



Seamounts: Oases of Life

Just as mountains on land support diverse species, so do undersea mountains, or seamounts (most of which are really extinct volcanoes).

How Do Seamounts Support Biodiversity?

VARIED GEOLOGY

Much of the seafloor is a flat, muddy plain interrupted by features like hills, valleys, and seamounts. Similar to mountains on land, some seamounts have steep sides, some have plateaus, and nearly all have ridges. For many deep-sea animals, such as corals and sponges, the hard, rocky surfaces of seamounts are ideal places to settle and grow.

Corals and sponges are **foundation species**, providing a food source for predators and expanded habitat for a large number of species, such as crabs, squat lobsters, and sea stars. The nooks and crannies on seamounts offer hiding places for many animals, such as fishes and octopuses.

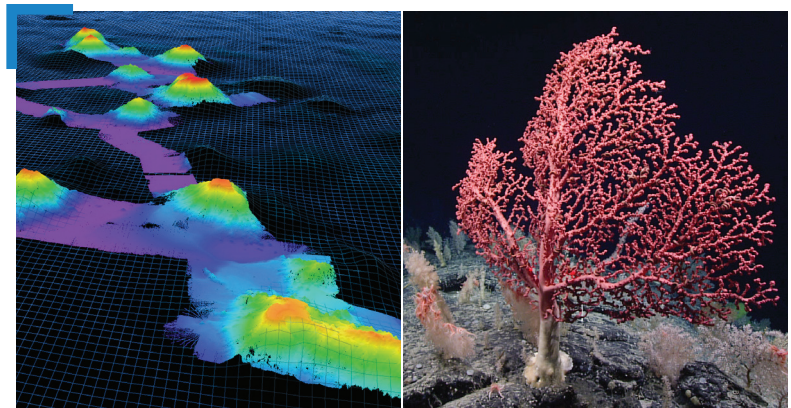
WATER CURRENT PATTERNS

Currents flow around seamounts much the same way they do around boulders in a river or stream. As fast-moving water comes in contact with an underwater mountain it creates dynamic circulation patterns that:

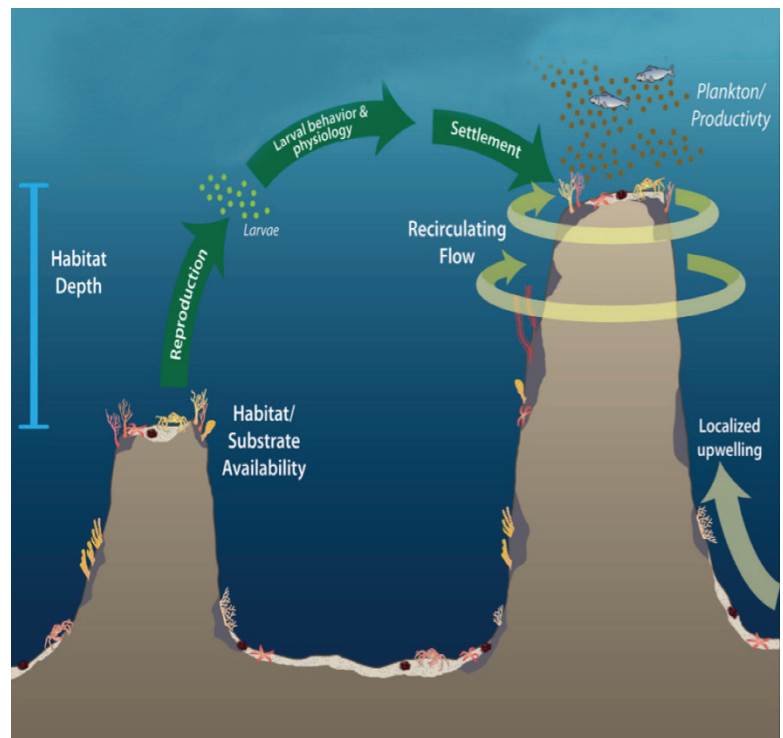
- Wash sediment away from rocky surfaces, creating prime settling ground for sessile (stationary) species.
- Carry a constant food supply for many organisms.
- Push water up the side of the seamount, carrying nutrients farther up in the water column (upwelling).

Upwelling means cooler, nutrient-rich water flows from the deep ocean towards the ocean surface. Nutrients from the ocean floor are lifted from the deep toward the sunlit surface waters. The nutrients provide the building blocks for phytoplankton to produce carbohydrates, fats, and proteins with energy from the sun. Several fish species gather near seamounts to feed on the abundant plankton. The presence of fish attracts larger animals such as tuna, whales, sharks, and seabirds. This creates an incredibly diverse “oasis of life.”

While these habitats are rich in biodiversity there is much we still don’t understand about the ecology of these regions. And it is highly likely that many species inhabiting seamounts remain to be discovered!



Seamounts, like the New England and Corner Rise Seamounts in the Atlantic Ocean (left), provide a hard substrate that is necessary for many benthic animals to attach. Deep-sea corals, like this large bubblegum coral (*Paragorgia arborea*) (right), provide a foundation for many other organisms to thrive. Images courtesy of NOAA Ocean Exploration.



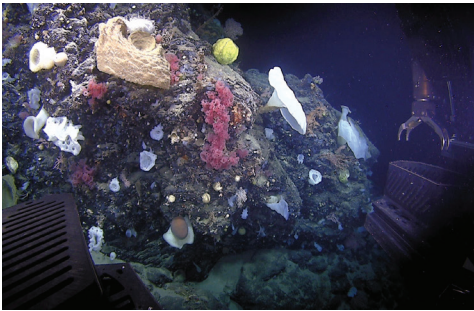
Seamounts act as obstructions for deep-water currents, diverting the water upwards. This localized upwelling brings deep-sea nutrients upwards, supporting the rich biodiversity found on seamounts. Scientists also believe that these currents support connectivity between seamounts by carrying larvae from one seamount to another. Image adapted from Shank 2010, *Oceanography*; Morrison et al. 2015.



Seamounts: Oases of Life

How Do Seamounts Support Biodiversity? cont.

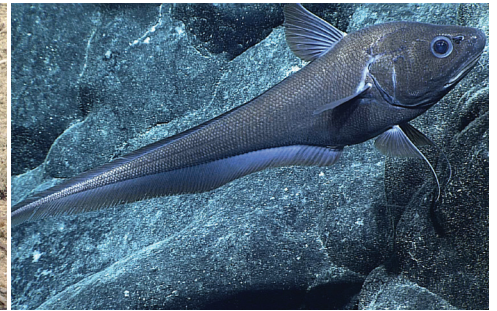
Images courtesy of NOAA Ocean Exploration.



Rock formations provide surfaces for sessile organisms to attach. Sessile animals, like the deep-sea corals and sponges pictured here on Retriever Seamount, cannot move relying on marine snow and currents to supply food.



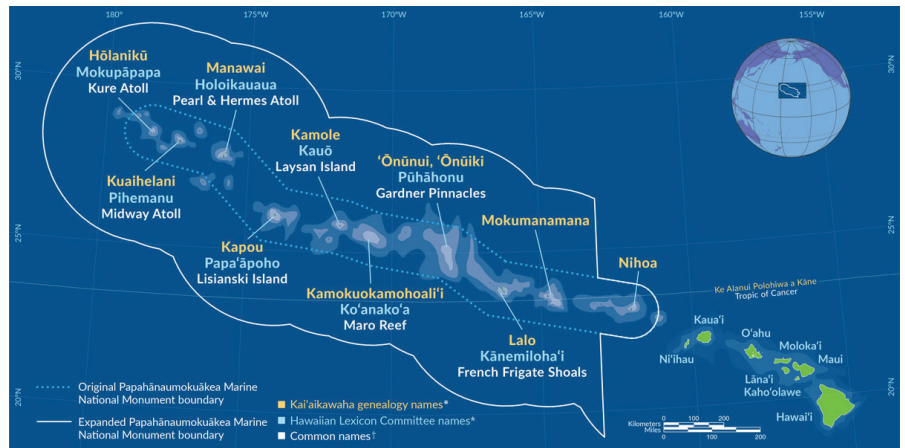
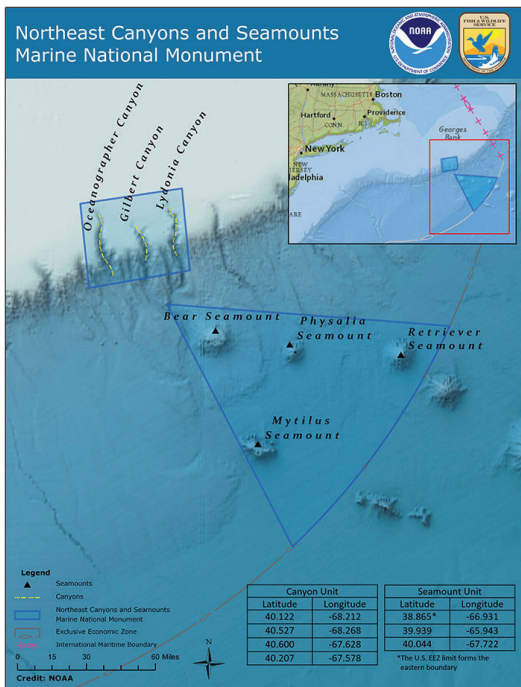
Sediment on top of a guyot provides habitat for sediment dwellers, such as marine worms and this pink sea cucumber.



Fishes, like this rattail fish, visit seamounts to feed on invertebrates like crustaceans.

PROTECTION

Because seamounts harbor a diversity of life, NOAA and its partners prioritize exploring them, identifying unique and vulnerable habitats, and providing data for informed decision-making regarding resource use and protection.



Papahānaumokuākea Marine National Monument (PMNM)

- Located northwest of the Hawaiian Islands.
- Among many other things, researchers are studying the coral communities and the microbes that are associated with rocks and mineral crusts on this hotspot seamount chain to provide baseline information about the mineral resource potential of the seamounts and the animals that live on them in order to inform management and conservation of the area.

Northeast Canyons and Seamounts Marine National Monument

- Found about 130 miles (210 kilometers) off the coast of Cape Cod, Massachusetts.
- This ocean ecosystem, formed by a hotspot seamount chain, supports fishes such as tuna, swordfish, and sharks. Whales, dolphins, and turtles are also found here.

Foundation Species (factsheet): <https://oceanexplorer.noaa.gov/edu/materials/DSC-foundation-species-fact-sheet.pdf>

Atlantic Seamounts (image): <https://oceanexplorer.noaa.gov/oceanos/explorations/ex2104/features/mapping/media/bathymetry-hires.jpg>

Bubblegum coral (image): <https://oceanexplorer.noaa.gov/oceanos/explorations/ex2104/dives/dive19/media/bubblegum-coral-hires.jpg>

Seamount illustration (image): <https://oceanexplorer.noaa.gov/oceanos/explorations/ex2104/features/stepping-stones/media/habitat-forces-hires.jpg>

Rock formations (image): <https://oceanexplorer.noaa.gov/oceanos/explorations/ex2104/features/looking-back/media/retriever-diversity-hires.jpg>

Sea cucumber on sediment (image): <https://oceanexplorer.noaa.gov/multimedia/daily-image/media/20210804-hires.jpg>

Rattail fish (image): <https://oceanexplorer.noaa.gov/oceanos/explorations/ex1606/background/guyots-bio/media/rattail-hires.jpg>

Northeast Canyons and Seamounts MNM (website): <https://www.fisheries.noaa.gov/new-england-mid-atlantic/habitat-conservation/northeast-canyons-and-seamounts-marine-national>

Papahānaumokuākea NMS (website): <https://www.papahānaumokuākea.gov/new-news/2021/08/26/expansion/>