

Sections of the plate that move below eventually melt and recombine to form new molten rock or "magma." This process of old rock changing to new is part of the never-ending "Rock Cycle." The granodiorite is marked by many parallel cracks called "joints." Under stress, hard rock cracks. Stress may be due to movement along fault lines or the result of temperature changes.

Monterey Cypress You are looking across at the Allan Memorial Grove, one of the last two places on Earth the Monterey cypress grows naturally. The other place is across Carmel Bay at Cypress Point in Pebble Beach. Growing in gnarled shapes on the cliff faces, these trees have inspired

many poets, artists, and naturalists over the years. Although they probably had a much wider range in the past, climatic and geographic changes have isolated them to these two natural pockets. The Monterey Cypress is grown widely from seed



View from the Cypress Grove Trail looking across Cypress Cove at Big Dome

around the peninsula. You can learn more about this tree by taking the Cypress Grove Trail to the east (0.8 mile, about 30 minutes).

STOP # 11 The final stop on the walk is the information station, operated by docents of the Point Lobos Natural History Association.

SUBJECTS: 1) pelts of marine mammals
2) postcards, posters

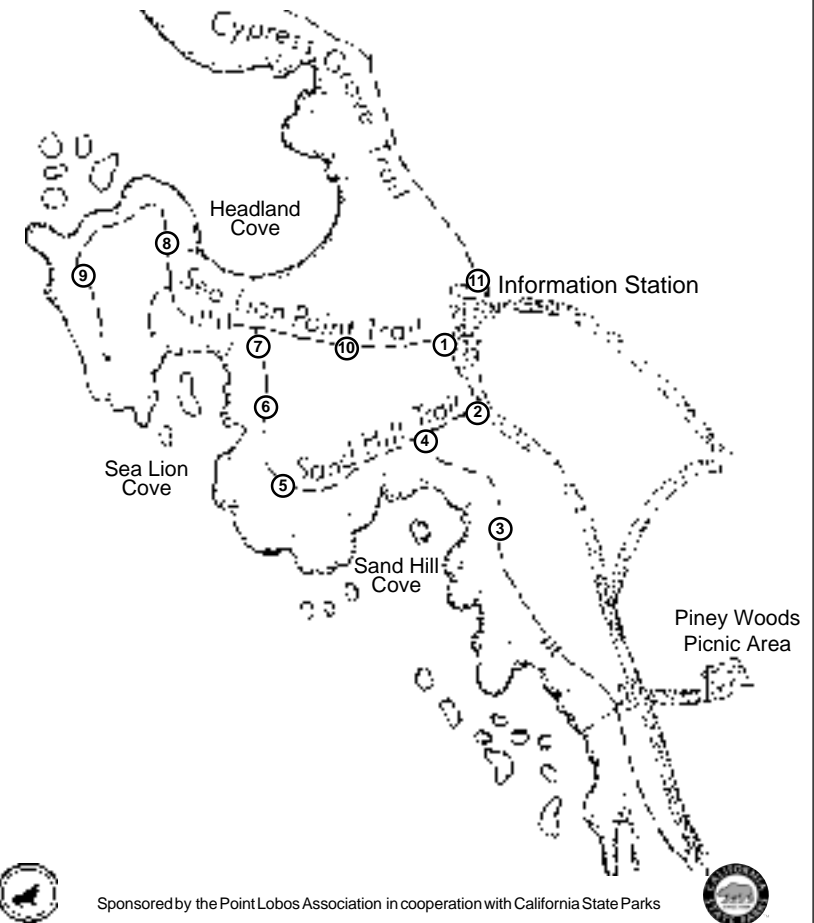
Pelts of Marine Mammals Touch and compare the pelts (obtained from specimens found dead on the beaches). The southern sea otter fur is the densest fur known, having an average 600,000 individual hairs in a square inch area. Notice the ears on the pelt of the California sea Lion. The harbor seal pelt has the coarsest hair, all aligned in one direction. It was once used to line the underside of snow skis, to help in climbing hills.

Information Trailer Postcards, posters, field guides, and membership applications for the Point Lobos Natural History Association are available. Source books are there for identification, and questions are answered, too!

Sea Lion Point Nature Walk

Theme

The Sand Hill and Sea Lion Point trails offer excellent opportunities for observing harbor seals, California sea lions, and the southern sea otter. These trails also give a revealing look at the area's geologic past and illustrate some interesting ecological features.



Sponsored by the Point Lobos Association in cooperation with California State Parks



STOP # 1 Go south of the Cypress Grove parking area on the paved road, just beyond the "No Parking Anytime" sign.

SUBJECTS: 1)poison oak
2)importance of coastal shrubs.



Poison Oak Warning! "Leaves of three, beware of me!" Point out poison oak plants. An oil called Urishoil in the plant affects our skin. The oil is present in every part of the plant including the roots. If the plant is burned, the oil can be inhaled with the smoke to affect the lungs. Although the plant causes irritating effects in most people, the Ohlone Indians pounded the plant, gathered the sap and allowed it to oxidize. With this preparation they dyed baskets and made a temporary tattoo they applied to their bodies.

Other low shrubs:

California sagebrush	(gray-green, aromatic)
coyote brush	(nicknamed Mr. and Mrs. Fuzzy-Wuzzy)
buckwheat	(with pink or rust flowers in summer)
sticky monkey flower	(orange trumpet-like flower)
wild lilac	(purple-blue flower from Feb. to April)

Shrubs provide homes and hiding places for birds, rabbits, lizards and other small animals. Look under the brush for pathways below and see if you can find footprints or other signs. The intricate root structures of the plants anchor soil and minimize erosion.

STOP # 2 Take Sand Hill Trail off the paved road and stop at the intersection with South Shore Trail. Look southward down the coastline.

SUBJECTS: 1)rock strata on South Shore
2)kelp in the cove

Rock Strata You are standing on and looking down the coastline at the Carmelo formation, deposited about 60 million years ago into a submarine canyon by strong flowing water - probably river flow, underwater landslides, and turbidity currents.

The Carmelo formation is made of gravel, sand, and mud that later became cemented into rock, often around well-rounded older rocks that range in size from marbles to footballs. This combination of round, older rock and sandstone is sometimes called "conglomerate."



layered and uplifted rock forms at Weston Beach

Notice how the layers are slanted upward and outward. Some layers look like waves frozen in stone! Remember that these layers were originally deposited flat, like pages in a huge book. They have since been broken and pushed upward by tremendous forces that drive the inner machinery of the earth.

in a predictable manner, the height and force of individual waves cannot be predicted. Don't go out on low rocks, and **NEVER** turn your back on the ocean. Large waves periodically appear "out of nowhere" and can wash people away. Local currents can be extremely rough.

Hypothermia is the lowering of the body's temperature below the normal range. As the temperature goes lower, the brain shuts down usual mental functions such as reasoning, coordination, speech, and then the muscle functions of breathing and heartbeat.

Several years ago a high school student from the Salinas Valley ignored warnings to get off the rocks and was swept into the ocean by a large wave. After about 30 minutes in the water, he lost consciousness and drowned, even though he was reportedly a good swimmer. He was not able to swim "in." A similar drowning took place in September of 1988. Hypothermia was considered a major factor in these drownings.

Bird and Mammal Droppings on the Rocks - Notice the white stains from droppings on the rocks. The waves and rain wash them back into the ocean where they can decompose and once again become nutrients for marine life. The decomposition of animals and their droppings is an important link in the cycle of life on land and in the ocean.

STOP # 10 Climb back up the stairs and move east along the Sea Lion Point Trail to a point just beyond the intersection with Sand Hill Trail. Look across Headland Cove (to the north).

SUBJECTS: 1) granodiorite rocks
2) Monterey Cypress Grove

Rocks Notice the area about halfway around Headland Cove where the pebbly conglomerate stops and the slabs of granite begin. Observe the conglomerate OVER part of the granite. This is another example of the Principle of Superposition, the newer over the older. On the opposite bank, notice how the older granodiorite is far higher than the Carmelo formation. This attests to great vertical shifts of parts of the land, probably due to the "collisional" movement of tectonic plates that tends to thrust one section upward, while the other dives below or "subducts."



Cypress Grove headland as seen from the lower plateau at Sea Lion Point

STOP # 4 Walk back up the hill and stop just before the intersection of the trails.

SUBJECTS: 1)listening stop
2)erosion

Listening Listen carefully without making any sound for a whole minute. You may be able to hear the California sea lions barking on the Sea Lion Point rocks. Listen for more! You may hear the “tap, tap, tap” of a southern sea otter breaking shellfish on a rock resting on its chest.

Erosion Erosion is the gradual process by which rock and soil is worn away. Look down the hillside toward the water. Notice the deepest cuts exist where there is no ground cover. Trails have no ground cover and must be engineered carefully so as not to weaken the hillsides. Please stay on the established trails rather than making your own, because erosion will follow!

STOP # 5 Take Sand Hill Trail to the left, and over the top of the hill to a wide place in the trail, with round, rocky conglomerate on either side. This is the first overlook to Sea Lion Point.

SUBJECTS: 1)cormorants on the rocks below
2)close-up look at the Carmelo formation
3)sea lions



Cormorants These are the black diving birds that perch and nest on the rocky cliffs. There are two species of cormorants at Point Lobos. Cormorants dive for fish and occasional crabs. Oriental fishermen still put a ring around the neck of a cormorant. When the bird catches a fish, it cannot swallow and brings the fish back to its master. For their hard work, the birds are given an occasional fish to really swallow!

California Sea Lion After hearing their loud calling, you can see sea lions on the rocks the reserve is named after: “Punta de los Lobos Marinos,” or Point of the Sea Wolves. One visitor speculated that sea lions were called “sea wolves” because their head-up posture was similar to that of a howling wolf. The big males are much larger than a harbor seal, with dark, blackish-brown fur. This is the familiar circus performer at Marine World that can turn its rear flippers under its body to “walk,” and that skillfully balances a ball on its nose. (Most trained seals are females, the males being harder to manage.) The California sea lion has external ear lobes. Probably most of the sea lions here are males. Most females stay in breeding ground areas farther south, from the Channel Islands to Baja. Older males are easily distinguished by a hump on their heads called a “sagittal crest.” The quiet pose on the rocks with upturned nose is probably a way of resting the large muscles that hold the head up while “walking.”



STOP # 6 Look down into Sea Lion Cove.

SUBJECTS: 1)rock strata in cliffs
2)marine mammals in cove

Rock Strata Look at the cliff on the right and count the layers of sediment and rock. At some places the Carmelo formation is over a thousand feet thick. The land that curves around to a point in front of the Sea Lion Rocks may, with erosion, become an island many years from now, perhaps covered with sea lions!

Marine Mammals. Harbor seals often “haul out” on the rocks below. The sea otter often swims on his back or dives for food in the waters below.

STOP # 7 The intersection of Sand Hill Trail with Sea Lion Point Trail.

SUBJECTS: 1)sea otters in Headland Cove
2)California ground squirrels

The Southern Sea Otter In Headland Cove, otters often float on their backs with the kelp draped over their chests. In this way, they rest without being washed into shore or against the rocks. Sea otters are the largest known member of the weasel family, which includes the skunk. Unlike the harbor seal and the sea lion, sea otters have no blubber or fat layer to protect them from the extremely cold water (approximately 55 degrees F). They must frequently groom their thick fur so that it will maintain its insulating qualities. This helps them maintain a layer of air bubbles in the fur so that the cold water never really touches their skin layer. Southern sea otters seldom leave the water unless ill or driven ashore by violent storms. They usually swim and float on their backs. Otters are one of the very few tool-using animals, using rocks as anvils to crack open shells while floating on their backs.



Nearly hunted to extinction for their luxuriant fur, the southern sea otter has increased its population to about 2,100 along the more than 200 miles of central California coast. This comeback is due to dedicated efforts by groups such as The Friends of the Sea Otter. The southern sea otter still remains a “threatened” species.

The California Ground Squirrel Although the most sociable animal in the reserve, the ground squirrel is also responsible for most first aid calls. They can inflict a terrible bite if you try to feed them or pick them up. The California ground squirrel prefers an area with low vegetation that is well drained and one with rocks or boulders for “lookout” posts. They normally eat plants and grasses. PLEASE DO NOT FEED THEM! Unnatural feeding encourages overpopulation, inability to go back to natural foods, and many starvation deaths after tourist season. The ground squirrel has also been known to transport fleas that carry bubonic plague. This can be transmitted to people who handle them.



STOP # 8 Walk down to the bottom of the stairs and look back to the tall eroded conglomerate forms.

SUBJECT: erosion

Erosion is often due to a combination of forces including wave action, wind, rain and natural expansion and contraction of solids. Students or people on tour might be encouraged to think of forms this rock might erode to under these conditions over millions of years. On the cliff side to the northeast you will notice some interesting erosion forms in sandstone. The low area around us may eventually erode farther downward to make a sea channel in this spot.

STOP # 9 Take the trail outward toward Sea Lion Point and stop to look out directly across at the rocks and sea lions.

SUBJECTS: 1) Sea Lion Rocks
2) wave action and hypothermia
3) bird and animal droppings on the rocks

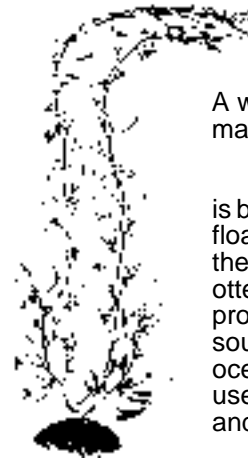
Sea Lion Rocks to the West While you stand on the 60 million year-old Carmelo formation, you are looking across to rocks nearly twice as old. These rocks, made of Santa Lucia Granodiorite (gran-oh-die-oh-right), were formed over 100 million years ago and cooled deep in the earth under a protective mantle that allowed them to cool slowly. Dinosaurs still walked the earth when these rocks were formed. Large crystal inclusions (feldspar) can be found in the rock. The thick mantle that helped cool the granite has slowly and completely disappeared. This is the oldest layer of rock in the reserve and was probably raised to sea level when part of the Pacific Plate was colliding with the North American Plate and moving under it rather than scraping against it as it now moves northward.



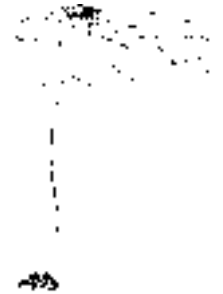
Sea Lion Rocks as seen from the Sea Lion Point Trail

Wave Action and Hypothermia You are looking across the Devil's Cauldron, named for the irregular ocean bottom beneath that stimulates rough, converging currents. Although tides move up and down

Kelp. In late spring, summer and fall you can best see growing masses of brown seaweed. Most is giant kelp (*Macrocystis*). Giant kelp is the fastest growing perennial plant, able to grow up to 12 inches a day, and anchored by a "holdfast" to rocks below. A waving banner up to 150 feet long is held afloat by many finger-sized, gas-filled sacs.



The next most common kelp is bull kelp (*Nereocystis*), the main float of which is mistaken by many for the bobbing head of the southern sea otter. The undersea forest of kelp provides a secure home and a source of food for thousands of ocean dwellers. Harvested kelp is used in everything from toothpaste and shampoo to beer and ice cream.



STOP # 3 Take the South Shore Trail to the south (left) about a hundred yards and stop to look at the small rock islands in Sand Hill Cove.

SUBJECTS: 1) harbor seals on rocks
2) sandstone, shale and conglomerate layers in the cliffsides

Harbor Seals Commonly seen on these rocks are the cigar-like shapes of the harbor seals, often before or after low tide. Their coats vary in color from nearly white to gray-black and are almost always spotted (for camouflage underwater). They normally never make a sound, although they can make a growling noise when annoyed. Some still call them "sea dogs" because of their dog-like faces that resembles cocker spaniels with no ears. They hear through holes where ear lobes would normally be. They cannot walk on their rear flippers, but rather hump and bump their way up and down the rocks like huge inchworms. They stay in the shallower water for protection, but can dive to 300 feet. They feed at night on fish, squid, and octopus.



Rock Strata The layers are not of equal thickness indicating different conditions for the deposit of each layer. Sandstone is light or buff-colored. Strata further out on points is sometimes almost black from clay and organic matter. Wave action is cutting a deeper cave to your left. Listen for the echo of waves and see the stones that have fallen down. The lower strata layer, the older it is; this is the Principle of Superposition. The soil on top of the strata was probably once a shallow ocean floor. Some of the sandstones contain fossil imprints of ancient sea life.