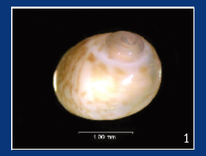
Sea Monsters in the Sand

Life On and Under the Seafloor at Gray's Reef National Marine Sanctuary

This poster has been designed to promote awareness of the fascinating life associated with the seafloor at the Gray's Reef National Marine Sanctuary (GRNMS). It is intended to help support an important goal under the sanctuary's management plan to enhance public awareness, understanding, and wise use of its natural resources and surrounding marine environment. To learn more visit the seamonsters wesite listed below.



Tectonatica pusilla - Gastropods

Moonsnails like this one have big appetites. While they are searching for their usual food of algae, clams and snails, they plow through the sand and mix it up, which changes the type and numbers of other animals in their area. Biologists refer to this process as bioturbation.

Glycerids

This bloodworm has a huge appetite for meat, making it a carnivore. Its usual prey includes crabs, echinoderms like sea stars, benthic (bottom-dwelling) fish, and other marine worms. The bloodworm waits in a burrow until it senses the presence of its prey by pressure changes in the surrounding water and sediment. Then it reaches out to stun and grab the victim with its long, nose-like proboscis that has four poisonous jaws on the end. See right.

Oxyurostylis smithi - Cumaceans

Cumaceans are small, shrimp-like organisms that live in soft burrows near the surface of the sand. They feed at night on plant and animal materials (detritus, plankton, and organic film) that are suspended in the water or that settle on the surface of the sand. In turn, cumaceans become food for many benthic fishes.

Ophiuroids

Ophiuroids are brittlestars that use a variety of feeding methods to scavenge for food, which consists mostly of organic deposits on the sand. As they actively search, they churn up the bottom sediment and dramatically change its physical and chemical characteristics. Ophiuroids, in turn, become prey for benthic fish predators (like tomtates), as well as other creatures like squid and octopus (cephlapods), and shrimp and crabs (decapods).

Aspidosiphon muelleri - Sipunculids

Sipunculids, or peanut worms, typically live in soft burrows that reach as deep as 20 inches (50 cm) below the surface of the sand. This sipunculid is coiled because it was living in a spiraled snail shell. To feed they use a mouthpart called an introvert that filters plankton and small, shrimp-like crustaceans from the water. They are best known for their role in decomposition, and for boring into rock which helps turn coral reefs into rubble.

Brachiopods

Brachiopods, or lampshells, are frequently found on the backs of decorator crabs. This arrangement works well for both parties. The crab is camouflaged by the brachiopod, and the brachiopod gets a free ride.

Lucina sp. - Bivalves

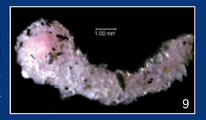
Lucinid clams are bivalves that have bacteria living within their gills that enable them to live in sulfur-rich environments, areas not usually suitable for most other species. Not many predators dare to enter these sulfur-rich environments, so the lucinids basically have a safe haven.

Echinoidea - Echinoderms

Echinoid sand dollars like this one often have crabs belonging to the genus *Dissodactylus* living on them. This living arrangement is called a commensal relationship because the crab benefits from the relationship, but doesn't harm the sand dollar. The crabs find food and shelter in the sand dollar, while the sand dollar, the host in this case, remains unaffected.

Not all organisms depicted in this rendering are discussed on this poster. Look for a complete discussion of each organism at www.seamonsters.noaa.gov.

Actinarians



Actinarians, like this burrowing anemone, have a mucus covering that is heavily coated with sand grains. It, like other attached anemones, harbors beneficial algae called symbiotic zooxanthelle that use sunlight to produce organic nutrients.

Cadulus quadridentatus - Scaphopods

Scaphopods, commonly referred to as tusk shells, are molluscs that live their entire lives buried in the sediment, sometimes a foot deep (30 cm). They are referred to as dioecious because they have separate sexes and can reproduce sexually. Their gametes (eggs and sperm) are released through an opening in the back of their shells, and fertilization takes place in the water column. Developing larvae are planktonic in the first stages of their life, and later settle to the bottom.

Ascideaceans

Ascidiaceans are a class of marine tunicates commonly referred to as sea squirts, and just like humans and other animals with backbones, are members of the phylum Chordata. They may reproduce asexually by budding; however, when reproducing sexually they give birth to live young, and are therefore called viviparous. Their initial larval stage resembles a tiny tadpole, and is the only lifestage of this animal with distinct chordate characteristics. In this larval stage they have a notochord, a dorsal hollow nerve chord, pharyngeal slits and a post-anal tail. The above tunicate is covered in sand grains and has its mucus net for catching food, usually positioned inside the animal, turned outward or everted.

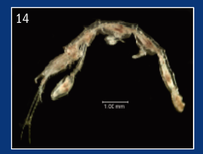
Paracerceis caudata - Isopods

Isopods like this one are referred to as marine pillbugs. Unlike many other organims, it is the female that travels to the male's breeding territory in order to mate. However, like an opossum or even a kangaroo, isopod females have a brood pouch or marsupium that houses her embryos and developing larvae until they are ready to live on their own.

Exogone rolani - Exogonid Polychaetes

This tiny exogonid polychaete worm reproduces in a very unusual and interesting way. Individual members of this family have either both male and female parts (called hermaphroditic) or only one or the other (gonochoristic). No matter which, fertilization takes place externally as the eggs exit the body. The newly formed embryos attach to the back (dorsal surface) or stomach (ventral surface) of the parent where they are protected until they hatch. This technique produces an amazing number of offspring despite the small size of this worm.

Luconacia incerta - Caprellid Amphipods



Males and females of caprellid amphipods look very different from each other (the one shown is a male). Males fight for females, and once fertilization takes place, young develop in the female's brood pouch. Upon hatching, the juveniles are well camouflaged and blend in with the female's habitat. Often, the mother cares for her young, which is not a common trait for animals in less complex phyla.

What is Gray's Reef?

Named after Milton B. Gray, a biologist who studied the area in the 1960's, NOAA's Gray's Reef National Marine Sanctuary was established in 1981. The sanctuary is located 17 nautical miles (32 km) off the coast of Georgia and is one of the largest near-shore live-bottom reefs in the southeastern USA, covering nearly 20 square miles (58 km^2). Its live-bottom habitats include rocky calcareous sandstone outcrops and ledges that provide attachment surfaces for numerous organisms. These outcrops and ledges are important patches in the open ocean for marine organisms to colonize and inhabit. The sanctuary consists mostly of open sandy areas with sediment-dwelling organisms that are important food sources for fishes feeding on the seafloor. As a result of the variety of bottom habitats, as well as its location on the edge of the inner and middle shelf breaks of the continental shelf, the sanctuary is home to a diverse and unique community of temperate and tropical marine animals, including many species of fish and invertebrates. In addition, the sanctuary is home to the threatened Loggerhead Sea Turtle and considered critical habitat for the endangered Northern Right Whale. From the human perspective, the sanctuary is important not only for scientific research, education and conservation, but also as a recreational area for fishing and diving.

www.seamonsters.noaa.gov

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