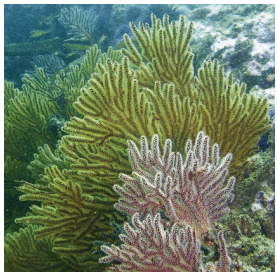


# Bathymetry



Gorgonians, also called sea fans, are attached to rocky reefs off Santa Catalina Island. CDFW photo: Dianna Porzio

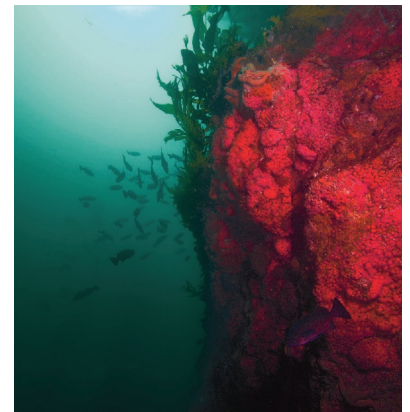
As mountains and valleys define the diverse topography of California, seamounts, banks, submarine canyons, and a narrow continental shelf define its coastal bathymetry. Bathymetry is the measure and study of water depth. This bathymetry map illustrates many fascinating ocean features in remarkable detail.

Seamounts are underwater geologic formations abruptly rising from the seafloor and are typically formed by volcanic activity. They are made of hard, rocky material, provide structure for various forms of marine life to grow on, and are considered biologically diverse hot spots. In central California, the Davidson Seamount occupies an area 8 miles wide by 26 miles long and rises over 6,500 feet tall, yet its peak remains over 4,000 feet below the sea surface.

In contrast to seamounts, banks form where the seafloor has been elevated above the continental shelf due to the movement of tectonic plates. Banks are biologically diverse because they provide solid structure among the soft sediments that characterize the continental shelf. Cold, nutrient-rich water flows up their steep slopes, creating conditions that are ideal for benthic organisms, including sponges and corals. Cordell Bank is located 22 miles offshore Point Reyes. It occupies an area 4 miles wide by 7 miles long, is 400 feet tall, and its peak is 115 feet below the ocean surface.

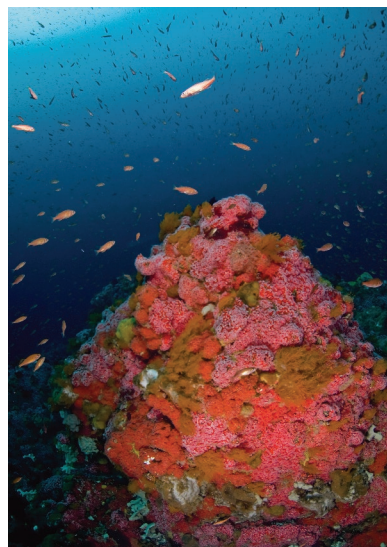
Submarine canyons are deep valleys relative to their immediate surroundings. They can form due to underwater landslides and intense currents, starting as underwater gullies and scarps, then subsequently deepening into canyons. Evidence of this canyon erosion is seen perpendicular to the shoreline up and down the California coast. Prominent examples exist below Cape Mendocino and along the Big Sur Coast (just below Point Sur). The state's largest and most dramatic example is the Monterey Submarine Canyon.

Dali's Wall offshore Pebble Beach characterizes the geologic formations found in the Monterey Area. Photo: Chad King, NOAA MBNMS



Beginning immediately at the shoreline of Moss Landing, it meanders over 100 miles out to sea to a maximum depth over 13,200 feet; this size rivals that of the Grand Canyon. Monterey Bay's distinctive symmetrical mapping profile is the result of this canyon's erosion over time.

The seafloor can also be categorized in terms of its composition, or habitat type. Rocky reefs, boulders, gravel, soft and coarse sediments, silts, clay, and mud are some of the diverse habitats found on California's geologically complex seafloor. In estuaries such as Humboldt Bay (near Eureka), the seabed composition is dominated by soft muds, sands, silts, and clays, and this environment is a nursery to a variety of marine life. In coastal environments around Big Sur, the seabed composition is a mix of coarse and fine sands, rocky reefs, and boulders. These environments are host to iconic marine life including kelp, rockfish, urchins, otters, and abalone.



Abundant assemblage of invertebrates at Cranes Point in Cordell Bank. Photo: Joe Hoyt, NOAA CBNMS

Bathymetry plays an important role in ocean current dynamics because the structure of the seafloor and its interaction with offshore winds dictate the directional paths of currents. These currents provide necessary nutrient-rich waters to organisms and can create biodiversity hot

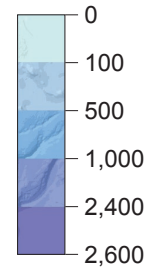
spots, as seen on seamounts and banks. Bathymetry also impacts various abiotic conditions (temperature, acidity, oxygen concentration) that drive species composition offshore California. Understanding the ocean bathymetry of California is important for understanding biological processes and marine ecosystems.



California's iconic Red Abalone (*Haliotis rufescens*) is typically associated with hard surface and kelp. CDFW photo: Athena Maguire

# Bathymetry

Depths in Fathoms  
(One Fathom = Six Feet)



Sources:

- Bathymetric DEM, 200 Meter Resolution*  
California Department of Fish and Game et al. (2002)
- Coastal Relief Model*  
National Oceanic and Atmospheric Administration (2002)
- Marine habitat mapping survey of Cordell Bank, California*  
California State University (2006)
- BathymetryB [5m]-Monterey Canyon and Vicinity, California*  
Dartnell et al. (2015)

Note:

Vertical exaggeration was applied to the data used in side view inset maps to emphasize landform relief.

