

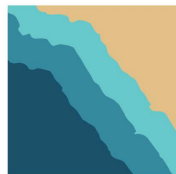


Orange County Marine
Protected Area

TIDEPOL GUIDE

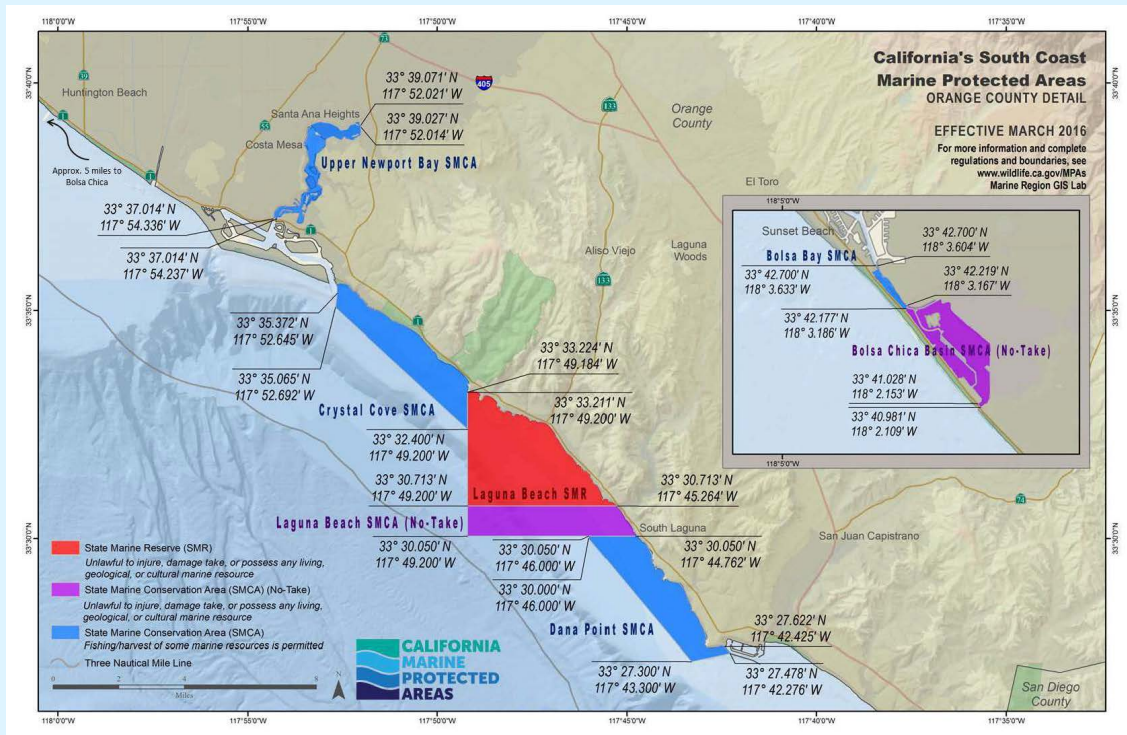
Illustrations by Sabrina Medina

DEDICATED TO THE OCEAN, THOSE THAT
WORK TO PROTECT IT, AND THE INDIGENOUS
PEOPLES AND LAND IN WHICH WE ARE
DEEPLY INDEBTED TO.



LAGUNA
OCEAN
FOUNDATION

Marine Protected Areas of Orange County



Orange County marine protected areas (MPAs) protect 14 miles of coastline—the longest continuous stretch of protected seashore in Southern California. These MPAs aim to protect the diversity and abundance of marine life, the rocky intertidal habitats on which they depend, and the integrity of marine ecosystems.



Tidal Zonation

TIMES TO TIDEPOOL

Tides are caused by the gravitational pull from the sun and moon. California experiences two high and two low tides a day. This causes sea creatures to arrange themselves vertically in the intertidal zone depending on their abilities to compete for space, avoid predators from above and below, and resist drying out. The best times to tidepool are during low tide when the water has receded the most.



High Tidal Zone

Often known as the splash zone, the high tide zone is characterized by barnacles, limpets, snails, and hermit crabs. These animals have adapted to frequent air exposure and desiccation.



Mid Tidal Zone

This zone is characterized by sea anemones and mussels. Many species of plants and animals are associated with a bed of mussels as the bed affords protection from waves and predators.



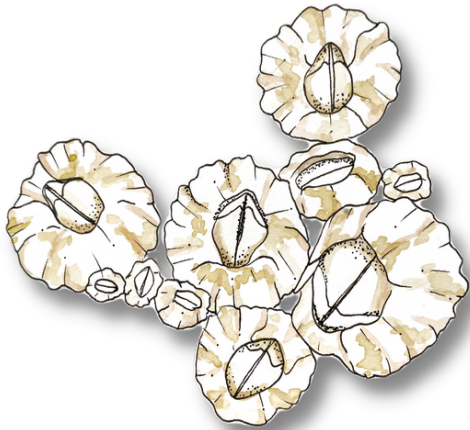
Low Tidal Zone

In the low tide zone, sea urchins are often present in large numbers. Sea stars and many species of brown and red algae are present. This zone is most often covered with water and only exposed during low tide.

Intertidal Species

Marine Animals

HIGH TIDAL ZONE



Acorn Barnacle

Balanus sp.

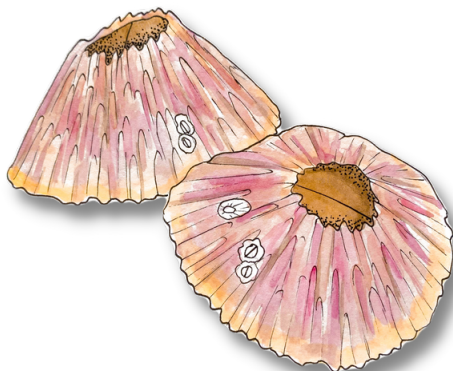
These barnacles are small and generally live in the upper tidal zone. They are typically white to light brown. They start their life in a larval form before metamorphosing. These barnacles can survive the harsh sunexposure by closing the trapdoor of their shell to prevent dissection and hold in moisture during low tide.



Gooseneck Barnacle

Pollicipes polymerus

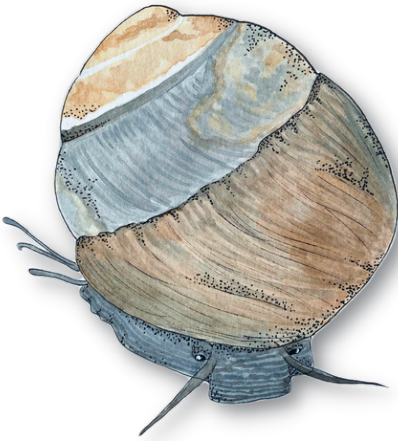
The gooseneck barnacles are sessile filter feeders. This species extends uses its cirri to catch small particles of detritus and tiny crustaceans. They are distinctive with several white plates and grow in bunches to reduce the risk of predation. They attach to substrates via a long stalk or peduncle.



Pink Volcano Barnacle

Tetraclita rubescens

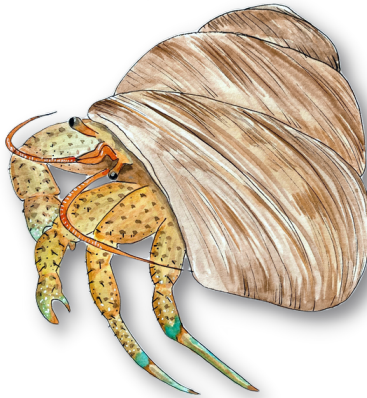
These barnacles are commonly an inch in size and can live as long as 15 years old. The shells of adults are pink to reddish and appear thatched. Unlike acorn barnacles, pink volcano barnacles tend to be solitary rather than form aggregations. They can grow large enough to avoid predation.



Black Turban Snail

Tegula funebris

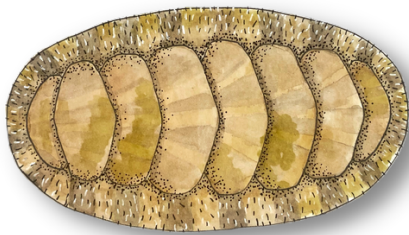
These snails are named for their dark often black rounded shell with four whorls. Overtime, the tops of their shell can get worn and expose the pearly-white color underneath. Like many snails they have a operculum to protect itself when withdrawing into their shell. They can grow to around 3 cm and 30 years in age.



Blueband Hermit Crab

Pagurus samuelis

These hermit crabs are commonly found in the intertidal zones. The distinctive bright blue band around their walking legs and red antennae given them their common name. They are often found inhabiting black turban snail shells. They are known to fight over the good shells and even steal from one another.



Chitons

Nuttalina sp.

Chitons have a set of eight plates that make up their shell. This allows the animal to have flexibility to move over uneven surfaces. The plates are encircled by a skirt known as a girdle. They cling tightly to rock which they graze algae off of and can often be difficult to see.

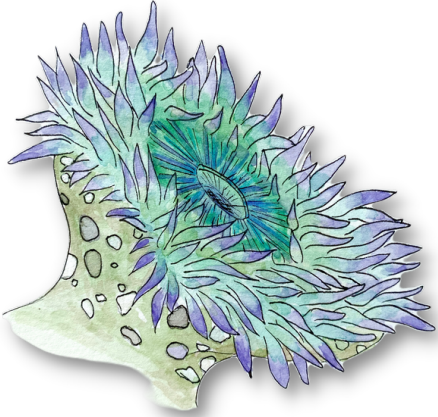


Owl Limpet

Lottia gigantea

As these are larger limpets they are often found with smaller barnacles and even other limpets on their shell. These limpets are territorial and often return to the same "homing scars". These are scars in the rocks that exactly fit their shell. They will farm by grazing on microalgae and allowing it to grow back often in distinctive patches.

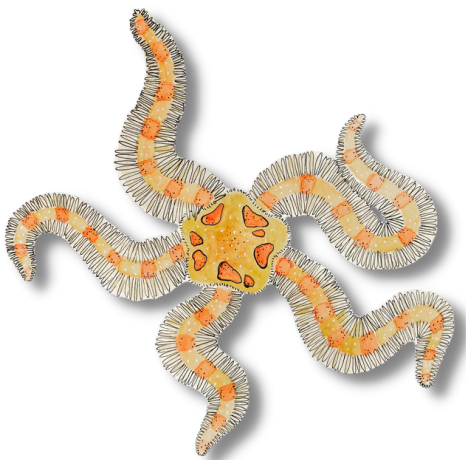
MID TIDAL ZONE



Sunburst Sea Anemone

Anthopleura sola

These anemones use their tentacles to capture and transport food to their central mouth. Their variation in color comes from symbiotic algae that also photosynthesize for them. Anemones often use shells to protect themselves from dissection and solar radiation.



Western Spiny Brittle Star

Ophiothrix spiculata

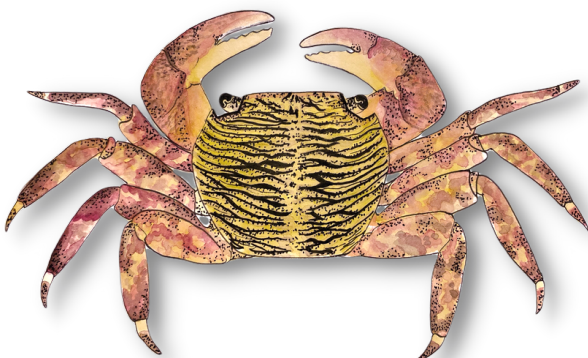
These stars are able to bury themselves by using the spines on their arms to anchor into crevices. The star is then able to extend one or two additional arms to catch food and bring it down to their central mouth. If a predator attacks the brittle star their arm will break off and is able to re-generate.



Chestnut Cowrie

Neobernaya spadicea

This snail grows to be 2-3 inches in length and is easily identified by its chestnut colored shell. Their polka-dot mantle will often extend to cover its shell, but can retract if threatened. This allows the snail deposit new enamel as they grow and also keeps their shell clean. These snails are known to eat a wide variety of algae.



Striped Shore Crab

Pachygrapsus crassipes

These crabs are typically 2-5 inches with males being larger. Their pinchers are dark purple-red and their carapace has horizontal yellow-green stripes. They eat both plants and animals making them omnivores. These crabs are able to survive in and out of water.



California Blue Mussel

Mytilus californianus

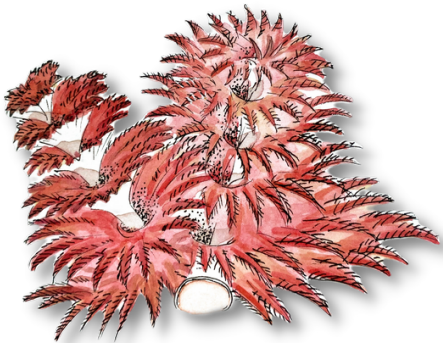
These mussels are blue-black in color with thick shells that are slightly iridescent on the interior. They secrete protein fibers called byssal threads from a gland in their foot which are used to attach themselves to hard surfaces and even to each other. They often dominate the substrate in waveswept areas.



California Cone Snail

Conus californicus

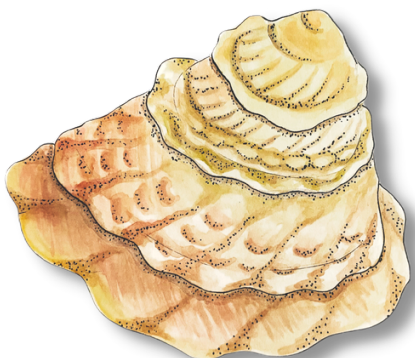
Cone snails are a small predatory snails that usually reside in the tropics. Unlike its relatives, this cone snail is unusual as it lives in the cooler waters along the California coast. This cone is found in both rocky and sandy areas, in the intertidal zone and subtidally down to 30 meters in depth.



Christmas Tree Worm

Spirobranchus sp.

These small feathery worms live in tube like structures and have brightly colored plumes. They use cilia, or tiny-hair-like bristles on their appendages, to catch plankton as it passes by. If these worms will rapidly retreat back into their burrows. Their triangular shape resemble tiny trees of red, orange, or blue.



Wavy Top Turban Snail

Megastraea undosa

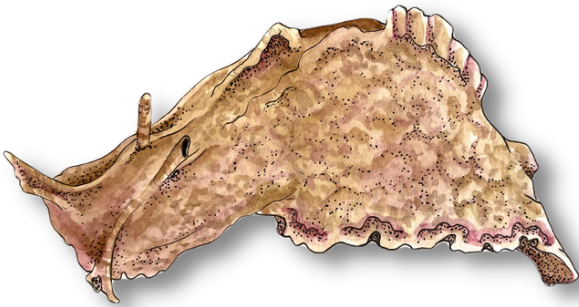
This snail is one of the largest invertebrates found in tidepools, they can grow its shell up to 6 inches long. The shell has undulating ridges, and is conical in shape with a flat base. Its color ranges from light brown to tan, and is often covered with coralline algae and other small organisms.



Bat Star

Patiria miniata

Bat sea stars are named after the "webbed" appearance between their five arms. They can be many different types of colors. Like many stars, they feed by extending their stomachs out of their body and over a plant or animal, slowly digesting it. They are territorial and often will gently "fight".



California Sea Hare

Aplysia californica

These sea slugs are named for their distinctive the pair of tentacle-like extensions, or rhinophores, on top of its head. They are related to snails, however they have lost their shell. When threatened these sea hares can expel a pink cloud of ink. They eat a variety of algae and can grow to weight up to 15 lbs.



Tidepool Sculpin

Oligocottus maculosus

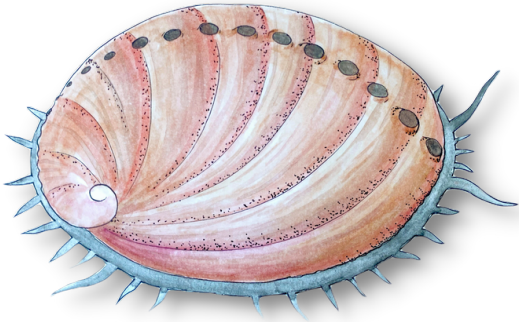
This small species of sculpin vary considerably in color. They can change color to camouflage into their environment. These fish are fast swimmers however their pectoral fins do not aid in their speed, instead are used solely for balance. They can get up to 9 in and can walk on land and breathe air.



Ochre Sea Star

Pisaster ochraceus

Ochre sea stars can be found on wave-washed rocky shores, tidepools, and occasionally out of water for limited times. The coloration of ochre sea stars vary from purple to orange to reddish brown. Sea stars are adapted to hold onto rocks with hundreds of sucker-tipped tube feet that are found under each arm.



Abalone

Haliotis sp.

The distinctive oval shaped shell of this animal is best known for the vibrant iridescent interior. A large single foot under their shell and the row of holes on their shell are used to move, breathe, remove waste, and reproduce. Once historically abundant along the California coast, they have been over-harvested and some species are now considered endangered.



Two-Spot Octopus

Octopus bimaculoides

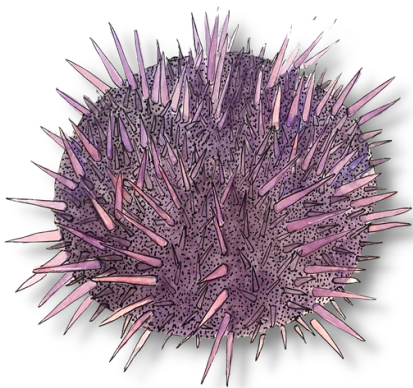
Octopuses are generally shy and hide, so only the most watchful and observant tidepoolers discover this interesting animal. Octopus are masters at blending into their environment and can change their color and skin texture in seconds. Their common name comes from the two fake eyespots below their real eyes.



Zebra Perch

Hermosilla azurea

This oval-shaped fish with a bright blue spot on the gill cover, behind the eye. They vary in color with some fish being dusky or olive to black dorsally and others being greenish or silvery-gray dorsally transitioning to white ventrally. They have five to ten stripes and a bright blue spot on the gill cover. Juveniles will often use tidepools until they reach adult size.



Purple Sea Urchin

Strongylocentrotus purpuratus

These sea urchins have a round internal shell called a test. Their body is covered with tube feet and purple spines that move on ball-and-socket joints. In the intertidal, these urchins will often camouflage or decorate itself with algae, rocks, and shells. This behavior might help with protection from UV rays or drying out.