

The Minerals Management Service's Seafloor Monitoring Program

David A. Ball

Minerals Management Service, 1201 Elmwood Park Blvd., New Orleans, LA 70123, USA
david.ball@mms.gov

Abstract

The Minerals Management Service (MMS) is the Federal agency under the U.S. Department of the Interior that regulates offshore mineral resources (primarily oil and gas production) and alternative energy facilities on the Outer Continental Shelf. The MMS Seafloor Monitoring Team consists of a pool of scientific divers (archaeologists, biologists, and geologists) who support the Environmental Studies Program and have participated in hundreds of research projects since the agency's formation in 1982. This paper highlights two recent research projects in which MMS divers have participated. The first involved participation in a project to capture tagged sea otters off Bering Island, Russia; the second is the discovery of a U.S. Navy gunboat off the coast of Louisiana.

Keywords: archaeology, Bering Island, *Castine*, Gulf of Mexico, Pacific Ocean, sea otter

Introduction

The Minerals Management Service (MMS) is responsible for managing offshore mineral extraction, primarily oil and gas production, in Federal waters. The agency is divided into three regions: Alaska, Pacific, and Gulf of Mexico (which also includes the Atlantic); with most of the offshore development currently occurring in the Western and Central Planning Areas of the Gulf of Mexico. Currently, there are over 7,000 active leases and over 33,000 miles of pipeline in the Gulf of Mexico Region. On September 30, 2008, the Congressional moratorium on offshore drilling expired, opening most of the Outer Continental Shelf (OCS) for potential oil and gas exploration and development. The MMS is currently preparing an environmental impact statement for a proposed lease sale off Virginia in 2011, which could bring oil and gas activity to the Atlantic Region for the first time since 1984.

Until recently, the typical activities that MMS permitted were concerned primarily with oil and gas production; permitting facilities such as platforms and pipelines. With the passing of the Energy Policy Act in 2005, MMS is now responsible for managing alternative energy-related projects on the OCS as well. There are eight areas along the Atlantic and Pacific Coasts that have been designated for testing facilities. The MMS is in the process of reviewing applications for meteorological towers, or 'Met Towers,' in several of these areas and is also reviewing the first application for an offshore wind farm, the Cape Wind facility, off Massachusetts. The Met Towers are designed to collect data in order to assess the viability of these locations for alternative energy production. In addition to Met Towers and wind power generators, other types of alternative energy facilities that may develop include current power generators and wave power generators. And of course, with these new permitting responsibilities comes the potential for additional impacts to submerged natural and cultural resources on the OCS.

In addition to requiring remote-sensing surveys as part of the permitting process, one of the ways that MMS assesses potential impacts to natural and cultural resources is by contracting research studies through the Environmental Studies Program. This program was mandated through the OCS Lands

Act of 1953 to provide scientific data on environmental, social, and economic issues for the protection of marine and coastal environments. Over the last thirty-five years, MMS (and its predecessor the Bureau of Land Management) has funded over \$840 million in research through the Environmental Studies Program. These studies have addressed a wide array of topics including, for example, biological studies such as the long-term monitoring of reef health at the Flower Gardens National Marine Sanctuary, in partnership with the National Oceanographic and Atmospheric Administration; oceanographic studies such as the survey of deepwater currents in the Gulf of Mexico; socioeconomic studies such as the oral history of the offshore oil and gas industry; and archaeological studies such as baseline studies of submerged cultural resources. All of the completed studies are available in portable document format (PDF) configuration on the MMS website (www.mms.gov). Currently, there are roughly 300 active studies on the books, and in the last two years, MMS has provided roughly \$37 million to fund almost 60 different studies. Information on current studies can also be found on our website.

In support of the Environmental Studies Program, MMS has a small team of science divers that comprise the Seafloor Monitoring Team. Though MMS has utilized divers since the agency's creation in 1982, the Seafloor Monitoring Team officially began in the Gulf of Mexico Region with a pilot project in 1997 as a way to assess industry compliance with mitigating measures applied to offshore activities. These mitigating measures often consist of avoidance criteria of seafloor features as a condition of a permit. Today, the Seafloor Monitoring Team's mission is to ensure compliance of permit mitigations (environmental enforcement) and to support research through the Environmental Studies Program. This work is typically conducted through remote sensing and diver investigations.

Currently, the team consists of three marine archaeologists, three biologists, and one geologist in the Gulf of Mexico Region and three biologists in the Pacific Region. The team typically participates in about a dozen projects annually. These projects can range in scope from marine mammal monitoring to analysis of the health and dispersal of coral reefs to archaeological documentation of historic shipwrecks. They can also be conducted solely through MMS or in cooperation with other government, academic or private partners.

Following is a brief synopsis of two recent projects in which the MMS Seafloor Monitoring Team has participated: a biological study to monitor sea otters in the Pacific and an archaeological study that identified a late 19th-century US Navy gunboat.

Sea Otter Research

As with many furry creatures that inhabit this planet, sea otters were once regularly hunted for their valuable pelts. By the early 20th century, their numbers had dropped from an estimated population of 250,000 to less than 2,000 worldwide. Before the fur trade decimated their numbers, sea otters could be found across the Pacific Rim, ranging from Baja California, north across the Aleutian Islands, and down to Hokkaido, Japan. Through conservation efforts in the 20th century, sea otter populations have recovered in many of these areas, yet are absent or declining in others. One example of this contrast can be found along the sea otters northern-most range. The population in southwestern Alaska has been declining over the last ten years, while a neighboring population on Bering Island in Russia is thriving.

Last year the MMS Seafloor Monitoring Team assisted with an international sea otter research effort. Over a three-year period researchers from the United States Geological Survey (USGS), the Alaska SeaLife Center, the Monterey Bay Aquarium, the Russian Pacific Institute of Geography, and Komandorsky State Nature Reserve conducted studies comparing the Bering Island population with

other sea otter populations across the north Pacific. Financial support was also provided by the United States Fish and Wildlife Service and the Marine Mammal Commission.

During the first year of the study approximately 30 sea otters were captured, tagged, and implanted with time-depth recorders (TDRs). The following year these animals were tracked and monitored in order to collect data on diet, activity, and geographic location. Last summer a team of divers from the USGS and MMS (Pacific Region) traveled to Bering Island to recapture tagged sea otters and remove the TDRs.

Sea otters are rather skittish creatures and recapturing them often involves a highly specialized technique that utilizes underwater scooters, a specialized trap, and closed-circuit oxygen rebreathers (Figure 1). This technique was described in detail in a previous AAUS paper (Sanders and Wendell, 1991). There are only a handful of people that have the experience and skills required to capture these animals, one of whom, Greg Sanders, works for the MMS Pacific Region.



Figure 1. Diver preparing to capture an otter (photo courtesy of Tom Campbell).

During the 2008 field season at Bering Island, 13 of the 30 sea otters tagged three years earlier were relocated; however, only two of these were recaptured with successful recovery of their TDRs. As Mr. Sanders described in his trip report, "Target sea otters were often mixed in large rafts of otters

(sometimes more than 100 animals) making it nearly impossible to capture specific animals. Otters became wary of the capture boats within a few days and weather did not cooperate on several occasions. Many non-target sea otters were captured incidental to achieving the primary objective. These animals were brought to shore for measurements, assessment of body condition, tagging and subsequent release" (G. Sanders, pers. comm., 2008).

While the recapture rate was relatively low on this trip, the team was successful in completing a highly complex mission in an extremely challenging and remote environment. Transporting a half ton of specialized and unique dive equipment in today's airline security environment and through Russian ports of entry provided for many interesting stories as yet untold. Analysis of the data from the TDRs that were recovered is currently underway and will provide valuable insight into the lives of sea otters at Bering Island.

U.S.S. *Castine*

In 2003, MMS awarded a contract to PBS&J of Austin, Texas to ground-truth, positively identify, and assess the National Register of Historic Places status of up to eight selected sidescan-sonar targets in the Gulf of Mexico. For those not familiar with the National Register of Historic Places, it is the official list of the Nation's historic places and is part of a national program to coordinate and support public and private efforts to identify, evaluate and protect America's historic and archeological resources. The list is maintained by the National Park Service.

The targets selected for this study had been identified through industry-related surveys that are required as part of the permitting process for wellsite and pipeline construction on the OCS. Most of the targets selected had been recommended for avoidance as a condition of permit, but had not yet been evaluated to determine whether they were significant archaeological resources.

Fieldwork for this project was conducted as two separate work orders: the first in May 2004 and the second in May 2005. The project succeeded in documenting 14 targets, three of which were determined to be potentially eligible for listing on the National Register of Historic Places. These three targets included two World War II U-boat casualties, the tankers *R.M. Parker, Jr.*, and *Sheherazade*, both of which had been attacked in 1942 during the German U-boat offensive in the Gulf of Mexico. The third was identified as U.S.S. *Castine*, a former U.S. Navy gunboat. Of all the sites, *Castine* proved to be the most exciting and most challenging from a diving perspective.

When the initial fieldwork on *Castine* was conducted in May 2005, the only information available on this target was a sidescan-sonar image that had been collected during a 2001 remote-sensing survey (Figure 2). The contractor that interpreted the 2001 sidescan-sonar records identified this target as a probable modern wreck measuring roughly 171 ft (52 m) long by 30 ft (9 m) wide. However, the target had an interesting shape to it, which MMS archaeologists felt might actually represent something a little more significant than a modern fishing or supply boat.

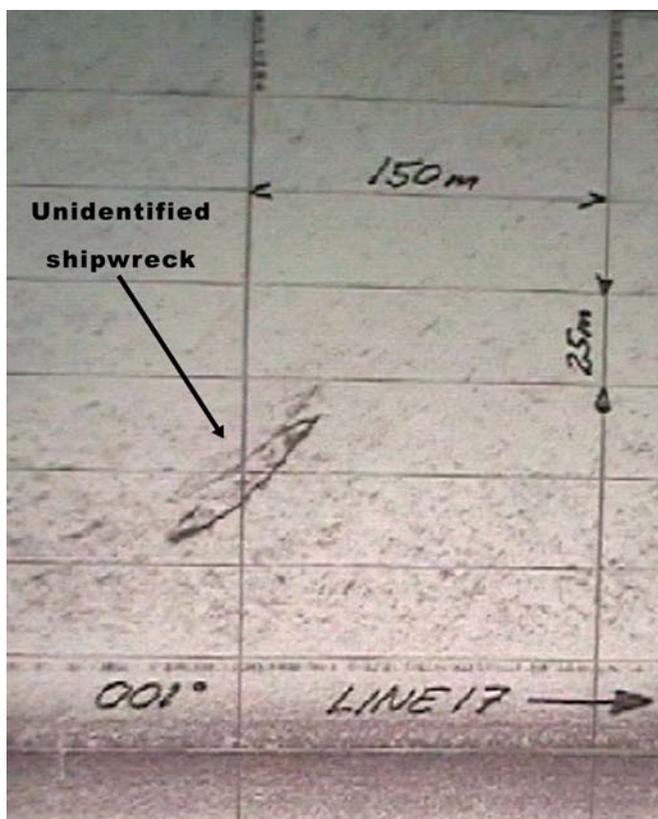


Figure 2. 2001 sidescan sonar image of unidentified shipwreck.

Castine is located about 20 miles off the coast of Louisiana in 115 ft (35 m) of water. Visibility on the site is often less than five feet and a large part of the site is covered in fishing nets, which makes it a challenging site to dive. Yet, a total of 26 dives were completed on *Castine* during the 2005 investigation over a three-day period.

Prior to diving on the site in 2005, a new remote-sensing survey was conducted in order to confirm the location of the wreck and identify any potential debris that might be associated with the site (Figure 3). When the 2005 investigations began, the identity of this wreck was unknown. However, one of the first dives completed surveyed the perimeter of the vessel structure in an attempt to identify any distinguishing features. This dive team succeeded in locating several areas along the hull line that arced out away from the hull. Discussions of these features after the dive suggested that they might be sponsons, features typically found on Navy gunboats. A quick review of the MMS shipwreck database identified the wreck as *Castine*, reported to have been lost approximately 13 miles northwest of this site. At the time of the 2005 investigation, little information was available on *Castine*, other than its reported loss location and date of loss – 1924.

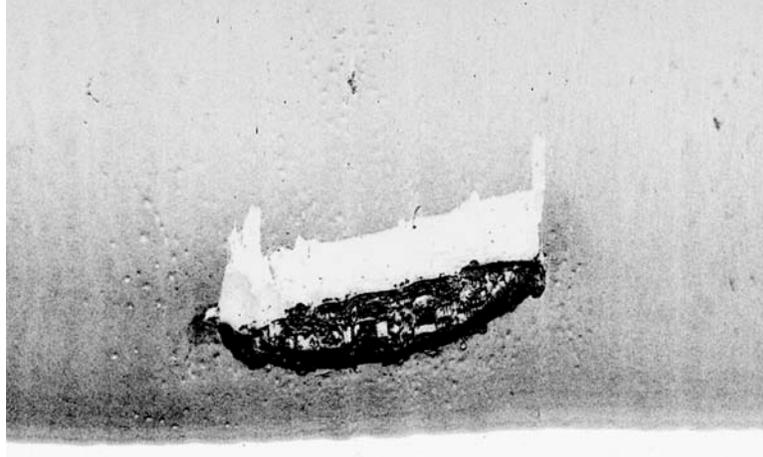


Figure 3. 2005 sidescan sonar image of U.S.S. *Castine*.

The principal investigator for this project, Bob Gearhart of PBS&J, made a call from our survey boat back to his office in Austin, Texas, and asked one of their researchers to initiate an Internet search to see what information might be available for the shipwreck *Castine*. Within a few hours we received a call back informing us that *Castine* was a U.S. Navy gunboat, originally built in 1892 and lost in 1924 (Figure 4). Based on this initial description and additional diver investigations, we felt pretty confident that we had found a rather intriguing shipwreck. Subsequent historical research, conducted after the fieldwork was complete, confirmed the identity and revealed an impressive story for this long-lost shipwreck.



Figure 4. U.S.S. *Castine* (courtesy of the Naval Historical Center, Photo No. NH 2087).

Castine was built in 1892 at Bath Iron Works, in Bath, Maine. Constructed as a gunboat for the US Navy, she was one of only two vessels of the Machias class ships, those being *Castine* and *Machias*. Both of these vessels were named after small coastal towns in Maine. Initially constructed at 190 ft (58 m) long by 32 ft (10 m) wide, and carrying a battery of eight four-inch rapid fire rifles, four six-pound guns, and two one-pounders, sea trials by the Naval Stability Board determined these vessels were too top-heavy. To remedy this situation, an additional 14 ft (4 m) was added to the length of both vessels. Modifications to *Castine* were completed in October 1894 and the vessel began its illustrious career under Commander Thomas Perry, with a crew compliment of 153 (Enright *et al.*, 2006).

The history of *Castine* has been rediscovered and retold in depth in a recent Master thesis (Jones, 2007). To briefly summarize, at the outbreak of the Spanish-American War in April 1898, *Castine* was assigned to blockade operations off Cuba and Key West, Florida. There is some discrepancy in the historical record; however, some reports suggest that *Castine* may have captured the first enemy vessel, or prize, of the Spanish-American War. The war ended in December 1898, and the following year hostilities broke out in the Philippines. In January 1899, *Castine* was sent to the Philippines to join the naval blockade of the islands, and in November 1899, the surrender of Zamboanga played out on her decks. In 1900, *Castine* was stationed off Shanghai when the Boxer Rebellion broke out. And in World War I, *Castine* took up patrol off the coast of Gibraltar as an escort vessel for allied convoys between European and North African ports.

After World War I, *Castine* returned to the port of New Orleans and was eventually sold into the private sector in 1921 for \$12,500. Historical documents from the U.S. Department of Commerce show that *Castine* was sold again in 1923, this time for \$40,000.

Castine's final cruise began on December 12, 1924. She left out of New Orleans that day as a barge-in-tow to Sabine Pass, Texas, where she was to be disassembled and scrapped. However, a mysterious explosion on board *Castine* forced the towboat to cut her loose and abandon ship; she sank in about 20 minutes.

The remains of *Castine* were initially documented in May 2005 during an MMS-funded study to ground-truth unidentified sonar targets. The site was reexamined in 2007 under a new MMS study, which was developed to identify potential impacts to historic shipwrecks from recent hurricane activity; *Castine* was selected as one of the targets for this study because she was located about 30 miles west of the eye of Hurricane Katrina.

Two visits were made to the site of *Castine* in 2007. The first was a remote-sensing survey conducted in May of that year. The second was in October when dive operations were attempted. Unfortunately, the seastate was such that all dives attempted on the site were aborted and no additional diver observations were completed. However, analysis of the remote-sensing data suggests that little damage occurred to *Castine* during the passing of Hurricane Katrina.

As a result of information obtained on *Castine*, a National Register of Historic Places nomination form was completed and submitted to the Keeper of the Register last year. The site was officially listed on the National Register of Historic Places in March 2009.

Conclusion

Over the last 12 years, the MMS Seafloor Monitoring Team has provided scientific diving support for dozens of projects in the Gulf of Mexico and Pacific Regions. Future directions for the team will include continued support of the Environmental Studies Program, along with continued partnerships with government, academic and private partners. The team will also continue to provide support of compliance monitoring and environmental enforcement.

Acknowledgments

The author thank Greg Sanders for his comments and suggestions regarding the sea otter research section.

References

Enright JM, Gearhart R, Jones D, Enright J. Study to conduct National Register of Historic Places evaluations of submerged sites on the Gulf of Mexico Outer Continental Shelf. OCS Study MMS 2006-036. USDO Minerals Management Service, New Orleans, LA. 2006; 164 pp.

Jones D. Too much top for its bottom: the historical and archaeological identification of the USS *Castine* and the significance of U.S. gunboats in the early steel Navy. Department of History, East Carolina University. December 2007; 162 pp.

Sanders G., Wendell F. Closed-circuit oxygen breathing apparatus: minimizing risks for improved efficiency. In: Krock HK, ed. International Pacifica Scientific Diving: Proceedings of the American Academy of Underwater Sciences. Costa Mesa, CA: AAUS, 1991: 87-101.