For related projects with equipment overlap**			**$**
			$
			$
		Total Co-Funding =	**$**

PROJECT DESCRIPTION

I. SUMMARY OF PROJECT: *objectives, methods, and the significance of the proposed activity to the advancement of research field, environmental management, or education. Please avoid use of first person.*

This project is part of a larger project involving several other PI's and significant other support from the National Science Foundation and the NOAA Ocean Exploration Program. The main objectives of the NURP portion of the project were to investigate the changes in the communities associated with vestimentiferan tube worms as the tube worm aggregations age and to examine differences in seep communities across the upper Louisiana Slope. Aggregations of different ages were selected based on visible differences in their morphology, both size and color. Samples of the water chemistry around these aggregations were taken to determine if the associated organisms were exposed to hydrogen sulfide. The sediment surrounding the "roots" of two of these aggregations was first removed by a custom designed suction device. This was in an attempt to determine the extent of the root mass and characterize the tube worms' impact on the chemical environment at the seeps. Taken together, this information will advance our knowledge of the effect that tube worms have on the composition of the communities found at hydrocarbon seeps as well as their structuring of the seep environment itself. It will also lend insight into the links between the seep communities and the larger ecosystem of the surrounding Gulf of Mexico. Because tube worms act as "environmental engineers" at hydrocarbon seeps and provide habitat for a large number of species, an understanding of the biodiversity and ecology of seeps is essential for effective oversight and management of these deep-sea ecosystems. Another important component of this project was public outreach and education. This summer, a high school teacher from Puerto Rico was hosted in the lab at Penn State. He also was able to participate in a research cruise this Fall and helped with the Ocean Exploration program web site and educational offering.

II. SUMMARY OF RESULTS: *Accomplishments, benefits, and new research topics:1) preliminary results and significance; 2) success of the mission in terms of project goals; 3) plans for use of the data, for example, management needs, publications, or other products; 4) new research ideas or directions generated.*

Approximately 50% of the year one goals of the NURP and OE portions of this project were accomplished during the first cruise. A total of 4 aggregations were collected from 3 different sites. Two of these collections were from sites from which tube worm communities had not previously been sampled. One of these sites (GC232) was established as a potential site for an independent test of the proposed succession model due to the large number of collectable tube worm aggregations found. The collection from the "Brine Pool" site was a unique sample of an aggregation comprised entirely of the newly described tube worm species *Seepiophila jonesi*. The other two aggregations sampled were visibly different in age, but were immediately adjacent to each other. This will provide information on hypothesized successional changes without the confounding factor of spatial variability. In addition, a total of 4 aggregations at 2 sites were stained for future determination of growth rates. Unfortunately, the rough weather encountered prevented the collection of aggregations at the widely distributed sites 100s of miles east and west of the central sites. However, one of the benefits of this study is that it is a component of a larger research program with additional funding from Ocean Exploration and the NSF. This allowed the participation of 4 scientist from PSU in a research cruise this past October led by Dr. Craig Young. During this expedition, 3 high quality collections of intact aggregations were made from 3 new sites, both east (Viosca Knoll and Mississippi Canyon) and west (GC354) of our main study area. The collections are still being sorted and analyzed, but significant differences in the associated fauna (from what are found at our traditional study sites) are already evident. In addition, two of these sites contained extensive reefs of the deep-sea coral *Lophelia pertusa*. These corals are the subject of a large international conservation effort, and may become a component of future study by this and other research groups. As a result of the 2 research cruises in 2002, approximately 90% of the year one goals were accomplished.

III. CENTER SUPPORT: *Advantages of NURC/UNCW program, particularly in situ support, to the project and your research program. Please comment on operations and highlight both strong and weak points; suggestions for improvement are appreciated.*

This study was conducted as part of a larger research program including components funded by NSF and NOAA's Ocean Exploration Program. The main focus of the OE and NURP components address the biogeography and biodiversity of the seep communities, and this work component is not directly supported by the NSF science support funds. OE support is for submersible costs only and did not include any direct science support. The NURC program was therefore essential to accomplish the biodiversity and biogeography related objectives of the project and to support our participation in two cruises that allowed us to accomplish 90% of our year one research goals.

IV. PUBLIC INFORMATION RELEASE: *please help us promote undersea science by writing a paragraph highlighting the importance of the research that may be used for public distribution and press releases.*

A paragraph is not included at this time, but specific press release materials will be made available upon request. There is a large body of material on the OE web site for the October cruise (the Ocean Explorers web site), written by our group and collaborating PIs that is designed for the general public and would be useful in preparation of any press releases.