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### [Ocean Science for Stewardship](#)

BOEM's Environmental Studies Program develops, conducts and oversees world-class scientific research specifically to inform policy decisions regarding development of OCS energy and mineral resources. Research covers physical oceanography, atmospheric sciences, biology, protected species, social sciences and economics, submerged cultural resources and environmental fates and effects. This poster provides photos, with short descriptions, of select research projects.

### [Historic Shipwrecks of the Gulf of Mexico](#)

Shipwrecks are like time capsules, preserving a record of what life was like in the past. BOEM requires the oil and gas industry to survey the seafloor to detect potential shipwrecks. Marine archaeologists at BOEM work with other archaeologists and historians to determine where shipwrecks are likely to be found by studying historic documents and maps.

### [Sea Turtles of the Gulf of Mexico](#)

Sea turtles are in the taxonomic class of Reptilia. They share class with crocodiles, alligators, lizards, snakes, land turtles, and tortoises. These incredible animals have been around for about 110 million years and are protected by the Endangered Species Act. BOEM studies protected species and their habitats in order to understand how human and natural activities impact them and their environment.

### [Whales and Dolphins of the Gulf of Mexico](#)

Twenty-one species of whales and dolphins regularly occur in Gulf waters and are identified in the National Marine Fisheries Service's Stock Assessment Reports. These animals and the sperm whale are protected by the Marine Mammal Protection Act. BOEM's support and funding of comprehensive studies of the possible effects of human activities on the distribution, abundance and behavior of marine mammals are an important part of our mission.

# Whales and Dolphins of the Gulf of Mexico



Keith Mullin, photo courtesy of NMFS

### Bottlenose Dolphin (*Tursiops truncatus*)

Size: Adults 6-12 feet. At birth approx. 3 feet.  
Gulf of Mexico Population: 35,159\* (excluding estuarine stocks)  
Trivia: The original "Flipper" was a bottlenose dolphin named Mitzi and lived from 1958-1972.



Carol Roden, photo courtesy of BOEM

### Spinner Dolphin (*Stenella longirostris*)

Size: Adult 6-7.2 feet, males slightly larger than females. At birth approx. 2.7 feet.  
Gulf of Mexico Population: 1,989\*  
Trivia: Spinner dolphins get their name because they spin horizontally, from the tips of their beaks to their tails, over the water.



Carol Roden, photo courtesy of BOEM

### Killer Whale (*Orcinus orca*)

Size: Adult males to 31 feet. Adult females to 23 feet. At birth approx. 8 feet.  
Gulf of Mexico Population: 49\*  
Trivia: Killer whales are the largest species of dolphins.



Wayne Hoggard, photo courtesy of NMFS

### Bryde's Whale (*Balaenoptera edeni*)

Size: Adults 43-51 feet; females slightly larger than males. At birth approx. 11 feet.  
Gulf of Mexico Population: 15\*  
Trivia: Bryde's whales are the most commonly observed baleen whale in the Gulf of Mexico.



Craig Hayslip, photo courtesy of BOEM

### Sperm Whale (*Physeter macrocephalus*)

Size: Adult males 49-59 feet. Adult females to 36 feet. At birth approx. 13 feet.  
Gulf of Mexico Population: 1,665\*  
Trivia: "Moby Dick" was a sperm whale. Sperm whales are the only resident endangered cetaceans in the Gulf of Mexico.



Carol Roden, photo courtesy of BOEM

### Atlantic Spotted Dolphin (*Stenella frontalis*)

Size: Adults 7-7.5 feet. At birth approx. 3 feet.  
Gulf of Mexico Population: 27,393\*  
Trivia: The bodies of Atlantic spotted dolphins are covered with spots, and they become more densely spotted with age.



Keith Mullin, photo courtesy of NMFS

### Risso's Dolphin (*Grampus griseus*)

Size: Adults 10-12.5 feet; males slightly larger than females. At birth approx. 5 feet.  
Gulf of Mexico Population: 1,589\*  
Trivia: Risso's dolphins lose their gray pigmentation as they grow older and can appear almost white.



Photo courtesy of NMFS

### Melon-headed Whale (*Peponocephala electra*)

Size: Adults 8.5-9 feet. At birth approx. 2.7 feet.  
Gulf of Mexico Population: 2,283\*  
Trivia: Melon-headed whales have a preference for deep water. Their melon-shaped head gives them their name.



Carol Roden, photo courtesy of BOEM

### Pantropical Spotted Dolphin (*Stenella attenuata*)

Size: Adults 5.2-8.5 feet. At birth approx. 2.7 feet.  
Gulf of Mexico Population: 34,067\*  
Trivia: Pantropical spotted dolphins are the most abundant offshore marine mammals in the Gulf of Mexico.



Carrie Hubard, photo courtesy of NMFS

### Short-finned Pilot Whale (*Globicephala macrorhynchus*)

Size: Adult males to 20 feet. Adult females to 17 feet. At birth approx. 5.5 feet.  
Gulf of Mexico Population: 716\*  
Trivia: Short-finned pilot whales are highly communicative, making sounds such as squeals, whistles, smacks, and snores.



Carol Roden, photo courtesy of BOEM

### Striped Dolphin (*Stenella coeruleoalba*)

Size: Adults 7-8 feet. At birth approx. 3 feet.  
Gulf of Mexico Population: 3,323\*  
Trivia: Striped dolphins are beautifully marked, fast-swimming dolphins sometimes called "streakers."

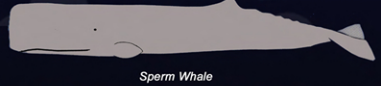


Carol Roden, photo courtesy of BOEM

### Clymene Dolphin (*Stenella clymene*)

Size: Adults 6-6.6 feet. At birth approx. 2.7 feet.  
Gulf of Mexico Population: 6,575\*  
Trivia: Clymene dolphins are thought to feed nocturnally.

### Size Comparison



There are at least 78 species of cetaceans - whales, dolphins, and porpoises - in the world. While porpoises are not known to reside in the Gulf of Mexico, 21 species of whales and dolphins regularly occur in Gulf waters and are identified in the National Marine Fisheries Service's Stock Assessment Reports. These animals are protected by the Marine Mammal Protection Act. The sperm whale is also protected by the Endangered Species Act.

Whales, dolphins, and porpoises share characteristics with humans. They have lungs and hold their breath while swimming underwater, so they must come to the surface to breathe. They also carry their young in the womb, give live birth, and nurse their young. These are some characteristics that classify them as mammals, in the taxonomic order of Cetacea.

The Bureau of Ocean Energy Management (BOEM) manages the exploration and development of the Nation's offshore resources. It seeks to appropriately balance economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development, and environmental reviews and studies. BOEM's support and funding of comprehensive studies of the possible effects of human activities on the distribution, abundance, and behavior of marine mammals are an important part of this mission.

\* Gulf of Mexico populations from National Marine Fisheries Service Stock Assessment Reports.



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# SEA TURTLES of the Gulf of Mexico

Did you know that sea turtles are reptiles?

Sea turtles are in the Taxonomic Class of Reptilia. They share this class with crocodiles, alligators, lizards, snakes, land turtles, and tortoises. Sea turtles breathe air and are cold-blooded. These incredible animals have been around for about 110 million years and are protected by the Endangered Species Act (ESA). Five species of sea turtles are found in the Gulf of Mexico with seven species found worldwide. All species are protected but threats to their existence continue. Manmade and natural activities within the Gulf of Mexico have potential impacts to sea turtles and their surrounding habitats. The Bureau of Ocean Energy Management (BOEM) studies protected species and their habitats in order to understand how human and natural activities impact them and their environment.

## LOGGERHEAD TURTLE (*Caretta caretta*)

FEDERAL STATUS: ESA Endangered-North Pacific Ocean and ESA Threatened-Northwest Atlantic Ocean (2 of the 9 Distinct Population Segments).

SIZE: Adults may average about 36 inches in length and weigh up to 250 pounds.

DIET: Powerful jaws allow them to eat hard-shelled prey such as whelks, conchs, and crabs.

HABITAT: Uses 3 different ecosystems—terrestrial, oceanic, and neritic. Found in all temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans.

DISTRIBUTION: The Archie Carr National Wildlife Refuge is the most important nesting area for loggerhead turtles in the western hemisphere. Twenty-five percent of all nesting in the U.S. occurs at this refuge on the east coast of Florida.

FUN FACTS: Named because of its relatively large head. Have callus-like traction scales beneath their flippers that allow them to "walk" on the ocean floor. During breeding season, females have been known to travel hundreds of miles to nest without foraging. Most abundant sea turtle in U.S. coastal waters.



Photo: National Marine Fisheries Service

## KEMP'S RIDLEY TURTLE (*Lepidochelys kempii*)

FEDERAL STATUS: ESA Endangered—throughout its range.

SIZE: Smallest adult marine turtle in the world, averages about 100 pounds with a length of 24-28 inches.

DIET: Adults feed in areas with sandy or muddy bottom. Diet includes mainly crabs, but they also feed on fish, jellyfish, and mollusks.

HABITAT: Neritic zones containing sandy or muddy bottoms.

DISTRIBUTION: Found throughout the Gulf of Mexico and the U.S. Atlantic seaboard; 95% of worldwide Kemp's ridley nesting occurs in the state of Tamaulipas, Mexico.

FUN FACTS: Unique characteristic of synchronized nesting called "arribada" ("arrival" in English), where females come ashore to nest in high numbers. They nest mostly during daylight.



Photo: National Park Service

## LEATHERBACK TURTLE (*Dermochelys coriacea*)

FEDERAL STATUS: ESA Endangered—throughout its range.

SIZE: Largest adult turtle and heaviest living reptile in the world. Measures 6.5 feet in length and can weigh 2,000 pounds.

DIET: Feeds primarily on jellyfish and other soft-bodied pelagic prey; can dive to a depth of 3,900 feet in search of prey.

HABITAT: Oceanic/pelagic, migrating between feeding areas and nesting beaches but also forages in coastal waters.

DISTRIBUTION: In the United States, nesting occurs in the U.S. Caribbean, primarily the U.S. Virgin Islands and Puerto Rico, and southeast Florida. Adult leatherbacks can tolerate colder water temperatures better than any other sea turtles species.

FUN FACTS: Only sea turtle that does not have a large bony shell, the leatherback is uniquely equipped with 7 ridges on the carapace. Because of its large flippers, Leatherbacks are the most migratory and wide-ranging of sea turtle species. Alone in Taxonomic Family of Dermochelyidae.



Photo: Matthew Godfrey

## GREEN TURTLE (*Chelonia mydas*)

FEDERAL STATUS: ESA Endangered—breeding populations in Florida and on the Pacific coast of Mexico; ESA Threatened - all other populations.

SIZE: Largest of hard-shelled sea turtles, weighing 300-350 pounds and growing to about 3 feet in length.

DIET: Adult turtles eat only plants - primarily seagrasses and algae.

HABITAT: Can be found in both inshore and nearshore waters from Texas to Massachusetts, the U.S. Virgin Islands and Puerto Rico.

DISTRIBUTION: Nesting in the U.S. occurs primarily along the central and southeast coast of Florida; found in about 140 countries throughout the world in tropical and subtropical waters between 30° North and 30° South.

FUN FACTS: Adults are strictly herbivores, hatchlings feed on pelagic plants and animals. Diet gives them a greenish-colored fat which gives them their name. Largest nesting populations can be found in Tortuguero, Costa Rica and Raine Island, Australia.



Photo: National Park Service

## HAWKSBILL TURTLE (*Eretmochelys imbricata*)

FEDERAL STATUS: ESA Endangered—throughout its range.

SIZE: Adults average about 100-150 pounds with the shell ranging 25-35 inches in length.

DIET: Feeds mainly on sponges, other invertebrates, and algae.

HABITAT: Often found around healthy coral communities.

DISTRIBUTION: In the U.S., hawksbill turtles are found in the Gulf of Mexico (especially around Texas), southern Florida, Puerto Rico, and the U.S. Virgin Islands; generally found between 30° North and 30° South in the Atlantic, Pacific, and Indian Oceans.

FUN FACTS: Shape of prominent hooked beak gives turtle its name; like the bill of a hawk. Front flippers can have two claws. Day or night, hawksbill turtles use ledges and caves of coral reefs for resting and are known to rest in the same spot every night. Hawksbill turtles are renowned for their elaborate, highly colored shells.

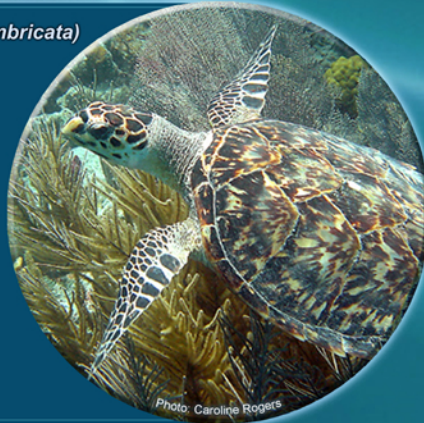


Photo: Caroline Rogers



**COMMON CHARACTERISTICS:** A sea turtle cannot retract its head into its shell because the muscles from the front flippers take up too much room in the shell. A sea turtle's ear is covered by thick skin; they have no external ear opening. They use their strong jaws to tear and crush food because they have no teeth. Sea turtles have four life stages—hatchling, juvenile, sub-adult, and adult. Juvenile turtles float on Sargassum mats and feed in the open ocean until they are young adults, when they move to inshore waters. They grow slowly, reaching sexual maturity between 10 and 40 years, and breed every 2-3 years. Sea turtles make long migrations between feeding and nesting grounds, and females typically nest on or near the beach where they were hatched. The sex of a sea turtle is determined by temperatures experienced during embryonic development.

**THREATS** to sea turtles can come from incidental catch from commercial and recreational fishing. Ingestion of and entanglement in marine debris is also a problem. There is degradation and loss of their nesting and foraging grounds. Environmental contamination can degrade habitats. Human consumption of turtle eggs and their meat is a great threat. Artificial lighting on or near beaches can deter adult female turtles from coming ashore and laying eggs, and newly-born hatchlings can be misdirected away from the sea by bright onshore lights.



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The Bureau of Ocean Energy Management promotes energy independence, environmental protection and economic development through responsible, science-based management of offshore conventional and renewable energy.

## Preserving the Past Under Water

The Bureau of Ocean Energy Management (BOEM) oversees the exploration and development of the Nation's offshore resources. It seeks to appropriately balance economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development, environmental reviews, and studies. There are many laws passed by Congress that BOEM must follow to ensure this is done in a way that is safe for people and protects the environment. One of these laws is the National Historic Preservation Act, which says that Government agencies, like BOEM, must take steps to protect places that are important in American history. In the Federal waters of the United States, most of these sites are historic shipwrecks.

## Protecting Historic Shipwrecks

Shipwrecks are like time capsules, preserving a record of what life was like in the past. People who study historic shipwrecks are called marine archaeologists. Marine archaeologists at BOEM work with other archaeologists and historians to determine where shipwrecks are likely to be found by studying historic documents and maps. Unfortunately, historic records rarely give a very precise location of an old shipwreck. As a result, BOEM requires the oil and gas industry to survey the seafloor to detect potential shipwrecks. Oil and gas companies are required to avoid impacting potential shipwrecks before they can drill wells or lay pipelines.

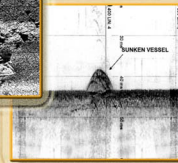
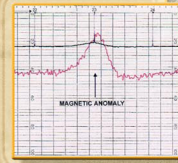
# Historic Shipwrecks of the Gulf of Mexico

### Colonial Shipwrecks



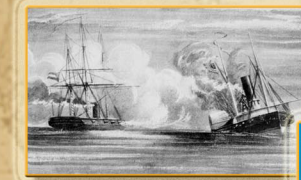
The Spanish explorer Alvarez de Pineda was the first European to sail along what is now the coast of the northern Gulf of Mexico in 1519. Spanish treasure ships regularly sailed through the Gulf transporting gold and silver from Mexico back to Spain. Three of these ships from the 1534 fleet, *Santa Maria de Yciar*, *Espiritu Santo*, and *San Esteban*, wrecked on Padre Island off South Texas. By the end of the 1600s French explorers and colonists were active in the area that is now Louisiana, Mississippi, and Alabama. When the Spanish regained control of Louisiana in 1762, Spanish naval and merchant traffic became more active along the Gulf Coast. Several shipwrecks from this period are documented in BOEM's Shipwreck Database and most have not yet been found.

### Finding Shipwrecks



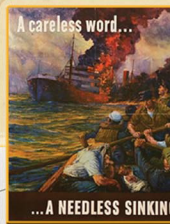
BOEM requires oil and gas companies to conduct surveys before an area can be developed to avoid harming potential shipwrecks. The companies use sophisticated electronic instruments towed from a ship to tell them what is buried in the seafloor. These instruments include a magnetometer that detects iron (like cannons or anchors), a sidescan sonar that uses sound waves to make a picture of the seafloor, and a subbottom profiler that shows the layers in the soil beneath the seafloor. Other instruments used for deepwater surveys include an autonomous underwater vehicle (AUV) and a remotely operated vehicle (ROV). The data collected by these instruments are studied by marine archaeologists looking for clues that a shipwreck might lie hidden under the sea.

### Civil War Shipwrecks



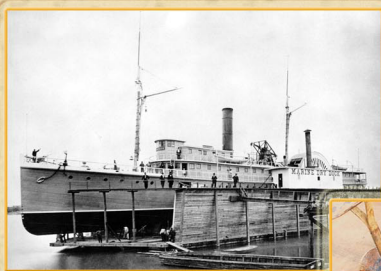
The only U.S. warship sunk in the Gulf of Mexico by the Confederacy during the Civil War was the U.S.S. *Hatteras*. Assigned to the Gulf Blockading Squadron in January 1862, the U.S.S. *Hatteras* captured seven Confederate blockade runners before she was sunk by the C.S.S. *Alabama* on January 11, 1863, off the coast of Texas. Today the vessel rests in 58 feet of water about 20 miles from Galveston. Her 210-foot long iron hull is completely buried under about 3 feet of sand. Only the remains of her 500-horsepower walkingbeam steam engine and her two iron paddlewheels remain exposed above the seafloor.

### World War II Shipwrecks



During the years 1942 and 1943, a fleet of over 20 German submarines, known as U-boats, cruised the Gulf seeking to stop the vital flow of oil carried by tankers from ports in Texas and Louisiana. They succeeded in sending 56 vessels to the bottom. As a result of remote-sensing surveys required of the oil and gas industry by BOEM, several U-boat casualties, such as the passenger ship *Robert E. Lee*, have been discovered on the seafloor. In addition, the only German U-boat lost in the Gulf during the war, *U-166*, was discovered in 5,000 feet of water during a pipeline survey.

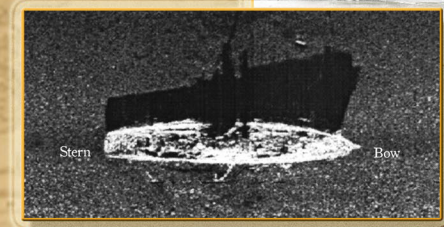
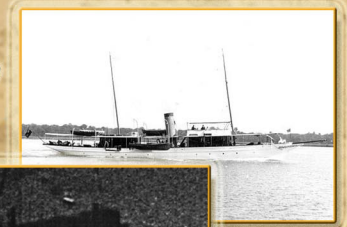
### 19th-Century Shipwrecks



The 19th century saw the change in shipbuilding technology from the Age of Sail to the Age of Steam. Examples of both types of shipwrecks have been discovered in the Gulf of Mexico through oil company surveys.

Several examples of early 19th-century, wooden-hulled sailing ships have been found in the Gulf. Two of these were armed with cannon during a turbulent period of the Gulf's history. Steamships were introduced in the Gulf in the 1830s. The wrecks of two steamships, *New York* (1846) and *Josephine* (1881), have been studied by marine archaeologists from BOEM.

### Early 20th-Century Shipwrecks



For thousands of years ships had been built of wood and powered by sails. In the 19th and early 20th centuries, hulls of wood began to be replaced by hulls of iron and steel, and sails gradually gave way to steam. The steam yacht *Anona*, built in 1904 for a wealthy Detroit industrialist, represented the height of the shipbuilder's art for her time and even boasted electric lights. The wreck of *Anona* lies in over 4,000 feet of water off the coast of Mississippi.



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Poster images have been provided by the following: Colonial Shipwrecks painting courtesy of William Trotter; Finding Shipwrecks sonar image of *Alvar Pizarro* courtesy of BP; Finding Shipwrecks ROV photos courtesy of NOAA's Office of Ocean Exploration and Research; Civil War Shipwrecks image of *Hatteras* and *Alabama* courtesy of Naval Historical Foundation Photographic Service; Civil War Shipwrecks used with permission, photo of diver exploring side wheel of USS *Hatteras* © Jesse Canales; 19th-Century Shipwrecks photo of *Josephine* courtesy of The Mariner's Museum; 19th-Century Shipwrecks photo of cannon courtesy of Texas A&M University Conservation Research Laboratory; 19th-Century Shipwrecks photo of hull of ship courtesy of NOAA's Office of Ocean Exploration and Research; World War II Shipwrecks "A careless word" poster courtesy of Northwestern University Library World War II Posters Collection; World War II Shipwrecks photo of *U-166* courtesy of the P.A.S.T. Foundation; World War II Shipwrecks photo of *Anona* courtesy of Naval Historical Foundation Photographic Service; Early 20th-Century Shipwrecks sonar image of *Anona* courtesy of BP; Early 20th-Century Shipwrecks photo of *Anona* courtesy of the Great Lakes, Bowling Green University. All other images belong to the Bureau of Ocean Energy Management.



**BOEM**  
BUREAU OF OCEAN ENERGY MANAGEMENT

# OCEAN SCIENCE FOR STEWARDSHIP

## ABOUT BOEM

The Bureau of Ocean Energy Management (BOEM) manages the responsible exploration and development of the nation's offshore energy and marine mineral resources on the U.S. Outer Continental Shelf (OCS).

## SCIENCE for DECISIONS

To fulfill its mandate for environmental stewardship and science-based management, BOEM develops, contracts and conducts scientific research through its Environmental Studies Program to obtain the best available scientific information. Findings are used to develop protective measures to prevent or minimize impacts to sensitive marine habitats and ecosystems from offshore energy and mineral development activities. The OCS Environmental Studies Program was established in 1973.

## RESEARCH DISCIPLINES

**Archaeological Resource Protection:** studies to evaluate and protect archaeological sites.

**Biological:** studies to understand marine and coastal habitats and organisms, and monitor marine ecology.

**Fates & Effects:** studies to evaluate the physical, chemical and biological impacts of oil and gas on biological communities.

**Meteorology & Air Quality:** studies to characterize the atmosphere and measure air pollutants generated on the OCS.

**Physical Oceanography:** studies to understand the motion of coastal and oceanic waters, including oil-spill risk analysis.

**Protected Species:** studies to address impacts to species protected under the Endangered Species Act, Marine Mammal Protection Act and other laws.

**Social Sciences & Economics:** studies to describe the economic and social systems of coastal residents, and determine how those systems are affected by offshore energy activities.

[www.BOEM.gov/studies](http://www.BOEM.gov/studies)

With special thanks to the following photographers and organizations for images used in this product:  
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NOAA National Marine Mammal Lab and our friends with the National Oceanic and Atmospheric Administration.

BOEM monitors OCS activities and their effects on sensitive species like Chinook salmon.



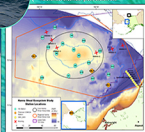
OCS projects the socioeconomic importance of subsistence fishing by Alaska Natives.



OCS Studies Plan and OCS Studies Plan (OCS) activities to responsibly land energy projects.



OCS documents the OCS Plan from the Alutian Islands to the Aleutians.



Alaska OCS Region

BOEM monitors coastal fish and shellfish resources.



BOEM monitors the health of fish and shellfish resources.



Pacific OCS Region



BOEM monitors and protects important coastal fish and shellfish resources.



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Fish and a variety of marine invertebrates (snail, scallop, oyster, and mussel) of a petroleum platform in the Gulf of Mexico.



California sea lions (and a Steller sea lion) are present at a petroleum platform in the Gulf of Mexico.



Loggervend turtles are found and monitored throughout the Gulf of Mexico.



Small lobster (Uca lobata) are present at a petroleum platform in the Gulf of Mexico.

