160 ft (50 m)

Mesophotic Benthic Habitats

"middle light zone"
160 ft - 980 ft deep

Mesophotic and deep benthic communities (MDBC) are deep seafloor habitats that are crucial to the Gulf of Mexico food web.

spotfin butterflyfish

spotted moray eel

short bigeye

trumpetfish

sharpnose puffer

980 ft (300 m)

Deep Benthic Habitats

Deeper than 980 ft

squat lobster

dumbo octopus

Mesophotic and Deep Benthic Communities Restoration

In 2010, the *Deepwater Horizon* (DWH) oil spill occurred off the coast of Louisiana. It became the largest offshore oil spill in U.S. history, causing extensive natural resource injuries across the northern Gulf of Mexico. Since the damaged wellhead was about 5,000 feet below the surface, a portion of the 134 million gallons of oil that spilled from it stayed in the deep sea. As a result, the oil spill injured more than 770 square miles of deep-sea habitat.

Putting the Spill into Perspective

Oil washed up on **over 1,300 miles** of coastline from Texas to Florida.

FL

TX

Surface oil slicks observed over **43,000 square miles**, an area larger than Virginia.

Over **770 square miles** of deep-sea habitat were harmed.

After the DWH oil spill, federal and state agencies formed the Deepwater Horizon Natural Resource Damage Assessment Trustee Council (DWH Trustees) to assess the impacts and identify actions to restore injured habitats, species, and the services they provide. From this assessment, a comprehensive restoration plan was developed to put the $8.8 billion in funds from the 2016 settlement with BP to work for the Gulf. One restoration type the DWH Trustees identified in the open ocean focuses on an important ecosystem along the seafloor: Mesophotic and Deep Benthic Communities (MDBC).

To restore these important habitats, the DWH trustees identified three goals:

- Improve understanding of mesophotic and deep-sea communities to inform better management and ensure resiliency.

- Restore mesophotic and deep benthic invertebrate and fish abundance and biomass for injured species, focusing on high-density mesophotic and deep water coral sites and other priority hard-ground areas to provide a continuum of healthy habitats from the coast to offshore.

- Actively manage valuable mesophotic and deep-sea communities to protect against multiple threats and provide a framework for monitoring, education, and outreach.

The following long-term projects have been selected to meet the goals of MDBC restoration.

Mapping, Ground-Truthing, and Predictive Habitat Modeling

Restoring and protecting low-light and deep-sea coral habitats is challenging because of the lack of information on the abundance, distribution, and location of MDBCs in the Gulf of Mexico. The ocean encompasses more than 70% of the planet's surface. However, only a tiny fraction is mapped at resolutions that provide adequate information to restore seafloor habitats–including only 0.2% of the Gulf of Mexico. Data collected by this project provides crucial information about the depth ranges, densities, and distributions of coral species and helps identify areas for restoration, protection, and management. These efforts will streamline processes for mapping and studying similar habitats in the future.

Habitat Assessment and Evaluation

There's much to discover and understand about the diversity, populations, and life histories of MDBC species in the Gulf of Mexico. Vertebrates, like deep-sea fish species, and invertebrates, like sea stars, snails, shrimp, crabs, and lobsters, are a few species in these deep-sea and mesophotic communities.

Habitat assessments collect information on baseline environmental conditions that can be compared to areas impacted by the oil spill. This helps to better understand changes to habitat structure, measure recovery, and monitor the effect of restoration efforts.

These assessments are used to support and prioritize MDBC restoration, protection and management. Additionally, they shed light on how corals, sponges, and other deep-sea animals are connected across the Gulf of Mexico.

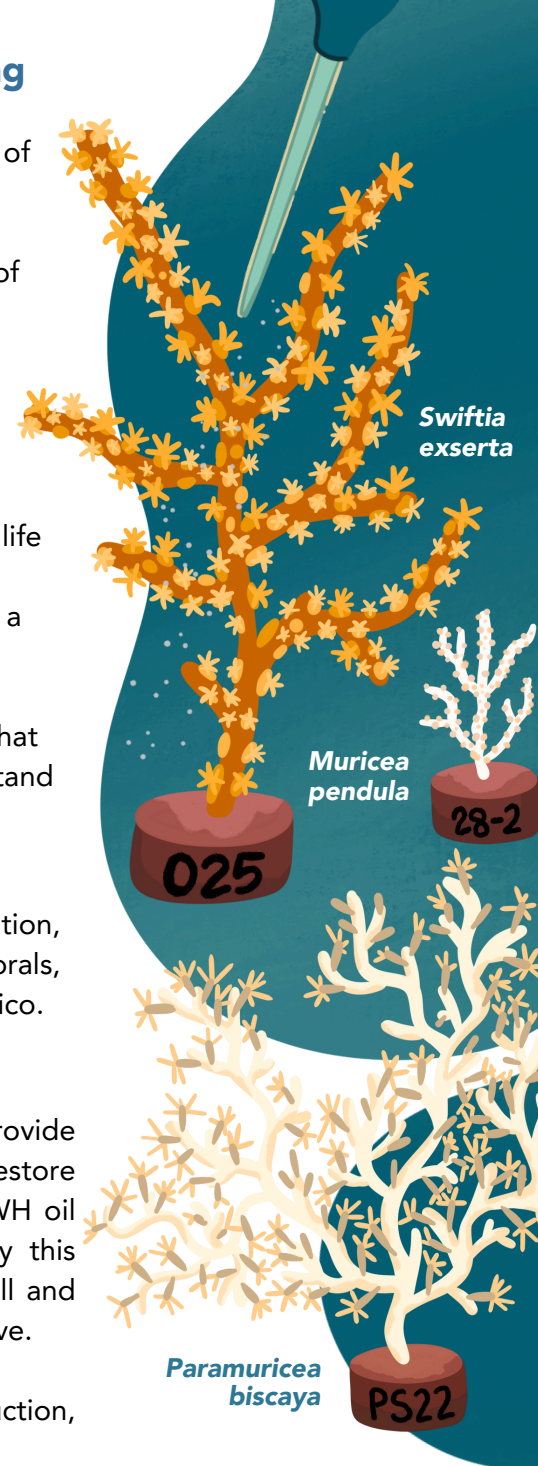*Swiftia exserta*

Muricea pendula

Paramuricea biscaya

Coral Propagation Technique Development

This project focuses on restoring habitat-forming coral species, which provide structure and shelter for fish and invertebrates. One direct approach to restore impacted deep coral communities is to help coral species injured by the DWH oil spill grow and reproduce. The coral propagation techniques developed by this project will replace some of the coral colonies injured or killed by the oil spill and provide restored habitat for other species that rely on corals to survive and thrive.

This project is also developing a better understanding of coral reproduction, lifespan, ideal environmental conditions, and more to inform restoration.

Active Management and Protection

Although mesophotic and deep benthic communities occur at great depths, human activities can still impact these ecosystems. Connecting the public and natural resources managers to MDBC through education and outreach can help prevent and reduce these impacts, ensuring the long-term health and resilience of deep Gulf of Mexico ecosystems. Additionally, existing threats such as marine debris, invasive species, boat and fishing activity, and legacy oil and gas infrastructure are being identified for potential removal or actions to prevent negative impacts.

Remotely Operated Vehicle (ROV)