8. CABRILLO BEACH TIDEPOOLS

Tides mark the regular rise and fall of the ocean, caused by the gravitational pull of the moon and sun. Tidepools are formed by depressions in the rocks that trap water as the tide goes out. The Cabrillo Beach Tidepools extend one-half mile from Cabrillo Beach to the base of the Point Fermin Lighthouse in San Pedro and are often used as an outdoor classroom by the Cabrillo Marine Aquarium. Tidepool animals live in different areas of the rocks depending on their ability to survive harsh conditions, including battering waves, drying out and access to food. The best time to visit the tidepools is at low tide, when most of the rocks and pools are exposed. Remember to watch the waves even at low tide. The rocks will be wet and slippery, making even small waves dangerous.

The diversity of algae and animals attests to the many different ways species evolved to protect themselves in this rigorous environment. To cling tightly to rocks in surf, barnacles glue themselves down, mussels attach with tough fibers they secrete and shore crabs use

their hooked legs to hold on to rocks. Empty snail shells provide hermit crabs with protection from battering waves and predators. To avoid drying out at low tide, limpets pull their shells tightly against the rock to seal in moisture, barnacles close up their shell plates and sea urchins live in damp holes. Sea anemones shield themselves with shell fragments and sand, while some seaweeds secrete a protective slime. The collection of seashore animals, algae and plants is prohibited throughout California without a Fish and Wildlife license. Rocks and shells should always be left behind as they are important to the survival to many of the organisms there.

Monterey shale forms the cliffs above the tidepools. Dating back to the late Miocene period, the cliffs contain fossils of whales and fish from 16 million years ago. You can check out some of these fossils at Cabrillo Marine Aquarium.

Along the base of the cliffs near the tidepools is a large concrete structure. The origins of this structure remain a bit of a mystery. Two stories are most commonly heard: 1) The structure held a pool used by a family that lived above the tidepools for their child with polio; 2) The structure was to be a control center for floating mines at the mouth of L.A. Harbor during WWII. Whatever the origin, use care in moving around the remaining walls of the structure, as the constant battering of the surf has made them unstable.

Do it! At low tide, select a tidepool to observe for a few minutes and count how many different organisms you see. The longer you look, the more you may find. Touch gently and leave all animals where you find them.

Three storm drains lead into the tidepool area that bring rainwater, soap from washing cars, pet waste, dead leaves, oil, trash and more to the ocean. The "Spanish breakwater" that extends into the water at the beginning of the tidepools was a cover for the lower part of the drain that descends from 40th Street. Avoid contact with any water flowing out of these pipes and any other storm drain. You can reduce the impact of gutter water by "adopting a gutter" and being responsible for keeping it clean. As you keep the gutters in your neighborhood clean, you're also protecting the beach by preventing damage from stormwater runoff. When you can, join beach cleanups. Together we can make a difference!

9. STEPHEN M. WHITE

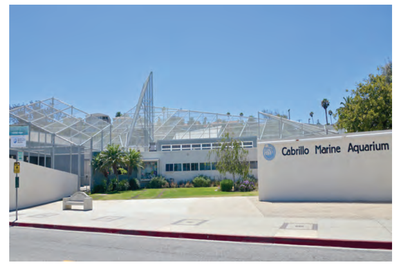
U.S. Senator Stephen M. White defeated efforts to move all major port business from San Pedro to Santa Monica in 1896. He opened the way for the federally constructed breakwater that transformed the extensive mudflats of San Pedro into the Port of Los Angeles.

10. JUAN RODRIGUEZ CABRILLO

In October 1542, Juan Rodriguez Cabrillo entered San Pedro Bay, making him the first European explorer to see the Coast of California. At the base of his statue is a bronze benchmark built by the U. S. Coast & Geodetic Survey as a reference point from which to measure how far the mountains rise above sea level and how far the tides rise and fall.

11. CABRILLO MARINE AQUARIUM

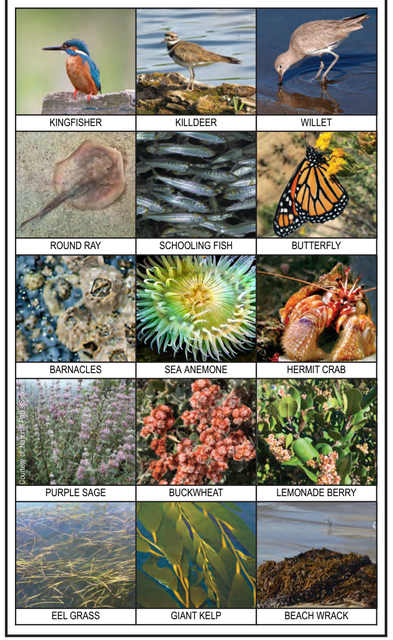
Designed by world-famous architect Frank O. Gehry, Cabrillo Marine Aquarium features exhibits and marine life of Southern California's unique coastal environment. Be sure to visit the Virginia Reid Moore Research Library, the hands-on Exploration Center and Aquatic Nursery designed by Barton Phelps. CMA is a facility of the City of Los Angeles Department of Recreation and Parks and is also supported by the non-profit Friends of CMA. It provides a variety of activities for all ages. Become a member and enjoy advance notice of Aquarium activities, new exhibits, invitations to special events, discounts on programs and purchases in the CMA gift shop.



Do it! See if you can find all the animals you saw on your Coastal Park adventure in the Exhibit Hall, Aquatic Nursery and/or Exploration Center at CMA.

Visit the watershed exhibit in the Exploration Center to find out how you can make choices to protect our shore. Storm drain pipes carry water from the streets of Point Fermin neighborhoods into the ocean. What messages should we place by these catch basins in our neighborhoods? Have you seen a message near your gutters that tells the same thing?

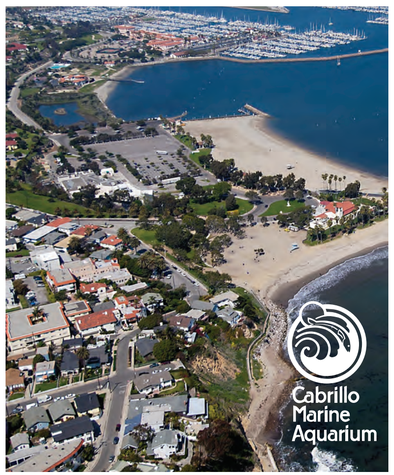
WHAT DID YOU SEE TODAY?



WALK Cabrillo

Cabrillo Beach Coastal Park
A DIVERSITY OF HABITATS

The Cabrillo Beach Coastal Park is unique because it offers a wide range of coastal habitats within its urban setting at the bustling Port of Los Angeles. Do as much or as little of the tour as your time and energy allow, knowing that no two trips around the Coastal Park will ever be the same – there are new things to see and explore each time you visit!



WHAT YOU SHOULD BRING

While the Coastal Park can be thoroughly enjoyed with a minimum of preparation, the following items can help enrich your visit:

- Comfortable walking shoes
- Sunscreen
- A windbreaker or jacket (winds can pick up suddenly anywhere in the park)
- Binoculars
- Camera
- A friend!

You should also consult local tide tables (parts of the Coastal Park are best explored during low tides)

If you are visiting during Cabrillo Marine Aquarium operating hours, be sure to borrow a key for the salt marsh gate from the Information Booth BEFORE heading out!

You can also explore the Coastal Park using the "*Agents of Nature*" Mobile Game app.

We all connect to the ocean through the watershed, which is the area of land from which water flows to a larger body of water like a river, lake or ocean. In Los Angeles, our main watersheds are the Los Angeles River, San Gabriel River, Dominguez Channel and Lower Santa Monica Watersheds. All of these carry water from the mountains and cities of the Los Angeles Basin into the Pacific Ocean. Any trash or toxins in gutters and storm drains can also get carried to the ocean. Areas of usable underground water, called aquifers, are recharged by areas in the watersheds where surface water can seep down into the soil.

As you move through the Cabrillo Beach Coastal Park, notice the many connections to the watershed. In this guide, watershed connections are marked by a water drop.

WALK CABRILLO KEY MAP

	Distance from Aquarium
1. Native Plant Garden	140 yards
2. Cliff/Fossils	150 yards
3. Salinas de San Pedro	300 yards
4. Inner Cabrillo Beach	160 yards
5. L.A. Harbor Breakwater/Fishing Pier	900 yds (1/2 mile)
6. Cabrillo Bathhouse	269 yards
7. Outer Cabrillo Beach	275 yards
8. Cabrillo Beach Tidepools	450 yds (1/4 mile)
9. Stephen M. White Statue	250 yards
10. Juan Rodriguez Cabrillo Statue	204 yards
11. Cabrillo Marine Aquarium	
Restrooms	

AQUARIUM EVENTS & PROGRAMS:

Underwater Parks Day
Salt Marsh Open House
Whale Fiesta
Meet the Grunion
Coastal Park Naturalist Training
Earth Day
Robotics By the Sea
Channel Islands Adventures
Summer Camps
Coastal Cleanup Day
Whale Watch Naturalist Training
Autumn Sea Fair
Sea Scare
Public Tidepool Walks

Check out our website, visit or call for more information about these and other outstanding events offered here at Cabrillo Marine Aquarium!

Cabrillo Marine Aquarium
3720 Stephen M. White Drive
San Pedro, CA 90731
Tel. 310-548-7562
www.cabrillomarineaquarium.org
A facility of the City of Los Angeles Department of Recreation and Parks with support from Friends of CMA

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Habitat photos: Gary Florin

Accredited by the ASSOCIATION OF ZOOS & AQUARIUMS

1. CABRILLO BEACH COASTAL NATIVE PLANT GARDEN

Established by Cabrillo Marine Aquarium in 1997, and expanded in 2014, the garden includes coastal sage scrub native to our area. Adapted to our Mediterranean climate (warm dry summers and mild winters), plants in this community are drought tolerant and can survive in nutrient-poor soil. Coastal sage scrub is recognized as a threatened plant community in Southern California, with 70-90% gone since the late 1800s and more in danger of being lost due to ongoing development.

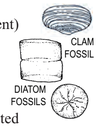
There are two native plant gardens: one is located along the cliff north of the main aquarium, and the other is located by Salinas de San Pedro. These gardens attract large numbers of birds, butterflies and other wildlife. Native Americans used these plants for food, medicines, dyes and other daily needs. Some people continue this practice today.

The native plant gardens survive primarily on rainwater. Their extensive root systems help keep sediment from washing into the ocean. When they are dormant (summer and fall), they often have smaller leaves or drop their leaves to keep from drying out. Visit the garden at different times of the year to see the changes the seasons bring. Establishing your own native plant garden can create much-needed habitat for local wildlife. Native plants can be very successful in your garden, requiring little water or fertilizer once established, reducing the amount of chemical pollution going into the ocean.

Do It! Use your senses of touch, smell and sight to gently compare leaves of different plants along the path and try to determine how they are uniquely adapted to this habitat.

2. CLIFFS/FOSSILS

The cliffs behind the Aquarium, tidepools and along the back of the Coastal Park are predominantly Monterey shale –a formation composed of very fine-grained sedimentary rocks (made from sand or sediment) that once formed the ocean floor. Within the cliffs are billions of compressed shells of microscopic algae called diatoms, as well as fossils of deep-sea life such as hatchetfish.



In 2013, a cement retaining wall was constructed over the cliff face when it was determined that erosion posed a possible safety hazard. The wall, fashioned to resemble a natural rock face, not only protects public safety, but also preserves the enclosed fossils from further erosion.

The unpaved ground along the cliffs and around the trees in the parking lot (as well as in your neighborhood) provide a place for water to seep back into the sediment. The fresh water that seeps into the ground near the shore helps to keep salt water from getting into ground water we use for drinking.

3. SALINAS DE SAN PEDRO

The Port of Los Angeles created this 3.75-acre salt marsh in 1984 to replace lost shallow-bottom wildlife habitat. Over 91% of California wetlands, which include salt marshes, have been lost due to development, dredging or filling. With loss of habitat, native plants and animals that depend on these communities disappear. Approximately 3,400 acres of wetlands were historically found in the Los Angeles/Long Beach Harbor area.

The salt marsh houses salt-tolerant plants *(halophytes)*, invertebrates, fish, migratory and resident birds. Salt grass and pickleweed are found growing along the banks of the marsh. The numerous holes on the mud surface are evidence of the thriving underground community of invertebrates that dominate the marsh mud. Corbina, small sharks and stingrays swim the calm waters, as well as many schools of juvenile fish.

The salt marsh acts as a natural filter, cleaning the water as it runs off the land. It collects fine bits of sediment so that seaweed and non-moving animals don't get covered by those sediments. While marshes have bacteria that can break down some toxins, it is essential to prevent chemicals from flowing down drains or into sewers, protecting this fragile nursery for baby fish and other wildlife.

A diverse bird population visits the salt marsh throughout the day. Birds feed around the marsh depending on the size and shape of their bills. Some have bills that are best for use in the mud at lower tides to reach worms, clams and crabs. Others are best for catching fish or eating floating algae at high tide. **Black-crowned night-herons, willets, great blue herons** and **snowy egret**s forage in this ecosystem year round, while migratory visitors include least **sandpipers, killdeer** and **grebes**. At low tide, look for footprints in the mud - these show where birds (and even **raccoons**!) have searched for food in the marsh.

You may also notice bubbles coming up through the water in parts of the marsh, as well as the smell of rotten eggs. This is hydrogen sulfide, a gas that naturally occurs in areas of petroleum deposits, like those along our coast. Additional hydrogen sulfide gas is generated by the decomposition of organic material in the marsh. Some bacteria in the marsh need this gas to grow and live, like plants need sunlight. Be aware of **feral cats** that roam around the area; the cats prey on native birds and upset the balance of the habitat. It is illegal to abandon or feed them.

Do It! Look for birds in the marsh and surrounding trees. Compare bill sizes and shapes to guess what they might eat. The length of their legs and the shape of their feet may also give you clues to their diet!

To the north, you can see the Youth Aquatic Sports Center and Cabrillo Marina. Both can be accessed by continuing along Shoshonean Road toward 22nd Street.

4. INNER CABRILLO BEACH

As a wave-protected sandflat, the inner beach is a relatively calm environment that supports a wide variety of burrowing animals, many of which are not found on the wave-swept outer beach. Small, thin tubes covered in shell pieces are a home for the **decorator worm** that is found buried under the sand. A plowed track in the sand or a small mound in the shallow water reveals the **purple olive snail's** position.

This habitat is well used. The narrow strip of beach between the road and the pier accommodates large groups of **ring-billed, western** and **Heermann's Gulls** and the protected waters contain **flatfish**, **pipefish** and schools of **smelt**. **Eelgrass** beds grow close to shore, providing shelter, food and protection for invertebrates and fish. Because of restricted tidal flushing, inner Cabrillo Beach sometimes has higher levels of bacteria and pollution than the outer beach. To help reduce these levels, the original sand used to make this beach has been replaced with sand from Simi Valley, quarried from an ancient ocean bed. Also, large poles connected by cables called "bird excluders" keep birds off the large upper beach area, reducing the bird waste the bacteria feed on.

A storm drain outfall pipe can be seen at the south west corner of the beach. Because the storm drain system removes storm water along streets and gutters of Los Angeles, anything found on the ground will flow into the ocean. Always wait 3 days after a storm to enter the ocean and check with a lifeguard to determine if conditions are safe for swimming. To help keep the ocean healthy, be sure to clean trash and debris from gutters near your home and educate family and friends about our connection to the ocean.

Do it! Find evidence of animals on the beach as well as things that do not belong there. Tell a story of how each item might have arrived on the beach.

5. LOS ANGELES HARBOR BREAKWATER AND FISHING PIER

Completed in 1912, the San Pedro side of the Los Angeles Harbor Breakwater curves 1.8 miles out to Angel's Gate Lighthouse at the harbor entrance. The entire length of the breakwater stretches over nine miles, running almost to Seal Beach, making the Los Angeles-Long Beach Harbor the largest man-made harbor in the Western Hemisphere. The breakwater rocks not only keep the power of the waves out of the harbor, but also provide habitats for a wide variety of marine life both above and below the waterline.

Public access to the breakwater is not permitted. However, in 1969, a fishing pier was constructed to allow anglers to fish near the breakwater. The pier pilings are rich with organisms such as **barnacles**, **mussels** and **sea anemones** that attach themselves to hard surfaces. The higher on the pilings these animals are found, the longer they can live outside of the water.

You don't need a license to fish from the pier, but all other fishing regulations, including size and number limits, are enforced. Check the latest California Fish and Wildlife regulations before heading out here to fish. Also, please heed posted health advisories about consuming mussels and various fish found in the harbor.

Where does the water from the sinks at the fishing pier flow? These sinks use fresh water. Remember to be water-wise when using them!

6. CABRILLO BATHHOUSE

Opened in 1932, the historic Cabrillo Beach Bathhouse served as home for the Cabrillo Marine Museum for almost 50 years, displaying local marine life and nautical artifacts. The collections were relocated with the opening of the Los Angeles Maritime Museum at Berth 34 in 1980 and the opening of the Aquarium at its present location in 1981.

In 2003, the bathhouse got a major facelift and is once again being used by Recreation and Parks to offer a variety of watersports and family programs throughout the year. Restrooms and showers are available during business hours. Showers are also located along both the Inner and Outer beaches as well.

Conservation tip: Limit your beach showers to reduce demand on fresh water as well as the amount of runoff to the ocean.

7. OUTER CABRILLO BEACH

Both Inner and Outer Cabrillo Beach -created between 1925 and 1927-are entirely man-made from mud and sand dredged out of the harbor to allow the entrance of larger ships. The wave-swept outer beach faces continuous erosion and needed sand replenishment in 1946, 1964 and 1991.

Some animals are adapted to live full time in this turbulent, shifting ecosystem. Most are powerful burrowers, such as mole crabs, pismo clams and bristle worms found beneath the sand. Their streamlined shapes aid in burrowing and resisting dislodgement. **Willets** and other shorebirds visit the beach to probe the sand for buried prey. Small Silvery fish called **grunion** will use the beach to lay their eggs in the sand on moonlit spring and summer nights.

Just offshore you can see the trailing tops of giant kelp floating. Named for its size, giant kelp is one of the fastest growing organisms on earth - growing up to two feet per day! **Kelp beds** provide shelter and food for a complex community of animals. Like other seaweeds, kelp attaches to rocks below with a root-like holdfast. During heavy wave action, the kelp may be dislodged and washed up on to the beach or tidepools, where it is called **beach wrack**. Small invertebrates, such as snails, worms and brittle stars may still be in the holdfast or attached to the kelp blades when first washed ashore. You might find older wrack covered in kelp flies and sand hoppers. These and other animals help to break down the seaweed, returning vital nutrients to the sand and water. Kelp and other seaweeds are harvested commercially for use in toothpastes, hair products, salad dressings, ice cream and many other products. Look for algin, alginate or carrageenan in your foods to see if you are eating seaweed!

Do it! Examine beach wrack that has washed ashore. Look for animals that may be attached or hidden among the kelp. This decaying kelp is critical to maintaining a healthy beach

Do you notice any human-made debris found in the beach wrack? Cigarette butts, microplastics and Styrofoam pieces mistaken as food harm animals that live in and migrate through the area. You can help by throwing away any trash that you find, and leaving natural items like rocks, shells and seaweed behind.

Santa Catalina Island can often be seen in the distance, approximately 22 miles to the south.