

# MMS OCEAN SCIENCE

VOLUME 4 ISSUE 4

OCTOBER/NOVEMBER/DECEMBER 2007

THE SCIENCE & TECHNOLOGY JOURNAL OF THE MINERALS MANAGEMENT SERVICE



**Celebrating  
25 Years of Science  
and Technology**

**MMS Unlocks the  
Secrets of the  
Ocean Floor**

**250th Unannounced  
Oil-Spill Drill in the  
Gulf of Mexico**

**Oil-Spill Research  
Flows for 15 Years**

**Gas Hydrates  
Present a  
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**MMS Milestones**

**Partnership  
Initiatives Shape the  
MMS Family Tree**

**MMS and  
Environmental  
Studies**

**Managing the Arctic  
Becomes More  
Sophisticated**

**The "Pros" of  
the Environmental  
Studies Program**





MMS *OCEAN SCIENCE* is published quarterly by the Minerals Management Service to communicate recent ocean science and technological information and issues of interest related to offshore mineral recovery, ocean stewardship, and mineral revenues.



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#### ABOUT THE COVER

Top Left: Early offshore oil development in the Gulf of Mexico.

Top Center: Tiny orange sea anemone growing on a rock near a natural asphalt site. *Image courtesy of Aquapix and Expedition to the Deep Slope 2007.*

Top Right: An expended shell casing from a German U-507 from the wreck of the *Alcoa Puritan*.

Main Photo: Frozen gas hydrate.

Back Page: *Background platform image by Gregory S. Boland*

*All photos courtesy of Minerals Management Service unless otherwise noted.*

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# MMS OCEAN SCIENCE

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Minerals Management Service  
1982-2007

For more information about the Minerals Management Service, check out our site on the World Wide Web:

[www.mms.gov](http://www.mms.gov)

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**A**s 2007 comes to a close, the Minerals Management Service (MMS) looks back on its 25 years of accomplishments in adding to its scientific knowledge base and managing economic development of the ocean environment. There have been many highlights, from 15 years of oil-spill research at Ohmsett to oil and gas production on the *Independence Hub* in the Gulf of Mexico (GOM), which is currently the deepest producing platform to date in the world. With these and numerous other advancements, new deepwater research and explorations hold exciting possibilities for the discovery of new domestic energy resources.

Currently, MMS manages offshore oil and gas exploration for 1.76 billion acres of the Outer Continental Shelf (OCS). This task, along with balancing protection of the ocean environment, is a huge responsibility for the 1,700 employees of MMS across the United States—and they have not taken it lightly. The continued study of the ocean has led to reaching great depths in the deep and ultra-deep waters of the OCS, advancements in the Arctic, significant coastline restoration, research partnerships with many government agencies and universities, and a new understanding of deepwater ocean communities.

Amid all the technological developments, safety has remained a top priority for MMS. Providing for the safety of offshore workers, engineers, inspectors, and scientists is of great importance throughout their operations. Even in the midst of Hurricane Katrina in 2005, all MMS and offshore workers were evacuated without a single injury or fatality, demonstrating the

Photo of the production platform *Ocean Confidence*.



# DIVING DEEPER: CELEBRATING 25 YEARS OF SCIENCE AND TECHNOLOGY

effectiveness of the top-notch safety regulations employed by MMS.

The prospects of future research and advancements are exciting, and

MMS remains a leader in securing the Nation's energy supply as it protects the ocean environment and its newly discovered frontiers.

# MMS UNLOCKS THE SECRETS OF THE OCEAN FLOOR

**T**hroughout the past 25 years, the Minerals Management Service (MMS) has used its resources to balance industry development with the protection of the ocean environment. Their research has not only allowed oil and gas exploration to plunge into deeper ocean depths in an environmentally sound manner, but in the process has provided scientists a window with which to see the previously unknown features of the ocean floor.

Seismic surveys and remotely operated vehicles (ROV's) are tools greatly utilized by scientists for ocean

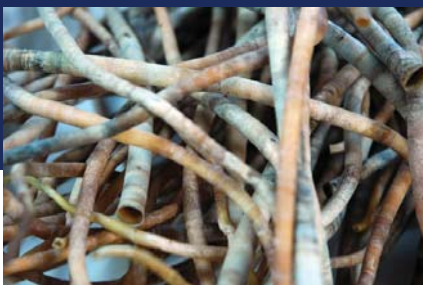
investigation. This technology has given MMS a means to ensure that deepwater biological communities are not disturbed by the search for domestic energy supplies. In addition to providing essential information about where oil and gas reserves lie

Knowledge gained from the Environmental Studies Program furthers the mission of MMS...

deep in the earth, seismic survey data are also used to map the ocean floor in 3D, aiding in the mapping of hazards on the seabed as well as providing the locations of sensitive

biological communities. The ROV's allow scientists close-up images of the deep-sea environment and its populations, and they can also be equipped with instruments to collect a variety of samples.

The MMS has partnered with the National Oceanic and Atmospheric Administration's Office of Ocean Exploration (NOAA-OE) for several studies to investigate deep Gulf of Mexico (GOM) waters. Federal deepwater areas hold 7 of the top 20 oil fields in the U.S., adding to the importance of understanding this environment. With the assistance of NOAA's ocean exploration program, MMS has



Left to right: Tubeworms - After documenting the ecology of the tubeworm communities, scientists are collaborating with NOAA educators by providing leftover tubes to teachers as educational aids to promote ocean literacy. *Image courtesy of Expedition to the Deep Slope 2007.* Gas Measurements - A mass spectrometer with a uniquely designed membrane inlet system allowing *in situ* dissolved gas measurements in deep-sea environments. *Image courtesy of Peter Girguis, Harvard University.* Asphalt - Due to its unusual nature and rare occurrence, the big asphalt sample attracted a crowd once on deck of the *Ron Brown*. It has a botryoidally shaped (like a bunch of grapes) hardened outer crust that is very friable and, when pulled apart, the rock's interior looks like chewing gum. *Image courtesy of Matt Frye, Minerals Management Service.*



been able to study the communities living in deep Gulf of Mexico waters, along with biological and archaeological studies of shipwrecks also acting as artificial reefs.

For the last two years, MMS and NOAA have partnered to visit communities deeper than 9,000 feet in the GOM. These expeditions have utilized modern ROV's to study chemosynthetic communities and deepwater corals to understand their habitat and to avoid any potential effects of future oil and gas production. This research allows scientists to pinpoint sensitive areas, protecting the environment as new reserves are explored. During the 2006 and 2007 "Expedition to the Deep Slope," the teams of scientists discovered hard corals, bamboo corals, sea fans, and mussels. They have also studied the tubeworms of the GOM seeps, some of the oldest animals on the planet.

**FOR MORE INFORMATION:**

**Deepwater Program**

Website: [www.gomr.mms.gov/homepg/regulate/envirom/archaeological/arch\\_bio\\_analysis.html](http://www.gomr.mms.gov/homepg/regulate/envirom/archaeological/arch_bio_analysis.html)

**MMS Ongoing Studies**

Website: [www.gomr.mms.gov/homepg/regulate/envirom/ongoing\\_studies/gm/GM-05-03.html](http://www.gomr.mms.gov/homepg/regulate/envirom/ongoing_studies/gm/GM-05-03.html)

**Deep Gulf Shipwrecks of WWII**

Website: [www.pastfoundation.org/DeepWrecks/index.htm](http://www.pastfoundation.org/DeepWrecks/index.htm)

**Expedition to the Deep Slope**

Website: [www.oceanexplorer.noaa.gov/explorations/06mexico](http://www.oceanexplorer.noaa.gov/explorations/06mexico)

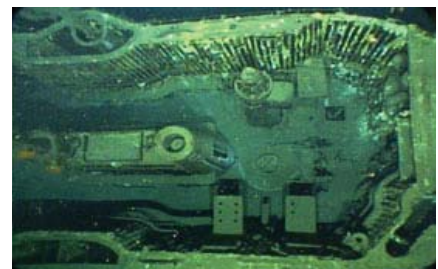
**Expedition to the Deep Slope 2007**

Website: [www.oceanexplorer.noaa.gov/explorations/07mexico/welcome.html](http://www.oceanexplorer.noaa.gov/explorations/07mexico/welcome.html)

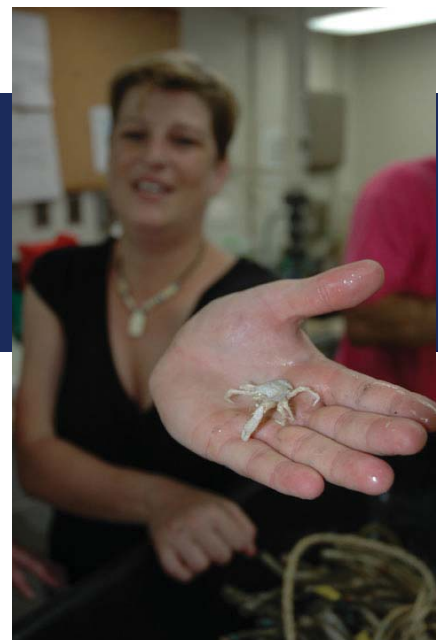


To learn more about the effects of artificial reefs, MMS and NOAA studied six World War II shipwrecks. Sunk by German submarines in the Gulf of Mexico, the *Gulfpenn*, *Virginia*, *U-166*, *Robert E. Lee*, *Alcoa Puritan*, and *Halo* were examined to determine how the manmade structures function as artificial reefs as well as for any historical properties significant to American history. Using satellite technology to map the wreck site and ROV's capable of plunging thousands of feet below the surface, scientists were able to view and sample sediments and organisms from the artificial reef environments to compare to the natural environment. In addition, scientists were able to view the long-term effects of manmade objects on the deep seafloor and their disintegration effects on the surroundings.

As the search for domestic energy moves farther into deep waters, the research collected will help provide for the safety of the biological communities located in these new production areas. Knowledge gained from the Environmental Studies Program furthers the mission of MMS as a steward of the ocean environment while securing the Nation's energy supply.



Top: Target ships for the Deep Wrecks Project. Image courtesy Minerals Management Service and PastFoundation.org. Above: Interior of the conning tower of the WWII German submarine *U-166*. Below: Julia Zekely shows off a tiny crab collected with the Bushmaster collection device. The species is found in association with tubeworm communities. Image courtesy of Expedition to the Deep Slope 2007.



## Minerals Management Service Conducts 250th Unannounced Oil-Spill Drill in the Gulf of Mexico

The Minerals Management Service (MMS) recently conducted its 250th oil-spill response drill as part of its Unannounced Drill Program. The drill, which took place October 16, 2007, tested offshore operator Shell Exploration and Production Company's (Shell) Oil-Spill Response Plan.

"MMS uses these drills to test the operators' Oil Spill Response Plans," explained Lars Herbst, Gulf of Mexico Regional Director. "Oil and gas operators have excellent safety records in the Gulf and response plans are seldom called into action, but MMS wants to be sure that the operators are able to respond to an event if necessary."

The 250th unannounced drill began with an early morning call to Shell's URSA platform in the Gulf of Mexico informing the crew that an oil-spill drill was being initiated. As part of the drill, all activities were observed and monitored by both MMS staff and a representative of the U.S. Coast Guard, who serves as the Federal on-scene coordinator. The MMS documents the operator's response time and ability to acquire the needed resources to respond.

At the conclusion of the drill's activities, staffs from MMS and Shell discussed the drill activities with the Coast Guard's on-scene coordinator. A major benefit of the drill program is the lessons learned about what works and what needs improvement. An operator must

meet all plan elements tested in order to successfully pass the drill.

The MMS initiated the Unannounced Drill Program in 1989. Approximately 20 drills are conducted by MMS staff each year. Every drill tests two components: an operator's ability to notify the appropriate contacts and an operator's ability to make the decisions concerning mobilization of a proper response.

"The drill program has improved incident response across the board," commented Rusty Wright, MMS Gulf Region oil-spill program administrator. "These drills have increased the speed of response and improved the effective use of the plans."

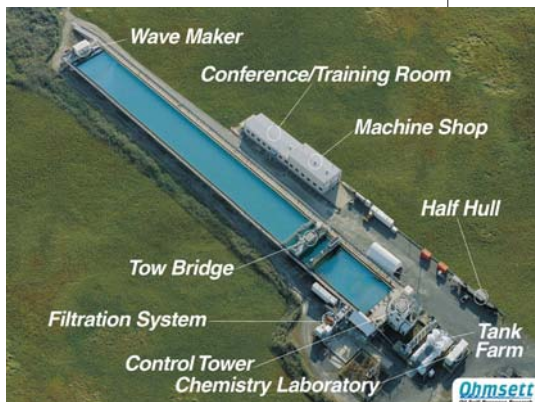
## Ohmsett Reaches Milestone – Oil-Spill Research Flows for 15 Years

In 1992, Ohmsett, the only full-scale, oil-spill response facility in the world was dedicated as a testing facility for the Minerals Management Service (MMS). As a steward of the ocean environment, MMS acquired and restored the Ohmsett facility, originally constructed in 1973, to provide a safe marine environment to research, test, and train for thorough response to oil spills.

Ohmsett is located in Leonardo, New Jersey, approximately an hour south of New York City. The main feature of the site is its test tank, one of the largest of its kind at 667 feet long and 65 feet wide, filled with 2.6 million gallons of salt water. Ohmsett is important to researchers who use it to create oil spills in an environment that models obstacles like those encountered in the vast ocean and to simulate real-world conditions with features such as wave-generators and artificial beaches.

With new upgrades to Ohmsett, the facility is now open throughout the entire year for testing and training in all temperatures. The data collected is vital to MMS for regulation of oil and gas development on the Outer Continental Shelf (OCS), and the training is very

important for future response. Joseph Mullin, MMS Program Manager for Oil Spill Response Research, says, "Ohmsett is an international asset where government, private industry and academia can conduct oil spill research and development programs." Partnerships and clients include foreign government agencies like the Canadian Coast Guard, major oil industry companies, and educational institutions such as the National Spill Control School at Texas A&M University. The knowledge and training gained from Ohmsett will continue to help MMS meet the challenges involved in protecting the OCS, while continuing to explore U.S. resources for domestic energy.



### FOR MORE INFORMATION:

Website: [www.mms.gov/tarprojectcategories/ohmsett.htm](http://www.mms.gov/tarprojectcategories/ohmsett.htm)

Website: [www.mms.gov/taroilspills/](http://www.mms.gov/taroilspills/)

Website: [www.ohmsett.com/index.html](http://www.ohmsett.com/index.html)

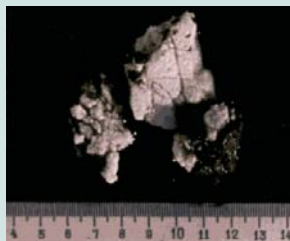


# GAS HYDRATES PRESENT A CHALLENGING OPPORTUNITY



Imagine energy reserves 200 times the current known natural gas supply in the United States. That is what scientists estimate the potential of methane gas hydrates to be! But converting that promise into production is years, if not decades, away and too complex and expensive for private industry to tackle alone.

In light of the enormous potential of this clean-burning fuel resource and its possible positive impact on our Nation's energy and economic future, Congress passed the Methane Hydrate Research and Development Act of 2000. This legislation directs agencies to determine the available supply of gas hydrates, its energy potential, and economically viable extraction methods. The Secretaries of the Department of the Interior and Energy were also directed to work together to develop technical and financial incentives to encourage private industry to develop gas hydrates as rapidly as possible.



Left: Gas hydrates (yellow) are ice with gas trapped inside; exposed beds are accessible to submersibles on the deep seafloor of the Gulf of Mexico. Ice worms (*Hesiocaeca methanicola*), a new species only seen in hydrate, were discovered in 1997 by C. Fisher, Penn State University. Right: Irregular shaped pieces of gas hydrate recovered from sediments in the Sea of Okhotsk, east of Sakhalin Island. The pieces were removed from sediment recovered from a gravity core that penetrated the seafloor sediments to about 2 meters in a water depth of 708 meters. Scale is in centimeters.

Gas hydrates are complex chemical compounds known as clathrate compounds. Clathrates exist where molecules of one material (in this case, water) form a "cage" that encloses molecules of another material (in this case, methane and related gases). This frozen lattice-like enclosure occurs without chemical bonding of the two materials. Areas where the environment is cold and/or highly pressurized, such as the Alaskan perma-

frost or deepwater seafloors, contain vast deposits of hydrates.

Although recent research has proven that extraction of gas hydrates is technically possible, significant obstacles to commercial production exist. One important obstacle to the safe development of hydrates is their propensity for destabilization or dissociation, creating an uncontrolled release of large volumes of methane. Gas hydrate dissociation may also cause the seafloor to become unstable, presenting a significant hazard for exploration equipment and personnel should the surrounding floor collapse. The Gas Hydrate Sea Floor Observatory has recently been established with funding provided by the Minerals Management Service (MMS), National Oceanographic and Atmospheric Administration, the Department of Energy's National Energy Technology Lab, and the Naval Research Lab. The observatory's purpose is to "better understand the relationships between gas hydrates and episodes of sediment instability that may pose a threat to the petroleum industry's infrastructure and safety of operations." This tendency has proved a nuisance in oil and gas exploration, but methods that restrain or redirect this tendency must be explored and perfected before commercial production of gas hydrates is feasible.

Identifying the location and composition of high-yield hydrate resources is another challenge that must be overcome. Their location in deepwater and Alaskan environments makes exploration difficult at best, and industry has thus far allocated minimal resources to research methods which could make hydrate development viable.

According to the National Research Council, a shortage of natural gas from conventional and unconventional sources is expected by 2020. The anticipated shortfall has led to renewed interest in finding alternative energy sources and has opened opportunities for industry to team with academic and governmental

entities to further investigate future hydrate exploration and production. Incentives provided under the Methane Hydrate Research and Development Act of 2000 along with research initiated by MMS will help ensure that location, characterization, and extraction of gas hydrates will provide new energy sources for a more secure economic future.

## FOR MORE INFORMATION:

### The Ocean Drilling Program

Website: [www-odp.tamu.edu](http://www-odp.tamu.edu)

### An Interagency Roadmap for Methane Hydrate Research and Development

Website: [www.fossil.energy.gov/programs/oilgas/publications/methane\\_hydrates/mh\\_interagency\\_plan.pdf](http://www.fossil.energy.gov/programs/oilgas/publications/methane_hydrates/mh_interagency_plan.pdf)

### Gas Hydrates Research Consortium

Website: [www.mms.gov/offshore/GasHydratesResearchConsortium.htm](http://www.mms.gov/offshore/GasHydratesResearchConsortium.htm)



# MILESTONES

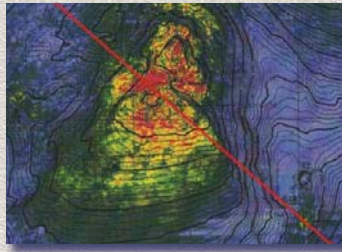
# MMS

1984



National Fishing Enhancement Act passed, encouraging use of offshore platforms as artificial reefs

1985



3D vertical seismic profiling developed  
(map of GOM seafloor courtesy of Harry Roberts, LSU)

1992



Dedication of Ohmsett, a full-scale, oil-spill research facility in New Jersey

1988



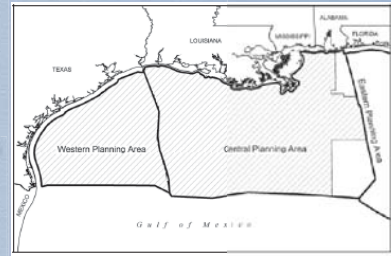
First horizontal well drilled from semisubmersible drill rig

1982



MMS created as a bureau of the Department of the Interior

1989



Most bids received on a block: Western GOM Lease Sale 122, offshore Galveston, Texas

19



First Outer Continental Shelf (OCS) rig installed for beach near Duval County

1980

1990

25



95



Continental sand used for restoration: Santa Rosa Beach, Florida

2001



OCS production begins in Alaska at the BP Northstar Unit in the Beaufort Sea

2004



Technology Assessment & Research (TAR) Program reaches a milestone of 500 research projects

2006



In 2006, the 25 millionth cubic yard of OCS sand is placed on a beach. Also in 2006, over 100 miles of U.S. shoreline had been restored.

2005



The Energy Policy Act of 2005 is enacted, giving MMS jurisdiction over renewable energy projects

2007



Production begins on the Independence Hub, the deepest production platform ever installed and the world's largest offshore natural gas processing facility

1996



Neptune, the world's first SPAR, is installed in the GOM in 1,851 feet of water

2000

2010

# 5 Years of Highlights





Minerals Management Service  
1982 - 2007

# Partnership Initiatives Shape the MMS Family Tree

**B**alancing development of domestic resources with protection of the ocean environment is no small task. For the Minerals Management Service (MMS), this goal is accomplished through many partnership endeavors, from educational research to industry operations. The information gained from these combined efforts is used to make the best decisions for oil and gas leasing and exploration. Some key partnerships include the Coastal Marine Institute (CMI), Marine Minerals Program (MMP), International Activities Program, Industry Awards Program,

Offshore Technology Resource Center (OTRC), and Ohmsett.

## Coastal Marine Institute

The CMI is an initiative proposed in 1991, with its first official partnership signed in 1992 with the State of Louisiana and Louisiana State University. Operated by the Environmental Studies Program, the purpose of the CMI initiative is to involve students and faculty at coastal institutions for development of new oil and gas activity research in the Outer Continental Shelf (OCS). This partnership has resulted in a better flow of information to the public,

strengthened State relationships, and provided opportunities for cost-sharing. Other CMI partnerships have included the University of Alaska and the University of California at Santa Barbara.

## Marine Minerals Program

Through the MMP, MMS has conveyed over 33 million cubic yards of OCS sand to restore 126 miles of the Nation's beaches and coastlines. Of the 23 projects completed to date, several were done on an emergency basis to prevent imminent loss of a portion of a barrier island. The MMP continues to work with coastal states through sand management working groups and other venues to coordinate shoreline restoration activities and potential borrow site studies, and to establish priorities for processing sand lease requests. In addition, the MMP manages generic environmental and other technical studies related to OCS sand and other minerals at the Louisiana State University CMI, the Center for Marine Resources and Environmental Technology at the University of Mississippi, and the Marine Minerals Technology center at the University of Alaska-Fairbanks.

## International Activities Program

The MMS has established relationships around the world and currently has involvement with 14 different countries. Through these

### FOR MORE INFORMATION:

#### Coastal Marine Institutes

Website: [www.mms.gov/eppd/sciences/esp/profiles/partners/cmi/index.htm](http://www.mms.gov/eppd/sciences/esp/profiles/partners/cmi/index.htm)

#### Offshore Minerals Management

Website: [www.mms.gov/BetYouDontKnow/Bet-GOMKnowledgeBaseContinuallyExpanding082207.htm](http://www.mms.gov/BetYouDontKnow/Bet-GOMKnowledgeBaseContinuallyExpanding082207.htm)

#### International Partnerships

Website: [www.mms.gov/international](http://www.mms.gov/international)

#### Industry Awards

Website: [www.mms.gov/awards](http://www.mms.gov/awards)

#### Offshore Technology Resource Center

Website: [www.otrc.tamu.edu/index.htm](http://www.otrc.tamu.edu/index.htm)

Website: [otrc.tamu.edu/Pages/mission.htm](http://otrc.tamu.edu/Pages/mission.htm)

#### Oil and beaches

Website: [www.gomr.mms.gov/homepg/whatsnew/papers/gp9518.html](http://www.gomr.mms.gov/homepg/whatsnew/papers/gp9518.html)

#### Ohmsett

Website: [www.mms.gov/tarprojectcategories/ohmsett.htm](http://www.mms.gov/tarprojectcategories/ohmsett.htm)

#### Environmental Studies

Website: [www.mms.gov/eppd/sciences/esp/profiles/partners/index.htm](http://www.mms.gov/eppd/sciences/esp/profiles/partners/index.htm)



relationships, MMS acts as a liaison for international activities and also provides policy direction for Federal OCS minerals management. The International Activities Program countries include: the United Kingdom, Australia, Canada, Kazakhstan, India, Afghanistan, Mexico, Georgia, Norway, China, Turkmenistan, Russia, Bangladesh, and Indonesia.

### Industry Awards Program

Each year, MMS presents the safest offshore operators and outstanding revenue management with national recognition of their achievement. Operators, inspectors, contractors, and industry professionals are acknowledged in award categories including National Safety Award for Excellence (SAFE), Mineral Revenues Stewardship, Corporate Leadership, and MMS Inspector.

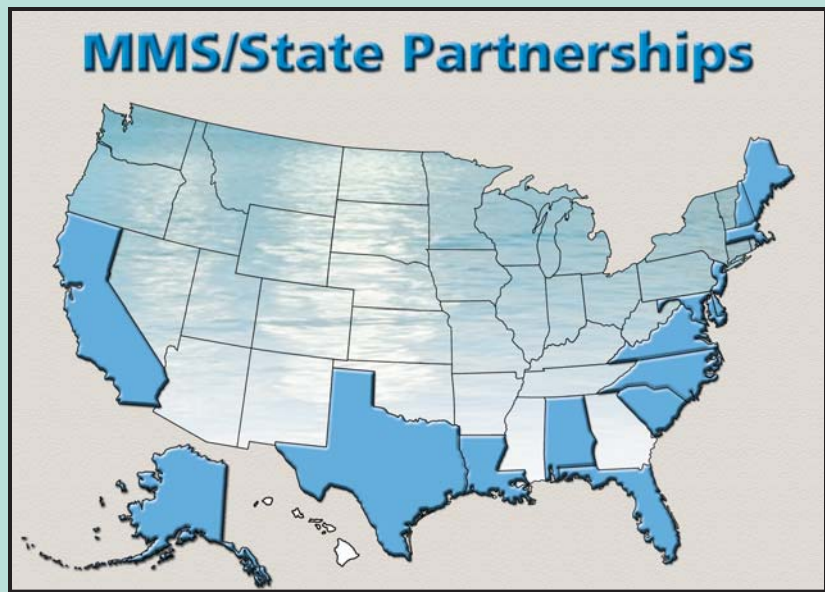
### Offshore Technology Resource Center

The OTRC is committed to providing offshore research related to the development of drilling, production, and transportation of oil and gas. The project works jointly with Texas A&M University and the University of Texas at Austin for research projects focused on the following:

- characterization of the ocean environment;
- characterization of the seafloor environment;
- environmental forces on structures and foundation systems;
- structural responses and integrity; and
- advanced composite materials.

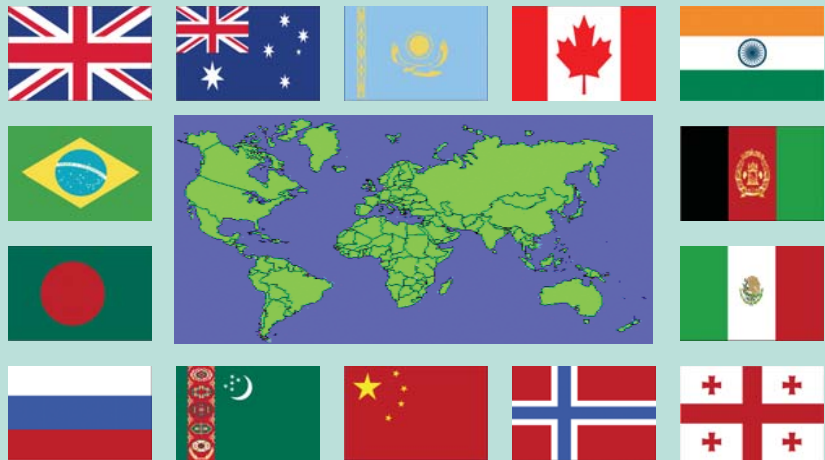
### Ohmsett

Ohmsett is the national oil-spill response test facility. The facility provides a location for simulated oil spills and cleanup methods as part of the oil-spill response research program. Through its capabilities



Map showing states which have partnerships with MMS. (Alabama, Alaska, California, Delaware, Florida, Louisiana, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, North Carolina, South Carolina, Texas, Virginia)

**T**he MMS Environmental Studies Program has completed more than 740 studies concerning the Gulf of Mexico ranging in topics from physical oceanography and marine archaeology to the study of habitats, fauna and flora, and meteorology.



The International Activities Program (IAP) has a dual role in MMS. The IAP functions as a liaison for MMS involvement in International Activities and provides policy direction for management of minerals resources on the Federal Outer Continental Shelf.

for training and testing, MMS works with a variety of government entities as well as private industry. Some of the clients include the U.S. Navy, U.S. Coast Guard, Environmental Protection Agency, University of Miami, and many others.

The MMS also has numerous important collaborations with

government agencies such as the National Oceanic and Atmospheric Administration and the U.S. Fish and Wildlife Service. The research gained from these lasting partnerships will help every American benefit from the over 1.76 billion offshore acres of Federal lands managed by MMS.

# From the Start

## MMS and Environmental Studies

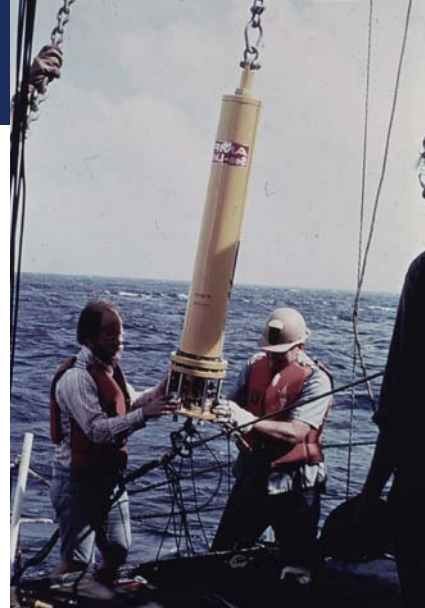
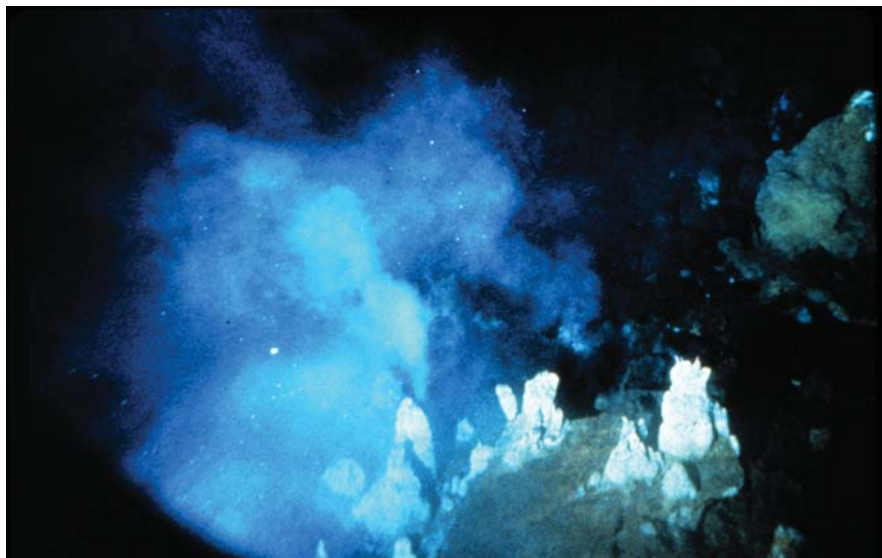
In the middle of the 20<sup>th</sup> century, scientists, governmental agencies, and the public became increasingly aware of the effect of human activity on ecosystems worldwide. The National Environmental Policy Act (NEPA) of 1969 was both a result and a precursor of increased environmental awareness in the United States. NEPA required Federal agencies to back their management decisions with environmental data on the impact those decisions might have on the ecosystems involved. The necessity for data for use as a “measuring stick” for environmental changes, especially in marine habitats, became clear. The Environmental Studies Program (ESP) was formed under the administration of the Department of the Interior and the supervision of the Bureau of Land Management (BLM), the agency then responsible for submerged lands. Subsequently, in 1982 the Minerals Management Service (MMS) was formed and given the stewardship of the Nation’s

Outer Continental Shelf (OCS), its resources, and its responsible management. The ESP became an essential part of that management.

The first funded studies of MMS’s ESP were broad baseline studies designed to enhance the knowledge base to describe the physical, biological, and socio-economic makeup of each region of the OCS. The studies were intended to provide a benchmark against which potential change caused by oil and gas activities could be measured and mitigated.

As early as 1974, BLM provided funding to the State University System of Florida, Institute of Oceanography to conduct a benchmark study in the Mississippi-Alabama-Florida (MAFLA) OCS in anticipation of oil and gas exploration in the area. The study was conducted by a consortium of investigators having special interests and expertise in the area. Results of the study indicated that in three of the five study areas, crude oil-like hydrocarbons were not present in

Minerals venting from the seafloor provide chemosynthetic sustenance for bacteria, some of Earth’s earliest life.



Current meter for deployment from deep-ocean moored buoy. Deployed off *Oceanographer* on DOMES project. DOMES was a study to determine the environmental impact of ocean mining.

the sediments or water column. The study concluded that the diverse and abundant inhabitants of the area were living in “pristine and natural ecological states.” Two of the areas, however, showed minimal petroleum traces. The study was then broadened to consist of seafloor, water column, and water surface data in the MAFLA area including biological, chemical, geological, and physical oceanographic data.

In the ensuing years, the original baseline studies have been supplemented by many additional laboratory, field, modeling, and synthesis studies in all MMS regions to enhance the body of knowledge on which offshore oil and gas resource management decisions are made. The MMS continues to use all available data to plan new, more specific and focused studies. These studies will better quantify any future environmental changes resulting from offshore oil and gas activities, ensuring protection of the Nation’s ecological resources.

### FOR MORE INFORMATION:

Website: [www.gomr.mms.gov/PI/PDFImages/ESPIS/3/4090.pdf](http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/4090.pdf)



## MANAGING THE ARCTIC

### Becomes More Sophisticated

**A**s newer and more complex equipment and applications are introduced, the development and protection of the Arctic environment are becoming more technologically sophisticated. Previously impractical tracking and in-depth study of Arctic mammals have become more feasible and methods of oil and gas exploration with a more sensitive environmental footprint are being used.

One dilemma scientists were facing while studying the Arctic polar bear population was: “How do you track well-camouflaged polar bear mothers and their cubs into their dens in deep snow drifts or total snow cover?” The answer may be found in forward-looking infrared (FLIR) imagery. This imagery is taken with a camera using the infrared portion of the electromagnetic spectrum. Studies have shown that FLIR can detect differences in temperature between the denning bears and the surrounding snow. FLIR technology allows scientists to pinpoint the location and number of dens without disturbing the bears or their



Above: An Arctic sunrise. Inset: Tarsuit Relief Spray Ice Island (ICETECH, 2005).

hiding places—vital knowledge when the possibility of oil and gas exploration in the area looms and the impacts on the animal population are being documented.

The possible negative impact of oil and gas exploration has also led to an innovative solution to the problem of human intrusion onto the tundra. The use of artificially constructed ice islands to host exploration and drilling platforms has proven both economically and environmentally feasible in the Arctic.

Ice islands in the Arctic have obvious advantages over conventional forms of platform construction, the foremost of which is the use of onsite natural materials with no transportation costs. The current technique of

choice, spraying ice to build up thick foundations, has been used for over 30 years, but new enhancements and refinements have continued to make it even more efficient. Future improvements may include larger, more efficient pumps for maximum build-up rates. Obstacles to the efficient construction of the islands include wind and natural variations in temperature. These barriers can be overcome with planning.

Developing the oil and gas resources of the Arctic, while protecting its delicate ecosystems, is a daunting challenge. But as scientists continue to discover new uses for old technology and new technology to solve old problems, this intimidating challenge can be the foundation for an even greater knowledge base. The Minerals Management Service, as the steward of the Nation’s offshore resources, continues to encourage new and innovative ways to protect the globally treasured Arctic.

#### FOR MORE INFORMATION:

Website: [www.mms.gov/Alaska/reports/2005rpts/c\\_core\\_2005/468\\_1.pdf](http://www.mms.gov/Alaska/reports/2005rpts/c_core_2005/468_1.pdf)

Website: [www.mms.gov/Alaska/reports/2004Reports/2004\\_062.pdf](http://www.mms.gov/Alaska/reports/2004Reports/2004_062.pdf)

# THE “PROS” OF THE ENVIRONMENTAL

**F**rom biologists to archaeologists, and engineers to economists, the Minerals Management Service (MMS) is made up of an extensive list of professionals dedicated to stewardship of the ocean environment.

But how are all of these experts involved in offshore oil and gas activities? Before the inception of MMS as a Federal agency in 1982, the Environmental Studies Program (ESP) was initiated in 1973 to gather environmental, social, and economic science information to assist in decisionmaking for the offshore oil and gas program. Previously under the Bureau of Land Management (BLM), ESP was formally authorized through the Outer Continental Shelf Lands Act (OCSLA) with three general goals:

- establish the information needed for assessment and management of environmental impacts on the human, marine, and coastal environments of the Outer Continental Shelf (OCS) and the potentially affected coastal areas;
- predict impacts on the marine biota that may result from chronic, low-level pollution or large spills associated with OCS production, from drilling fluids and cuttings discharges, pipeline emplacement, or onshore facilities; and
- monitor human, marine, and coastal environments to provide time series and data trend information for identification of significant changes in the quality and productivity of these environments, and to identify the causes of these changes.

In 1982, BLM joined with the U.S. Geological Survey's Conservation Division to create the present-day MMS.

Dr. Fred Piltz, Senior Environmental Scientist for the Pacific OCS Region, has seen many changes in ESP over the years. “One significant change in the ESP started in the early 1980’s with the funding of social and economic studies of the potential effects of offshore oil and gas activities,” said Dr. Piltz. “These topics had been narrowly investigated previously and then mostly confined to studies of archaeological and submerged cultural sites that are required to be protected. In the 1980’s, at the encouragement of our OCS Scientific Committee, MMS began to do studies of the history of changes in communities that were adjacent to or depended upon offshore oil and gas economically.”

At this time the Pacific Region also began to undergo major

changes. “There was a shift from studies focused on potential effects of leasing or exploration, to a focus on studies looking at long term effects and long-term monitoring,” said Dr. Piltz. “We still have significant oil and gas production here, and we have continued some long-term studies such as our Multi Agency Rocky Intertidal Network (MARINe) to make sure we are continuing environmentally safe operations,” he added.

Research conducted by ESP makes it possible for continued exploration of oil and gas resources in the OCS and, in addition, provides information essential to protection of the ocean environment. The analysis of oil and gas impacts on the human, marine, and coastal environments is vital to the assessments that guide

A Fall College and Conference Recruiting Tour finds Geosciences Recruiting Team member Mike Smith talking to an interested student at the University of Tennessee.





the management of resources in the OCS. To make the results readily available to MMS, industry, and government agencies, ESP research reports are available through the Environmental Studies Program Information System (ESPIS), a web site accessible through the MMS homepage. Over 2,000 complete reports of ESP activities are available to view or download.

The ESP has provided for research collaborations with other Federal agencies and educational institutions, such as the National Oceanic and Atmospheric Administration and many state universities in coastal regions located near offshore mineral development areas. The faculty and students at these universities are able to be involved in ESP Coastal Marine Institutes where they can participate in long-term research as well as assist MMS staff in scientific studies. These studies create exciting opportunities for those interested in a career in the offshore industry. The many professionals in the offshore program include



Early offshore oil development in the Gulf of Mexico.

<b>geologists</b>	<b>meteorologists</b>
<b>geophysicists</b>	<b>marine biologists</b>
<b>physical scientists</b>	<b>economists</b>
<b>environmental scientists</b>	<b>archaeologists</b>
<b>oceanographers</b>	<b>paleontologists</b>
<b>mineral leasing specialists</b>	<b>computer specialists</b>
<b>petroleum engineers</b>	<b>information specialists</b>

The MMS Environmental Studies Program is presently in a number of studies, covering a variety of topics such as deep-sea ecosystems, marine mammals, physical oceanography, bowhead whale aerial surveys, and offshore

industry operations. As many possibilities and advancements lay ahead for MMS "pros," the knowledge gained from research will provide for continued balance of domestic offshore resources and the ocean environment.

#### FOR MORE INFORMATION:

#### **Environmental Studies Program (ESP)**

Website: [www.mms.gov/eppd/sciences/esp/index.htm](http://www.mms.gov/eppd/sciences/esp/index.htm)

#### **ESP History**

Website: [www.mms.gov/eppd/sciences/esp/history.htm](http://www.mms.gov/eppd/sciences/esp/history.htm)

#### **MMS Ocean Role**

Website: [www.mms.gov/ooc/newweb/publications/OurOceanRoleMMS.pdf](http://www.mms.gov/ooc/newweb/publications/OurOceanRoleMMS.pdf)

#### **ESPIS**

Website: [www.gomr.mms.gov/homepg/espis/espisfront.asp](http://www.gomr.mms.gov/homepg/espis/espisfront.asp)

#### **MMS Pacific ESP**

Website: [www.mms.gov/omm/pacific/enviro/enviro\\_studies.htm](http://www.mms.gov/omm/pacific/enviro/enviro_studies.htm)

# MMS

## A Steward of the Ocean Environment

# NEW WAVES

Late-Breaking News & Information



Western Gulf of Mexico Lease Sale 204 held August 22, 2007, in New Orleans, Louisiana. Pictured at the head table from left to right: Regional Director Lars Herbst, MMS Director Randall Luthi, and OMM Associate Director Chris Oynes.

## *MMS Announces New Regional Director for GOM*

**T**he MMS is pleased to name Lars Herbst as the new Regional Director of the Gulf of Mexico OCS Region. According to MMS Director Randall Luthi, "(Herbst) brings a wealth of experience and a great perspective to the job." Having been an employee of MMS for 23 years, Herbst has held a variety of positions. He began as a petroleum engineer and has since worked as a supervisor for the past 13 years on the way to his most recent position as acting Gulf of Mexico (GOM) Regional Director. Luthi also commended Herbst on recent efforts for new hurricane standards and contract negotiations, saying these "are but examples of his leadership." Herbst began his new position on October 1, 2007,



Lars Herbst was named Regional Director of the MMS Gulf of Mexico OCS Region by MMS Director Randall Luthi on October 1, 2007.

directing approximately 600 employees in the GOM region including engineers, geophysicists, geologists, marine biologists, oceanographers, offshore inspectors, and many other professionals.

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