

# **Minerals Management Service**

## **FY 2006 Cooperative Conservation Report**



**Minerals Management Service**  
**FY 2006 Cooperative Conservation Report**

**Activities**



# **Minerals Management Service Cooperative Conservation Activity**

## **Activity Title**

Louisiana Sand Management Working Group (LA\_SMWG)

## **Activity Summary**

The LA\_SMWG, formed in 2003, facilitates the efficient management, in the most cost-effective and environmentally sound manner, the use of sand offshore Louisiana for barrier island rebuilding, an effort which is estimated to require upwards of 61 million cubic yards of Federal Outer Continental Shelf (OCS) sand. The group is composed of individuals representing Federal and State Agencies, academic institutions, environmental organizations, environmental/oceanographic consulting firms, coastal engineering and dredging companies.

## **Key Partners**

National Oceanic and Atmospheric Administration (NOAA) – Fisheries, U. S. Fish and Wildlife Service, Environmental Protection Agency, Louisiana Department of Natural Resources, Louisiana Department of Wildlife and Fisheries, Louisiana State University and the U.S. Mineral Management Service

## **Results and Accomplishments**

- The efforts of the LA-SMWG have facilitated the potential use of Federal sand for barrier island restoration in Louisiana, in particular planned projects to transport sand from Ship Shoal, a submerged sand shoal located south of the Isle Dernieres, a major barrier island chain in desperate need of restoration.
- The passage of Hurricanes Katrina and Rita have resulted in some reassessment on the part of the State in terms of prioritization of projects and volumes of sand required, but several projects which will require OCS sand are expected to move forward in calendar year 2007.
- Complex issues relative to the use of OCS sand are discussed openly by all stakeholders and recommendations have been made for further resource and environmental studies or data collection to help inform decision-making.
- The meetings have provided a forum for information sharing. Coastal restoration project staff within the various Federal and State agencies are normally concerned only with their individual projects. Seeing the problems that other project managers face and how they are being resolved has greatly improved each subsequent project.
- Coastal restoration project managers and stakeholders are kept up-to-date and informed on MMS procedures, lease requirements, potential stipulations, etc, which has facilitated the negotiated agreement process for OCS sand projects as they come on-stream.

- Lines of communication are greatly improved, at both the formal, agency-to-agency level and the informal person-to-person level. Members know who to contact about questions or issues and are more willing to respond when asked to assist others.
- The Louisiana Department of Natural Resources (LDNR) has taken the lead in an effort to create a database on sand sources and inventory of projected sand needs which will improve LDNR's ability to develop guidelines for sand resource allocation.

**Information Provided By**

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# **Minerals Management Service Cooperative Conservation Activity**

## **Activity Title**

Memorandum of Understanding (MOU) between the Native Village of Kaktovik and the Minerals Management Service, Alaska Outer Continental Shelf Region

## **Activity Summary**

At the request of the Native Village of Kaktovik, MMS jointly developed an MOU to formalize a government-to-government process to ensure that the native village's concerns are considered whenever MMS is planning a proposed offshore action that may impact tribal members or their subsistence way of life.

Many of the members of the Native Village of Kaktovik are dependent upon food resources gathered in their subsistence lifestyle. The mandate of the MMS is to responsibly manage the Nation's resources in the Outer Continental Shelf to meet our energy needs. These divergent views must be addressed to facilitate the effective multiple use of the area for both oil and gas exploration and production as well as native subsistence hunters in their quest for bowhead whales, polar bears, seals, walrus, and other marine life.

Although the DOI has a region wide policy on working effectively with federally recognized Alaska Native Tribes, the MMS had not previously developed a formal agreement with any of the 231 tribes in Alaska. This MOU is being considered as a model for possible use by several other Alaska Native tribes.

## **Key Partners**

Native Village of Kaktovik

## **Results and Accomplishments**

The MOU facilitates open communication between key contacts in the Tribal government and the senior leadership of the MMS regional office. The tribe is able to focus the community's issues and concerns and bring those to the table when meeting with the MMS. Tribal representatives have lauded MMS' willingness to work with them to ensure input into our decision making process.

## **Information Provided By**

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Signing of MOU between Native Village of Kaktovik and MMS AK OCS Region

Standing: L to R: George Kaleak, Sr.; Eddie Rexford, Sr.; Susie Akootchook, Native Village of Kaktovik;  
Seated: L to R: John Goll, Alaska Regional Director, Offshore Minerals Management; and Isaac Akootchook, Native Village of Kaktovik

## **Minerals Management Service Cooperative Conservation Activity**

### **Activity Title**

Memorandum of Understanding (MOU) between the Oil Industry Safety Directorate (OISD) of India and the U.S. Minerals Management Service

### **Activity Summary**

In July 2005, the largest offshore production facility in Indian waters was lost to a fire as a result of a loss in well control when a supply vessel ran into the platform during high seas. The OISD requested MMS assistance early on to assist in the accident investigation and provide internal mitigation measures to prevent another such disaster. This dialog gave way to the establishment of a MOU for future cooperation.

After many attempts and years of negotiations, the MMS signed an MOU in July 2006 with the OISD of the Indian Ministry of Petroleum and Natural Gas. The MOU establishes a cooperative framework to share common offshore oil and gas regulatory issues over the next five years.

### **Key Partners**

Indian Oil Industry Safety Directorate

### **Results and Accomplishments**

The first activity commenced under the MOU was an Offshore Minerals Management technical review of OISD draft Oil and Gas Regulations for Offshore Worker Safety in August 2006. The draft regulations encompassed all major aspects of offshore oil and gas activities from permitting through platform and well decommissioning and the potential use of safety management systems.

### **Information Provided By**

Kevin T. Kunkel  
International Program Specialist

# Minerals Management Service

## FY 2006 Cooperative Conservation Report

### Projects





# **Minerals Management Service Cooperative Conservation Project**

## **Project Title**

California and the World Ocean '06 Conference

## **Location**

Long Beach, California

## **Project Summary**

The California and the World Ocean '06 Conference is the third in a series that began in 1997. This conference brings together more than 1,000 Federal and State agency professionals, elected officials, non-governmental interest groups, academic professionals, and the public to discuss ocean governance, policy, multiple use, and ocean conservation. Keynote addresses by elected officials and noted ocean scientists highlight the three day conference held September 17 - 20, 2006, in addition to several hundred presentations in concurrent sessions.

## **Innovation/Highlight**

A conference highlight was the announcement by the Governors of California, Oregon and Washington of a three-state memorandum on ocean health, which pledged working together to represent ocean issues and ocean policy to Congress and the Administration in Washington, DC. Plenary session addresses by the Honorable Leon Panetta, Chair of the Pew Ocean Commission and Joint Ocean Commission Initiative Co-Chair, and Dr. Thomas Kitsos, Executive Director for the U.S. Commission on Ocean Policy, also highlighted the event.

## **Resource Challenge**

Multiple uses of resources along the Pacific Coast, conservation and preservation in designating marine protected areas, and increasing challenges in creating a working governance of the ocean in the face of rising coastal populations in all three states were among the principal challenges discussed during the conference.

## **Examples of Key Partners**

California Resources Agency, California Environmental Protection Agency, California Coastal Conservancy Association, Aquarium of the Pacific, California Sea Grant College Program, California State Water Resources Control Board Chevron Corporation, Gordon Moore Foundation, National Marine Sanctuary Foundation, National Oceanic and Atmospheric Administration, The Packard Foundation, The Ports of Los Angeles and Long Beach, and the U.S. Minerals Management Service.

## **Results and Accomplishments**

More than 1,000 professionals attended the three day conference, exchanging ideas and information, and debating issues affecting the oceans. A high point of the conference for MMS was the session on Rigs-to-Reefs for California; MMS participated on the panel, providing technical and scientific information. MMS scientists participated on the conference planning committee to organize sessions, and presented papers and chaired sessions as well. Scientists conducting ocean research under MMS Environmental Studies Program funding presented the results of their research in papers and poster sessions.

## **Project Contact**

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# Minerals Management Service Cooperative Conservation Project



## **Project Title**

MARINE – Multi-Agency Rocky Intertidal Network

## **Location**

Pacific coastline; concentrated from Oregon to California but includes sites from Alaska to Mexico.

## **Project Summary**

MARINE is a partnership of Federal, State and local agencies, universities and private organizations interested in determining the health of the rocky intertidal communities along the Pacific shoreline. MARINE currently includes 40 partners who collectively monitor key species such as mussels, barnacles, abalone and seastars at 80 rocky intertidal sites every fall and spring. MARINE also conducts comprehensive biodiversity surveys at 91 rocky intertidal sites from Alaska to Mexico on a rotating basis. MARINE works with managers from local, state and federal governments to provide the scientific information needed to make decisions about coastal resources.

## **Innovation/Highlight**

MARINE, a model partnership in existence for almost a decade, is funded entirely by the independent contributions of its members and jointly publishes data in peer-reviewed literature.

## **Resource Challenge**

Findings from this extensive and unique long-term monitoring program indicate that many rocky shores along the coast, particularly those near urban centers, are under stress with some intertidal populations changing significantly over the past several decades. Factors correlated with these changes include increased public use of the shoreline, increased fishing pressure, poaching, and pollution. Management solutions need to be informed by scientific data and include close partnership with local agencies, enforcement groups, citizen watch groups, and volunteers.

## **Examples of Key Partners**

Channel Islands National Park, U.S. Minerals Management Service; University of California at Santa Cruz, Santa Barbara, and Los Angeles; California State University Fullerton, County of Santa Barbara, Partnership for Interdisciplinary Study of Coastal Oceans,

Cabrillo National Monument, Southern California Coastal Water Research Project, California State Water Quality Control Board, Golden Gate National Park, Point Reyes National Seashore, Bureau of Land Management, California Department of Fish and Game

### **Results and Accomplishments**

MARINe data, shared on a common database, led to the closure of the black abalone fishery on the mainland and is used by the State to evaluate impacts to the shoreline from non-point discharges.

MARINe has published curriculum for K-8, high school and a university textbook.

### **Project Contact**

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A biologist from UC Santa Cruz counting motile invertebrates near Vandenberg Air Force Base for the MARINe project



Representing the MARINE project, MMS biologists work with teachers off Malibu to develop field exercises for the classroom



A photo from a recent MARINe Taxonomic Workshop



A shot of the MMS-funded MARINe project site at Carpinteria from a hand-held blimp

# **Minerals Management Service Cooperative Conservation Project**

## **Project Title**

Variability in Abundance of Arctic Cisco in the Colville River: Analysis of Patterns in Existing Data

## **Location**

Nuiqsut, Alaska

## **Project Summary**

Arctic Cisco, an anadromous fish restricted to the Arctic, is an important cultural and subsistence resource for the residents of Nuiqsut. Native residents are concerned that Arctic Cisco in the Colville River have been less abundant during the last few years than in the years preceding oil and gas development. They perceive that offshore development may be a causal factor in the recent unprecedented decline in the subsistence catch of Arctic Cisco.

This nearly completed study analyzed existing data to gain further understanding of the observed trends in Arctic Cisco abundance and estimate what factors influence population variation and will more precisely delineate and prioritize the need for additional data. The study includes a pilot test of incorporating traditional ecological knowledge using a validation panel made up of local experts to maximize the use of traditional knowledge and expertise of local residents familiar with Arctic Cisco and the local environment. This study used existing data to gain further understanding of the observed trends in Arctic Cisco abundance.

## **Innovation/Highlight**

The implementing vehicle is a validation panel of approximately five to ten local experts or key informants to create a dialogue that flows between the panel and the scientists throughout the period of the study. The panel was consulted throughout the project to validate interpretations of the data, and especially to review plausibility and credibility of emerging patterns and interpretations. The panel provided feedback on the plausibility of hypothesized relationships based on local familiarity with the resource and environment and helped identify alternative explanations not readily apparent to the scientists. The project continues the effort begun in a 2003 workshop in which scientists and local experts were involved on an equal basis to identify and prioritize important questions surrounding the variability of Arctic Cisco for future study.

This is the first instance we are aware of in which a local panel of experts were asked to review and validate the results at all stages of the study. The expert panel provided recommendations on the variables and data analysis and suggested additional factors that could help to improve the interpretations and choice of variables in the statistical



analyses. An independent panel final report, prepared by the local report writer, will be included in the final project report. The panel is writing an independent review of the study results and the success of the study process along with suggestions for improving the incorporation of local expertise and traditional ecological knowledge in future study efforts. The panel's final report shall include a summary of activities, recommendations, or inputs at each stage of validating the information with local expertise; discussion of where they felt their input was most valuable; and the strengths and weaknesses they perceived in the process.

### **Resource Challenge**

The mandate of the MMS is to responsibly manage the Nation's resources in the Outer Continental Shelf to meet our energy needs. This provides for potential conflict during exploration and production of oil and gas with native subsistence fishers in their quest for food. Many of the members of the Native Village of Nuiqsut are dependent upon food resources gathered in their subsistence lifestyle. Fall fishing under the ice of the Colville River for Arctic Cisco is considered an important part of Inupiat culture and is a vital subsistence harvest for the village of Nuiqsut. At a 2003 workshop in Nuiqsut to review existing knowledge and identify major questions, it became evident that much could be gained from a multidisciplinary exploration of existing data sets before commencing with further field data collection. Through the panel, the study seeks to maximize the use of traditional knowledge and expertise of local residents familiar with Arctic Cisco and the local environment to validate the scientists' interpretations.

### **Examples of Key Partners**

Kuukpik Subsistence Oversight Panel of Nuiqsut and the U.S. Minerals Management Service

### **Results and Accomplishments**

Local residents expressed the belief that MMS was finally listening to their concerns after MMS brought the workshop to the village and involved residents in the knowledge presentations, the brainstorming and prioritization process on an equal basis with scientists and agency representatives. The present study represents a further exploration of methods to meaningfully involve local expertise and include traditional ecological knowledge in the scientific process to improve the scientific outcome of the study.

### **Project Contact**

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# **Minerals Management Service Cooperative Conservation Project**

## **Project Title**

Cape Wind Energy Project

## **Location**

Cape Wind LLC has proposed to construct an offshore wind park located on Horseshoe Shoal in Nantucket Sound, Massachusetts, 4.7 miles offshore on the Outer Continental Shelf (OCS).

## **Project Summary**

The purpose of the project is to provide a utility-scale renewable energy facility project providing power to the New England Power grid. The proposed wind park will consist of 130 (3.6 megawatt) offshore wind turbine generators arranged to maximize the park's maximum potential electric output of 454 megawatts.

## **Innovation/Highlight**

This could be one of the first offshore wind park in the United States and one of the first sources of OCS alternative energy to make its way to Northeast consumers via the New England grid.

## **Resource Challenge**

The Cape Wind Energy Project proposal has stirred significant controversy, with major political figures taking different positions, and national environmental groups divided over the issue. Potential impacts to migratory bird, radar systems, vessel traffic, recreational/commercial fishing, and aesthetics (primarily view shed) are major issues of concern.

## **Examples of Key Partners**

Cape Wind LLC, State of Massachusetts, Cape Cod Commission, Massachusetts Audubon Society, Alliance to Protect Nantucket Sound, U.S. Coast Guard, U.S. Corps of Engineers, U.S. Environmental Protection Agency, Federal Aviation Administration, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, the Wampanoag Tribe of Gay Head, and the U.S. Minerals Management Service.

## **Results and Accomplishments**

Under the Energy Policy Act of 2005 (EPAct), the DOI/MMS became the lead Federal agency for the Cape Wind Energy Project. The MMS is preparing a draft Environmental Impact Statement (EIS) covering issues outlined in Section 388 of the EPAct and the National Environmental Policy Act. Scoping for the EIS was completed in July 2006.

The draft EIS is scheduled be available for public review and comment in February 2007; public hearings will be scheduled in April 2007. A final EIS is scheduled for November 2007 and the Record of Decision covering the project will be available in January 2008.

**Project Contact**

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# **Minerals Management Service Cooperative Conservation Project**

## **Project Title**

Long Island Offshore Wind Park (LIOWP)

## **Location**

Long Island Power Authority (LIPA) and Florida Power and Light (FPL) have proposed an offshore wind park located about 3-4 miles off the South Shore of Long Island, New York on the Outer Continental Shelf (OCS).

## **Project Summary**

The proposed wind park would entail installation of 40 (3.6 megawatt) offshore wind turbines to produce 140 megawatts of electricity for use by Long Island communities.

## **Innovation/Highlight**

This could be the one of the first offshore wind parks in the United States and one of the first sources of OCS alternative energy to make its way to local consumers.

## **Resource Challenge**

Local businesses and activist groups in the Long Island, New York area are split over support for this project. Potential impacts to migratory bird, radar systems, recreational/commercial fishing, recreational activities, and aesthetics (primarily view shed) are major issues of concern.

## **Examples of Key Partners**

Long Island Power Authority, Florida Power and Light, State of New York, Save Jones Beach, U.S. Coast Guard, U.S. Corps of Engineers, U.S. Environmental Protection Agency, Federal Aviation Administration, National Oceanic and Atmospheric Administration, and U.S. Fish and Wildlife Service.

## **Results and Accomplishments**

Under the Energy Policy Act of 2005, the MMS became the lead Federal agency for the LIOWP project. The MMS published a Notice of Intent to prepare an Environmental Impact Statement (EIS) in June 2006 and held public scoping meetings on Long Island, New York in July 2006. MMS anticipates the draft EIS will be available to the public for review and comment in May 2007, with public hearings held in June 2007. A final EIS is scheduled for March 2008 and the Record of Decision on the Project will be available in April 2008.

## **Project Contact**

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# **Minerals Management Service Cooperative Conservation Project**

## **Project Title**

Deepwater Program: The Archaeological and Biological Analysis of World War II Shipwrecks in the Gulf of Mexico; A Pilot Study of the Artificial Reef Effect in Deepwater

## **Location**

Gulf of Mexico, Central Planning Area

## **Project Summary**

This study is jointly sponsored by MMS and National Oceanic and Atmospheric Administration's (NOAA) Office of Ocean Exploration (OE) as part of the National Oceanographic Partnership Program (NOPP).

With expanding development of oil and gas activity in deepwater comes increasing challenges in managing Submerged Cultural Heritage on the Outer Continental Shelf and Slope. In order to fulfill our obligations under Section 106 of the Historic Preservation Act of 1966 (36 CFR 800), the MMS needs a clearer understanding of the size of debris fields to be expected around deepwater wrecks, as well as their state of preservation and future research potential. This information is critical for making management decisions concerning disturbance avoidance areas. In addition, 36 CFR 800.4(c) states that "the Agency Official shall make a reasonable and good faith effort to identify historic properties that may be affected by (an) undertaking and gather sufficient information to evaluate the eligibility of these properties for the National Register." In order to make a determination of potential eligibility, the MMS requires sufficient documentation to apply the National Register criteria for evaluation (36 CFR 60.4) to each selected site.

The MMS has played an instrumental role in the development of the Rigs-to Reefs program in the Gulf of Mexico (GOM) leading to the passage of the National Fishing Enhancement Act of 1984 and publication of the National Artificial Reef Plan in 1985. Converting offshore oil and gas structures has been well accepted as a benefit to fisheries on the continental shelf of the entire GOM. A total of 49 structures have been converted to artificial reefs from a total of 383 structure removals between 1999 and June 2002. In the near future, decisions will be required for the removal of structures located in water depths beyond the continental shelf. Options for removal at shallower depths have previously relied on the concept that the structure left behind would serve a positive fisheries enhancement or other beneficial environmental function. The MMS now has a direct need for information that will help describe any significant ecological role (if any) that man-made structures may have in deepwater of the GOM (in this case, greater than 300 feet).

The archaeological objective of the study is to ground-truth, document, positively identify, and assess the National Register status of up to eight wrecks sunk during World War II. This objective will require both historical research and field investigation to be conducted for each site. The biological component of this study is intended to approach one basic question: do man-made artificial structures or objects, *i.e.*, shipwrecks, function as artificial reefs in deep water? Although there is not yet a complete understanding of how artificial reefs function on the continental shelf it is generally accepted that they serve a positive function by creating new habitat and in the case of fish, they act as attraction devices.

Detailed historical research has been conducted on each vessel proposed for study. This research includes primary source material such as photographs, ship's plans, and oral histories to evaluate each vessel's potential significance in American history. Archaeological site investigations included collecting detailed photographic and acoustic imagery of each vessel.

The biological investigations investigated the inter-relationships of the biological activities associated with each wreck site with the local ocean-floor environments. The investigation followed the fundamental premise that the local biomass (all living cells and creatures) becomes focused at each wreck site as a result of the disturbance to the local ocean floor created by the presence of the wreck. Study methods included detailed photo analysis, sediment cores, and specimen collection.

### **Innovation/Highlight**

The MMS Pilot Study could have significant impact on deepwater oil and gas exploration in the GOM and around the world. The results of the biological research will provide information on the viability of deepwater shipwrecks and platforms in the GOM as artificial reefs. These data will be available for comparison with data from similar studies on both a regional and global scale that could further our understanding of deepwater ecosystems worldwide. Archaeologically, the study is one of the most comprehensive deepwater shipwreck investigations ever conducted. Information from this project will provide valuable insight into deepwater archaeological site formation and preservation.

### **Resource Challenge**

The resource challenge of this project is to protect the archeological resources of the GOM and to understand their role in determining the biology and ecology of the deepwater while allowing the development and production of much-needed domestic oil and gas resources. Meeting this goal requires an understanding of the biological roles of deepwater structures and their use in the Gulf of Mexico in order to mitigate any adverse impacts created by oil and gas activities.

### **Examples of Key Partners**

MMS, NOAA Office of Ocean Exploration, National Oceanographic Partnership Program, C&C Technologies, Sonsub, Hornbeck Offshore Services, Droycon,

Bioconcepts, Dauphin Island Sealab/Univ. of Alabama, University of West Florida,  
University of Alaska Fairbanks, University of Montana, PAST Foundation

## **Results and Accomplishments**

The contract was awarded September 24, 2003 to C&C Technologies, Inc. of Lafayette, Louisiana. Fieldwork was completed in August 2004. As a result of the extensive amount of data that were collected, the contract was extended to the end of 2006 in order for the analyses to be completed. All analyses have been finalized and a draft report is currently under review.

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# Minerals Management Service Cooperative Conservation Project

## Project Title

Investigations of Chemosynthetic Communities on the Lower Continental Slope of the Gulf of Mexico

## Location

Northern Gulf of Mexico; full depth range of all U.S. Exclusive Economic Zone deeper than 1,000 meters

## Project Summary

This is a partnership study initiated through the National Oceanographic Partnership Program (NOPP) and co-funded by MMS and the National Oceanic and Atmospheric Administration's Office of Ocean Exploration (NOAA/OE). This project extends previous MMS studies of Gulf of Mexico chemosynthetic communities and hard bottom coral communities to include the entire continental slope to depths of 3,000 meters. Objectives of the study include both exploration of newly discovered sites as well as focused/process-based studies at known sites. Knowledge of the distribution, relative abundance, and population structures of deepwater organisms, particularly the high-density chemosynthetic communities and coral habitats, will provide critical information for management of these unique biological assemblages. Objectives also include the development or improvement of assessment methodologies for remote sensing detection of these sensitive deepwater communities to be used to avoid environmental impacts. This project will expand understanding of sensitive biological communities throughout all depths of the Gulf of Mexico.

## Innovation/Highlight

This cooperative NOPP project has leveraged co-funding from both the Department of Commerce and the Department of the Interior to explore and study completely new deepwater habitats in the Gulf of Mexico. The only manned submersible in the United States capable of diving to the full depth of the Gulf of Mexico, the *Alvin*, was utilized with outstanding success. A second year's field work in 2007 will utilize the state-of-the-art Remotely Operated Vehicle (ROV) *Jason II*, operated out of the Woods Hole Oceanographic Institution.

## Resource Challenge

Our recent basic understanding of chemosynthetic communities and deepwater hard bottom communities has been limited to the study sites chosen by previous projects that were restricted by the depth capabilities of available submersible technology, *i.e.*, the *Johnson Sea Link* submersibles with a depth capability of 1,000 meters. Information on the deepwater environment and its biota deeper than 1,000 meters is needed because the

oil and gas industry is moving into deeper and deeper water in their continuing search for extractable hydrocarbon reserves. Exploration is now taking place in the deepest parts of the U.S. Gulf of Mexico. Knowledge of the distribution, relative abundance, and population structures of deepwater organisms, particularly the high-density chemosynthetic communities and deepwater coral communities, will provide critical information to estimate the potential effects of deepwater exploration and production and allow refinement of mitigation measures for protection this deeper continental slope area.

### **Examples of Key Partners**

The two funding partners are MMS and NOAA/OE, but there are a variety of contractors including those from the private sector, universities and other government agencies. The prime contractor is the company, TDI Brooks International, Inc., with subcontractors including Texas A&M University/Corpus Christy, Penn State University, Louisiana State University, and the University of Georgia. Additional collaborative work with investigators from the U.S. Geological Survey began in 2006, but will be significantly expanded during the second field sampling year in 2007.

### **Results and Accomplishments**

The first year of field work has been completed with spectacular results. The first cruise used the newly acquired R/V *Gyre*, previously operated by Texas A&M University, to investigate potential study sites with a variety of sampling equipment including a lowered digital camera array. This cruise confirmed the presence of communities of interest targeted by utilizing seabed seismic amplitude data obtained by industry and maintained at MMS. Already completed field work in 2006 using the submersible *Alvin* has discovered numerous chemosynthetic and coral communities and many new animal species including long-lived chemosynthetic tubeworms not previously known to science.

### **Project Contact**

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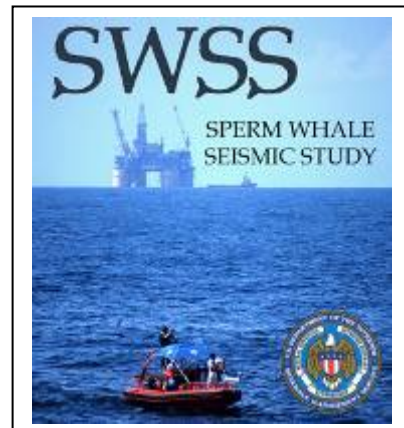
# SWSS SPERM WHALE SEISMIC STUDY



Managed by Texas A&M Research Foundation

Jonathan Gordon  
Photo

## Minerals Management Service Cooperative Conservation Project



### Project Title

SWSS : Sperm Whale Seismic Study

### Location

Gulf of Mexico

### Project Summary

In managing the oil and gas resources of the Outer Continental Shelf (OCS), the U.S. Minerals Management Service (MMS) seeks "to ensure that all activities on the OCS are conducted with appropriate environmental protection and impact mitigation." The MMS sponsors studies to evaluate environmental impacts of OCS activities and to identify appropriate mitigation measures. Since the 1970s, one environmental focus has been the potential for impact of anthropogenic noise on marine mammals. Marine mammals are adapted to use sound in the ocean for communication, navigation, prey identification and location, and sensing of the environment. These animals have evolved in an ocean that is filled with natural sounds. Humans began to introduce additional sound sources with the advent of the industrial age in the mid-19th century. As these sounds increase, the potential for affecting marine mammals increases as well. Of concern are the potentials for negative behavioral and physiological responses to human-generated sound, at both the individual and population levels.

As oil and gas activities moved into ever-deeper water in the Gulf, MMS recognized the increased potential for industry impacts to deepwater species of cetaceans. One species of particular concern was the sperm whale (*Physeter macrocephalus*), which is listed as endangered under the Endangered Species Act (ESA). In response, the Sperm Whale Seismic Study (SWSS) was proposed to and approved by MMS in 2002.

The SWSS is a multi-institutional, interdisciplinary research project supported by MMS under Cooperative Agreement 1435-01-02-CA-85186 for *Cooperative Research on Sperm Whales and their Response to Seismic Exploration in the Gulf of Mexico* through the Texas A&M Research Foundation. Texas A&M University (TAMU) provides program management and data management. Scientists from Ecologic, Oregon State University (OSU), Scripps Institution of Oceanography (SIO), Texas A&M University (TAMU), Texas A&M University-Galveston (TAMUG), University of Colorado (CU), University of Durham in the United Kingdom (UD), University of Saint Andrews in the United Kingdom (UStA), and Woods Hole Oceanographic Institution (WHOI) develop and implement scientific research plans associated with the study of sperm whales in the

northern Gulf of Mexico. Sponsors are MMS, National Science Foundation (NSF), ONR, IRFC, and the National Fish and Wildlife Foundation (NFWF). A five-member Science Review Board (SRB), established in year 2, provides recommendations and review of this Report. All activities associated with sperm whales are conducted under permits issued by the National Marine Fisheries Service (NMFS).

The objectives of SWSS are to:

- (1) Establish the normal behavior of sperm whales in the northern Gulf of Mexico,
- (2) Characterize sperm whale habitat use in the northern Gulf of Mexico, and
- (3) Determine possible changes in behavior of sperm whales when subjected to manmade noise, particularly from seismic air gun arrays used for offshore petroleum exploration and geological monitoring.

Field cruises were conducted in 2002, 2003, 2004, and 2005. In 2006, efforts were dedicated to analysis, synthesis, and integration for a Final Report expected in 2007.

### **Innovation/Highlight**

The SWSS program has combined cutting-edge technology with internationally-acknowledged research to gain knowledge of the behavior of endangered sperm whales. The multi-faceted study design, and the ongoing synthesis of data from a variety of perspectives, is giving researchers and regulators the information needed to insure the protection of this endangered species. Technical innovations have led to numerous new equipment and instrument designs that will not only benefit the SWSS project, but other research around the globe.

### **Resource Challenge**

The resource challenge of the SWSS project is to protect the endangered sperm whale and its habitat while allowing the development and production of much-needed domestic oil and gas resources. Meeting this goal requires an understanding of sperm whale behavior and its use of the GOM in order to mitigate any adverse impacts created by oil and gas activities.

### **Examples of Key Partners**

The SWSS is sponsored by the U.S. Minerals Management Service and involves researchers from Texas A&M University, Oregon State University, Woods Hole Oceanographic Institution, Scripps Institution of Oceanography, Texas A&M University-Galveston, University of Durham, University of Saint Andrews, University of Colorado, and Ecologic with support and cooperation from the Industry Research Funders Coalition (International Association of Geophysical Contractors and oil and gas companies), National Fish and Wildlife Foundation, National Science Foundation, and Office of Naval Research.

### **Results and Accomplishments**

Although the Final Report is not due until 2007, numerous results have already been

included in interim reports and are outlined below.

### ***Behavior***

Preliminary SWSS findings indicate that GOM sperm whales are different from other populations. Significant genetic differences have been identified between northern Gulf sperm whale population and the populations of sperm whales from the Mediterranean Sea, the North Sea, and the North Atlantic Ocean. The preliminary analyses of coda vocalizations of GOM sperm whales finds significant differences in these as compared with sperm whale populations in the rest of the Atlantic. The mixed group coda vocalizations in the GOM belong to an acoustic clan that is rare in other areas, and this leads researchers to believe that sperm whale groups from other clans rarely enter the northern GOM.

### ***Genetic Analyses, Coda Vocalizations, and Population Structure Support***

Population structure of sperm whale groups studied in the northern GOM between the Mississippi Canyon and the Desoto Canyon showed variations from other populations studied in similar detail. The GOM sperm whales are also smaller than the whales in the Gulf of California, which have been studied using similar measurement techniques. These results suggest segregation between GOM sperm whales and those in the rest of the Atlantic that, based on the lack of matches and the differences in coda vocalizations, has likely spanned decades. All of these data support the management treatment of northern GOM sperm whales as a separate population.

### ***Habitat Use***

The 2002-2004 SWSS cruises searched for whales mainly in the area between Mississippi Canyon and DeSoto Canyon.

Researchers hypothesized that locally high chlorophyll features that persist for periods of months, particularly cyclonic eddies or eddy-induced off-margin flows, provide the sustained primary production needed for higher biological production that can be feeding grounds for sperm whales along the continental slope. Multiyear measurements demonstrated a very dynamic environment with striking year-to-year differences in the locations along the 1,000-meter isobath where similar oceanographic features occurred.

### ***Sperm Whales and Manmade Noise***

Experiments were designed to investigate the sound exposure level at which behavioral changes begin to occur. The primary tool for this investigation was the D-tag used in conjunction with seismic air gun CEE's to quantify changes in the behavior of sperm whales throughout their dive cycle. Eight whales were tagged over two field seasons (2002-2003). The acoustic exposure and foraging behavior of these whales were recorded on the D-tag before, during, and after a 1- to 2-hour controlled sound exposure to typical air gun arrays. The maximum sound level exposures for the eight whales were between 130 and at least 162 dBp-p re 1  $\mu$ Pa at ranges of 1.5-12.8 km from the sound source.

The whales showed no change to diving behavior or direction of movement during the gradual ramp-up or during the full-power sound exposures. There was no avoidance behavior toward the sound source. Foraging behavior was temporarily altered for the whale that was approached most closely. The surface resting period was prolonged hours longer than typical, but normal foraging behavior resumed immediately after the air guns ceased.

The results of these three independent approaches suggest that sperm whales display no horizontal avoidance to seismic surveys in the GOM. However, these observations are based on very few exposures <160 dBp-p re 1  $\mu$ Pa. Also, these experiments were carried out in an area with substantial human activity and the whales are not naive to human-generated sounds.

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