

GULF OF MEXICO

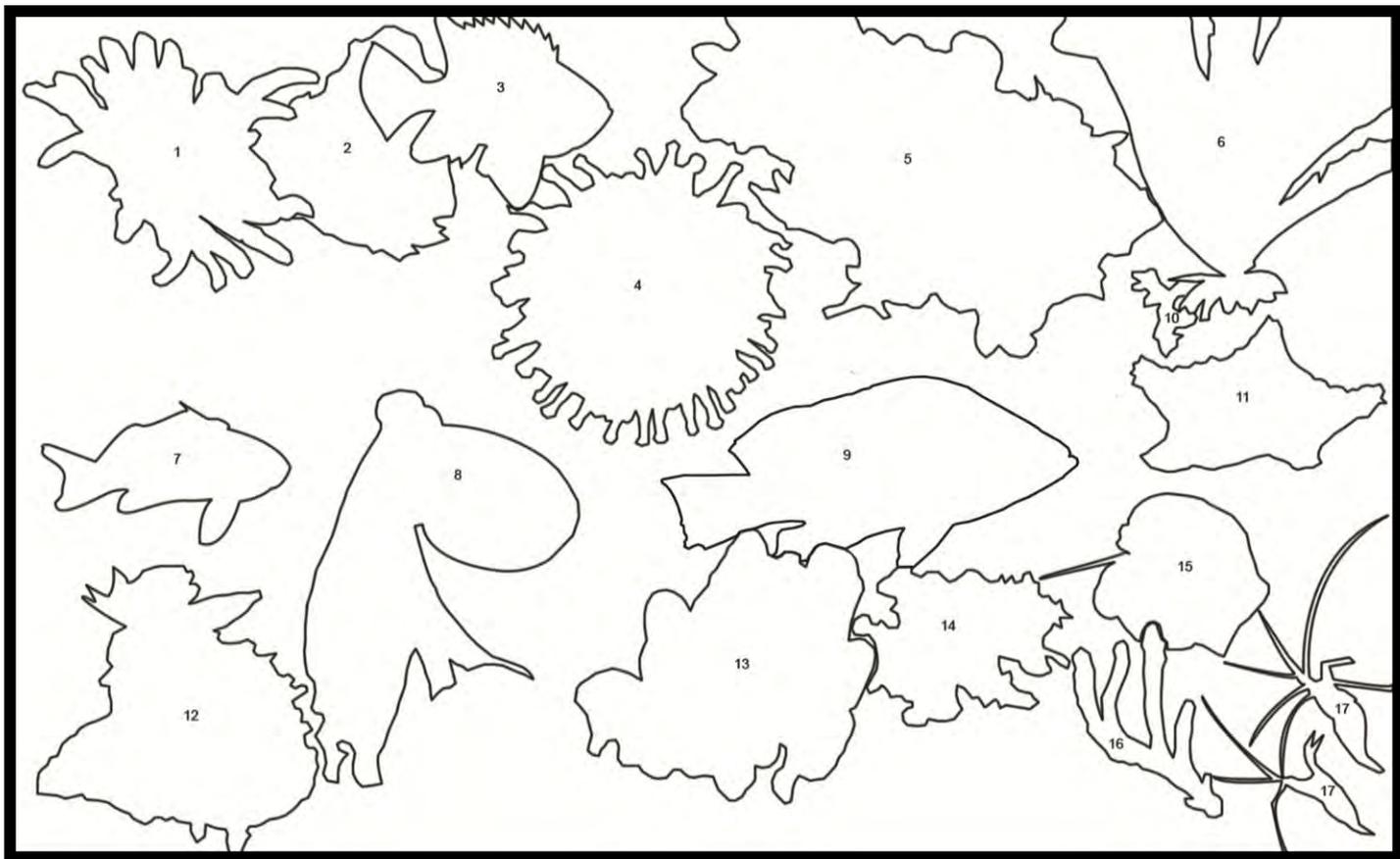


FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

Flower Garden Banks National Marine Sanctuary, located roughly 115 miles south of the Texas/Louisiana coast, is part of a connected ecosystem of banks, patch reefs, and valleys along the continental shelf of the northwestern Gulf of Mexico. While the crests of the banks support diverse coral reef ecosystems, beautiful mesophotic reefs, supporting a variety of fish and invertebrates, extend throughout the 'twilight zone' (~130ft to 500ft). These deepwater reef ecosystems provide valuable habitat for many different species and are considered habitat highways between banks in the northwestern Gulf of Mexico.

Collage of mesophotic organisms from the banks of the northwestern Gulf of Mexico- Photography by FGBNMS/NURC-UNCW and Joyce and Frank Burek

Key to Flower Garden Banks National Marine Sanctuary Deep Water Collage



1. **Sea Lily (*Stylometra spinifera* var. *brevispina*)**. Sea lilies, also known as crinoids, live in both the shallow and deep water areas of the ocean. This sea lily has climbed onto a white-colored, fan-shaped black coral to feed. Sea lilies are closely related to sea stars, and usually have arms in multiples of five. How many arms can you count on this sea lily?
2. **Black Coral (*Antipathes* sp.)**. Black corals are well adapted to life in the mesophotic zones of the ocean. While brain and star corals require well-lit environments to allow their symbiotic zooxanthellae to photosynthesize, black corals live in low-light environments. As a result, black corals rely mostly on their tentacles to capture food particles in the water while photosynthesis provides minimal energetic support. To enhance their ability to capture floating food particles, many fan-shaped black corals grow perpendicular to the direction of the current, maximizing the surface area exposed to the flow of water. Due to their beautiful, hardy black skeletons some species of black coral are harvested to make jewelry, and massive areas of black coral have been wiped out to support this trade. Like stony corals, black corals are a slow growing species and cannot easily recover from such destruction.
3. **Short Big-Eye (*Pristigenys altus*)**. The red color and large eyes of this Short Big-Eye fish give you some clues about its lifestyle and habitat. As depth increases, each color that makes up white light decreases. Red is the first color to disappear, so at the depths of the mesophotic zone, it is very difficult for predators to see an animal that is red! We are able to see these animals when exploring because of the remotely operated vehicle's (ROVs) large artificial lights. How many other red colored animals do you see in this picture? Although predators may have difficulty seeing the Short Big-Eye, its large eyes allow it to see quite well in this low-light environment.
4. **Sea Anemone (*Telmatactis* sp.)**. This beautiful sea anemone is actually a predator lying in wait. Sea anemones have stinging cells, called nematocysts, in their tentacles, which are used to capture prey as it swims or drifts by. The name anemone is taken from a group of terrestrial flowering plants, due to the sea anemone's resemblance to a flower.
5. **Leafy Green Alga (*Anadyomene lacerata*)**. The intricate lace-like appearance of this leafy green algae stands out against its environment. Like land plants, marine algae contain chlorophyll within their cells, which help capture and convert light to energy. The type of chlorophyll contained within the algae influences the color of the plant. This algae contains chlorophyll *a* and *b*, which contribute to its bright green color. The presence of algae like this indicates that enough light is reaching this area in the mesophotic zone to allow photosynthesis to occur.

6. **Sea Lily (*Crinometra brevipinna*)**. Sea lilies use their arms to comb the water for food particles, and move about the reef, using their root like appendages, to find a good place to feed. Sea lilies are considered living fossils. Their ancestors can be seen in fossil records from the Ordovician Period, which was 490–443 million years ago!
7. **Roughtongue Bass (*Pronotoqrammus martinicensis*)**. This iridescent, pearl-colored Roughtongue Bass is one of the most commonly encountered fish species throughout the mesophotic zone. It is often seen in large schools around patch reefs, which provide good habitat for the fish to hide from predators. These fish inhabit mesophotic environments throughout the Gulf of Mexico, comprising a large portion of secondary consumers in the mesophotic zone's food web.
8. **Unicorn Octopus (*Scaurgus unicirrhus*)**. The Unicorn Octopus is very small, growing to a maximum size of six centimeters (2.4 inches) in length. It uses its eight arms, which are covered in suction cups, to walk across the ocean floor. An octopus can push water out of siphons to propel itself quickly through the water dragging its arms behind. Even though it is very small, the Unicorn Octopus is not an easy target for large predators. It uses camouflage to disguise itself and can release a cloud of ink from its ink sacs to distract predators. Like other octopuses, it has specialized pigment cells in its skin, called chromatophores, which allow it to change color and texture very quickly. A chromatophore is like a flexible bag of color. It can be stretched out to cover a large flat area or retracted back to a small point. As the animal travels across a reef it changes its appearance to blend in with whatever background it might be passing. Because of the lack of an internal or external skeleton, the Unicorn Octopus is able to squeeze into extremely tight spaces and hide. Did you know that most octopuses have a beak, much like a parrots beak, which is located in the center of the body?
9. **Marbled Grouper (*Dermatolepis inermis*)**. Marbled Grouper is considered a rare species throughout its range. However, the northwestern Gulf of Mexico appears to be a hotspot for this species. It is occasionally sighted on the reef caps of Flower Garden Banks National Marine Sanctuary by scuba divers and in deep water habitat surrounding the banks by remotely operated vehicles and technical scuba divers. The Marbled Grouper lives for many years and is slow to reach sexual maturity. It is also believed to gather in seasonally predictable aggregations for mass spawning, making it extremely vulnerable to over fishing.
10. **Soft Coral (*Chyronepthia caribaea*)**. This orange coral represents one of the few species of soft coral found in the mesophotic zones of Flower Garden Banks National Marine Sanctuary. Soft corals do not produce a calcium-carbonate skeleton like reef-building corals, and are instead supported by tiny spines called sclerites, which can be used to identify the species. In order to nourish itself, this soft coral uses its tentacles to capture floating food particles in the water, and symbiotic zooxanthellae to photosynthesize, producing energy from light.
11. **Sea Star (*Tosia parva*)**. Although great expanses of the ocean floor in the Gulf of Mexico are covered by mud, they are still teeming with life. If you look closely, you can often find trails left in the mud by benthic (seafloor) creatures. This pretty sea star was photographed during a remotely operated vehicle survey. Sea stars have small tube feet that they use for locomotion and moving food to their mouth, which is located in the center of their ventral (bottom) side.
12. **Hunchback Scorpionfish (*Scorpaena dispar*)**. As you may have guessed from its name, the scorpionfish is equipped with a painful sting to ward off attacks from predators. Sharp fin spines coated with a venomous mucous provide its main defense. The Hunchback Scorpionfish is a bottom dweller encountered in the mesophotic zones of Flower Garden Banks National Marine Sanctuary, where it feeds on small fishes and crustaceans.
13. **Branching Tube Sponge (*Aiolochoira crassa*)**. This particular sponge species is commonly bi-colored, purple and yellow, with either color being the prevalent color. The oscules (openings at the branch tips) of this sponge are small compared to other tube sponges. The surface of the sponge is covered in small pyramid shaped bumps, which lend to its rough texture. Like all sponges, this species does not have a distinct digestive system, so it must feed by passing water through its openings and filtering out tiny particles.
14. **Soft Coral (*Anthomastus robusta*)**. This bright orange, mushroom-shaped animal is actually a beautiful soft coral! While only two species of soft coral have been identified in the mesophotic zone of Flower Garden Banks National Marine Sanctuary, this species is commonly seen nestled among black corals and gorgonians on the sea floor.
15. **Hermit Crab (*Dardanus fucosus*)**. Most hermit crabs have soft abdomens, which make them vulnerable to predators. In order to protect themselves, they scavenge for empty shells that they can tote around and hide in when they feel threatened. This hermit crab, found in Flower Garden Banks National Marine Sanctuary, is using a tulip shell as its home. In order to effectively protect itself, it will need to find a larger shell when it gets too big for this one.
16. **Sponge (*unidentified*)**. Many of the deep water sponges scientists are familiar with have been identified by preserved samples. This is why it is often difficult to identify species of sponges from *in situ* (in place) photographs of the living animals. Flower Garden Banks National Marine Sanctuary staff are working with sponge scientists to develop a catalog of living specimens, tying the biology to the taxonomy, through a system of *in situ* photography, sampling, and comparison with preserved samples.
17. **Scarlet Cleaner Shrimp (*Lysmata grabhami*)**. These Scarlet Cleaner Shrimp congregate at cleaning stations in the sanctuary where they advertise their cleaning service by waving their bright white antennae. Fish in need of cleaning then approach the shrimp, and even wait in line if necessary. At cleaning time, the fish open their mouths wide, and flare their gills to allow the shrimp to clean parasites out of their mouths and off of their teeth, without any intention of eating these tiny shrimp. The shrimp may also remove damaged scales on the outside of the fish. This symbiotic relationship in which both species benefit is called mutualism. The fish get rid of nasty parasites, and the shrimp get a meal.