Field Guide

to the MONTEREY BAY NATIONAL MARINE SANCTUARY

NATIONAL MARINE SANCTUARIES ™
MONTEREY BAY


2
Welcome to the Monterey Bay National Marine Sanctuary

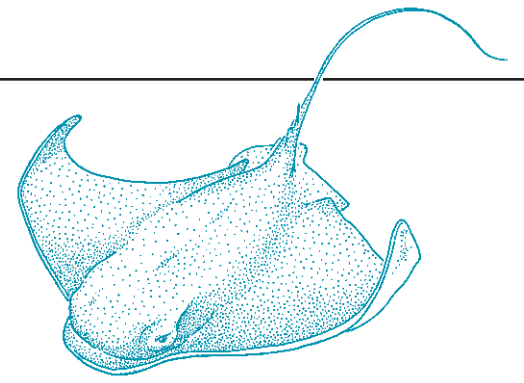

4
Discover Amazing Wildlife!


8
Kids Pages


10
How's the Water?


12
Get Out and Do It!

Explore & Enjoy



the Monterey Bay National Marine Sanctuary!

This guide introduces you to some of the sanctuary's natural wonders—including spectacular wildlife, unique habitats, cultural resources, and endangered species—as well as ways to experience its beauty by foot, boat, bike, or car. Walk along cliffs while pelicans glide past, or cruise the waters by kayak shadowed by curious harbor seals. Dive into towering kelp forests, or join scurrying sandpipers at the water's edge.

Snowy egret

What is a National Marine Sanctuary?

National marine sanctuaries are our nation's underwater "crown jewels," much like our treasured national parks. NOAA's National Marine Sanctuary Program serves as the trustee for a system of 14 underwater parks ranging from Washington to Florida, and Lake Huron to American Samoa. Within their protected waters, humpback whales breed and calve, coral colonies flourish and shipwrecks tell the stories of our maritime history.

To protect the special natural and cultural features of each sanctuary, we conduct research, monitoring, public education and outreach programs while carefully managing recreational and commercial uses. Together with our partners and the public, we carry out our mission of preserving American's ocean and Great Lakes treasures now and for the future.

Why have sanctuaries?

Our very existence and future depends upon the sea, yet oceans worldwide are being harmed by human activities such as pollution, habitat destruction, fishing and coastal development. Oceans cover more than 70 percent of the earth, yet they are among the least explored ecosystems. If we are to live on this planet in ways that sustain our needs, we must better understand the world's oceans, and accord them the protection they deserve. Marine sanctuaries are one way to protect the marine environment, ensuring a healthy future for us all.

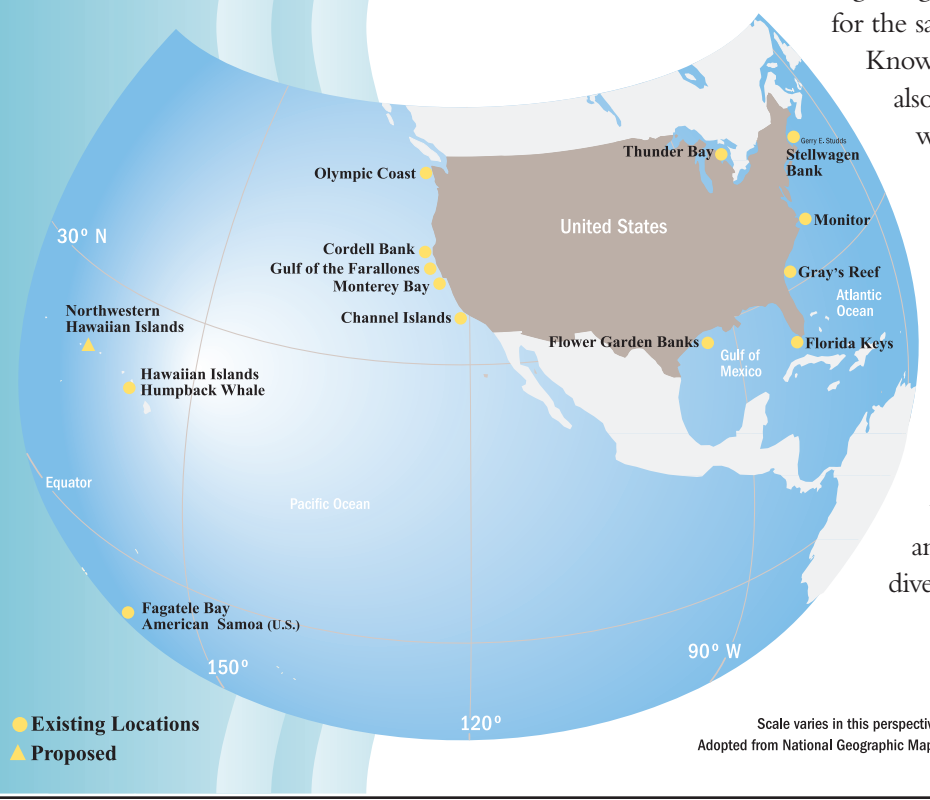
A special place

The Monterey Bay National Marine Sanctuary is the nation's largest marine protected area (larger than either Yosemite or Yellowstone National Parks), spanning 5,322 square miles (13,727 sq. km) along Central California's coast from the Marin Headlands south to Cambria. Congress designated the sanctuary in 1992 for its biological richness, unique habitats, sensitive and endangered animals, and the presence of shipwrecks and other cultural relics.

Along the coast, sheer cliffs, rugged rocky shores, wave-swept sandy beaches and placid wetlands afford important feeding, breeding and resting areas for a huge variety of species. Some inhabitants, like the western snowy plover are endangered, others like the California sea otter are threatened. Offshore, equally varied habitats support a wealth of life. Lush kelp forests are rich with crabs, snails, sea stars, octopus and a multitude of fishes. Farther from shore, the seafloor is covered with sand or mud, and harbors colorful communities of fishes and invertebrates including sardines and market squid. Deep offshore, the massive Monterey submarine canyon descends two miles into the dark abyss, and is populated with strange-looking creatures like vampire squid and lanternfish.

Seasonal winds play an important role in the oceanography of the sanctuary. During the spring and summer, northwest winds push the surface waters offshore, replacing them with cold water from greater depths. These waters are rich in nutrients, fueling the growth of phytoplankton—the basis for the sanctuary's rich marine food chain. Known as coastal upwelling, this process also creates fog as cold, upwelled waters cool the moist ocean air along the coast.

The sanctuary lies within the California Current System, which carries waters of differing temperatures and salinity, attracting a wide variety of marine life—both predators and prey. The central coast is also a meeting place where species from the north and south overlap, resulting in a rich diversity of life.



Scale varies in this perspective.
Adopted from National Geographic Maps.

Powerful waves are common along sanctuary shores.

Many uses

The sanctuary supports many human uses. Commercial and recreational fishing, marine research, and recreational activities like diving, kayaking, boating and surfing all take place here. However some activities that could harm the sanctuary's health—such as oil drilling, ocean dumping or seabed mining—are not allowed.

Commercial fishing for salmon, rockfish, sole, swordfish, squid, sardine, anchovy, albacore and other species is an economic mainstay in the sanctuary's ports. Fishing has played an important role in the history of this region, as many coastal cities can look back to immigrant fishermen from countries such as Italy, China, and Japan as a source of their cultural identity.

THE SANCTUARY AT A GLANCE

The Monterey Bay National Marine Sanctuary:

- encompasses 5,312 square miles—about the size of Connecticut
- extends along one quarter of California's coast, and as far as 53 miles offshore
- is the largest marine sanctuary in the U.S. and one of the largest marine protected areas in the world

The sanctuary features:

- the Monterey Submarine Canyon—twice as deep as the Grand Canyon
- the largest expanse of kelp beds in the nation
- 34 species of marine mammals, 130 species of seabirds, 345 species of fish, 4 species of turtles, countless invertebrates and more than 450 species of algae
- 26 threatened or endangered species
- 1,276 shipwrecks and 718 prehistoric sites

SANCTUARY HABITATS

A variety of habitats are found within the sanctuary, from quiet wetlands and wave-swept beaches to majestic kelp forests and deep, dark canyons. These habitats support a wealth and diversity of life unrivaled in the world's oceans.

Sandy beaches, despite their barren appearance, are full of life. Animals who live here, such as worms, clams, sand crabs or sand dollars must be able to burrow, move in and out with the tides, and contend with surging waves and moving sands.

At the **rocky shore**, water advances and retreats daily with the changing tides, making it alternately part of land and ocean. At low tide, the shore is exposed, leaving life to endure sun and drying conditions. At high tide, huge waves may roll in, pounding the shoreline with crashing surf. Creatures who live here, sea stars, snails, crabs and sea anemones—are adapted to withstand these extreme conditions.

Wave-protected **wetlands** afford a calm refuge for a huge diversity of animals. Elkhorn Slough, at the middle of Monterey Bay, is one of the largest remaining coastal wetlands in California. Quiet slough waters are an important nursery for more than 80 species of fishes, and teem with hundreds of thousands of migratory birds during winter.

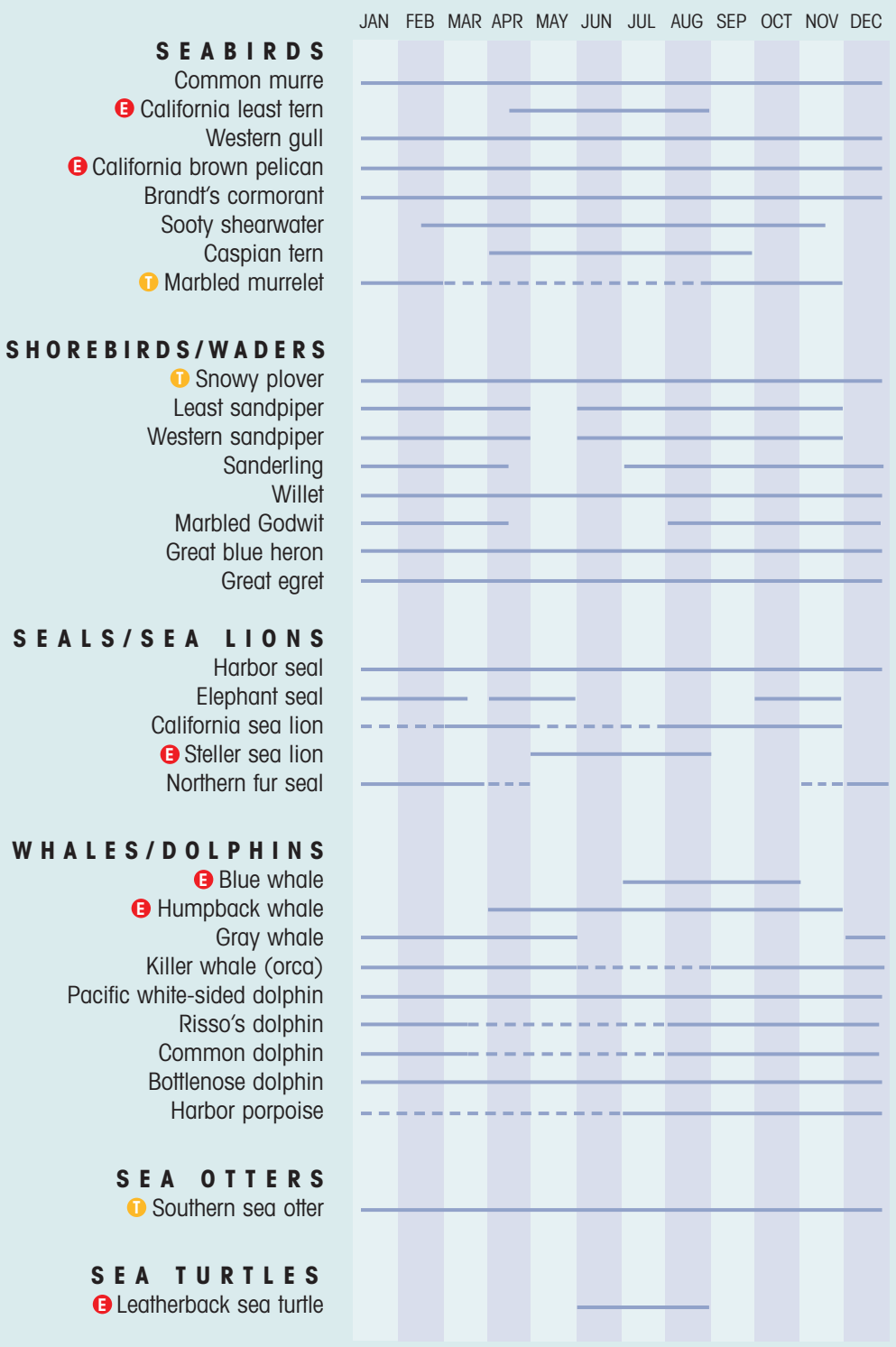
Kelp forests rival coral reefs and rain forests for their richness and diversity of life. Look just offshore, and you'll see a brown tangle of seaweed at the ocean's surface. Down below, majestic kelp plants tower 100 feet above the ocean floor forming a lush forest teeming with fishes and other life. Sea otters frequent kelp forests in search of shellfish, like crabs and sea urchins.

The **open sea** is a vast, fluid and edgeless world. Life in the open sea is divided into two broad groups: drifters (plankton) and swimmers. Plankton— ranging from microscopic organisms to large jellies—generally drift or weakly swim with the currents. Strong ocean swimmers like fishes, whales, sea turtles and squid usually travel great distances to find food.

The **deep sea** is the largest, but least understood region on earth. Several submarine canyons carve into the sanctuary's seafloor, the largest of which is the Monterey Canyon. The canyon harbors seldom-seen deep-water species adapted to darkness, cold water, and high pressure.

Wildlife Viewing Calendar

This calendar shows what time of year you can expect to see certain animals around the sanctuary. To find out where to see them, have a look at the map on pages 6-7.



**Note: the number of seabirds in the sanctuary is lowest in March/April, increasing to a peak in Sept., then declines through the winter. The population of shorebirds is highest in late Oct-early Nov, declining as they continue south; it peaks again in April or May, as they migrate back to northern breeding grounds.*

E endangered *T threatened* *can usually be found somewhere in the sanctuary* *doesn't always occur annually*

WILDLIFE VIEWING TIPS

The sanctuary is one of the best places in the world to see marine wildlife. Here are some tips to help you enjoy watching wildlife—and view them responsibly—so you don't disturb the animals or their homes:

- **Learn before you go.** To get the most from your experience, learn about where and when to see wildlife. Many species are found only in specific habitats. Seasonal and daily cycles can influence an animal's whereabouts too. Use the Internet, guidebooks and identification keys, or talk with local environmental groups or guides to maximize your viewing opportunities.
- **Keep your distance and never chase or harass wildlife.** Use binoculars, spotting scopes or zoom lenses for a closer look. You'll enjoy the animals more when you observe them behaving naturally. If wildlife appears nervous, fidgety or starts to flee, you are too close slowly and calmly back away.
- **Hands off.** Tidepool and beach animals die quickly if removed from their habitat. If you're quiet and look closely, you'll see much more. Enjoy the animals in their natural environment, and leave them where you find them.
- **Don't feed wildlife.** Wild animals may not be able to digest human food, and can get sick if they do. Feeding may also cause animals to become attracted to humans, a potentially dangerous situation for both wildlife and people.
- **Stay away from wildlife that appears abandoned or sick.** Some animals, such as seals, beach themselves on purpose. Young animals appearing orphaned may actually be under the watchful eye of a nearby parent. If you see an injured, sick, or abandoned animal, contact the authorities listed below.
- **Wildlife and pets don't mix.** Wild animals can injure or spread disease to pets, and pets can harm or disturb wildlife. Keep pets on a leash or away from areas frequented by wildlife.
- **Avoid sensitive habitats.** Observe signs directing you away from important nesting or resting areas.
- **Take only memories and leave only footprints.** Dispose of trash properly and pick up litter. Marine animals can get entangled in debris or mistake it for food.
- **Help others become responsible wildlife watchers.** Speak up if you notice other viewers behaving in a way that disturbs wildlife.

If you see sick or injured marine wildlife, contact:

- **Marine mammals or sea turtles:** Call the Marine Mammal Center at (415) 289-SEAL (7325) or in the Monterey Bay area, call (831) 633-6298.
- **Seabirds:** In San Mateo County, call the Peninsula Humane Society at (650) 340-8200. In Santa Cruz County, call Native Animal Rescue at (831) 462-0726. In Monterey County, call the SPCA at (831) 373-2631. In San Luis Obispo County, call Pacific Wildlife Care at (805) 543-WILD (9453).

DISCOVER Amazing Wildlife

Whether you walk, bike, boat, or drive, you can't miss some of the best scenery and wildlife viewing on Earth! Like Africa's Serengeti Plain, the sanctuary offers spectacular wildlife watching with its wealth and diversity of animals, many of which can be seen easily from shore.

SANCTUARY HABITATS

- Sandy beach
- Rocky intertidal
- Sloughs and estuaries
- Kelp forests
- Sandy or muddy sea floor
- Deep sea and open ocean

MAGNIFICENT MARINE MAMMALS

With more than 30 species, you can find marine mammals here in abundance every day. Look just offshore for shy harbors seals, noisy sea lions or curious sea otters. In winter, watch for the heart-shaped blows of gray whales as they travel close to shore. Three major groups of marine mammals can be seen in the sanctuary: seals and sea lions; whales, dolphins and porpoises; and sea otters.

SEALS AND SEA LIONS

Seals and sea lions can be hard to tell apart. They both have thick layers of fur and fat to keep warm, and tapering bodies and strong flippers for fast swimming. They spend most of their time at sea, but come ashore to rest or give birth. True seals or "earless" seals, like the harbor seal, lack visible earflaps. On land, they wriggle awkwardly on their bellies. Eared seals, including fur seals and sea lions, have external ear flaps and much larger flippers they use to "walk" on land.

Northern Elephant Seal

One of the largest true seals, elephant seals live on beaches and offshore islands when breeding (December to March) or molting (summer), otherwise feeding far offshore. Diving more than a mile deep, they feed on sharks, fishes and squid. Adult males with their large elephant-like noses and long canine teeth engage in bloody battles to establish territories and harems of females. Once hunted nearly to extinction, they've staged a remarkable comeback, with a population today of over 150,000. The best places to see them are at Año Nuevo State Reserve and Point Piedras Blancas.

Harbor Seal

Quiet and shy, plump harbor seals can be seen year-round, resting lazily on rocks just offshore. These small sausage-shaped seals have spotted silver-gray to black coats. Often curious, harbor seals will watch people walking along the shore or follow divers or swimmers in the water. Fast predators, they hunt for a variety of fishes and crabs. Females give birth to one pup each spring.

California Sea Lion

Social, playful and loud, California sea lions pack together on rocks, jetties and under wharves. Their piercing bark can be heard from quite a distance. In the water they rest on the surface in "rafts" of many animals, with heads and flippers poking above the water. They can also be seen body surfing and "porpoising," or leaping high out of the water. Males are dark brown, and can weigh up to 1,000 pounds, while females are considerably lighter and smaller. They feed offshore for squid, herring, anchovies, salmon, hake, and rockfish.

Southern Sea Otter

SEA OTTERS

(Threatened)
The smallest marine mammal in North America, sea otters are actually related to weasels, skunks and river otters, and like them, have stubby front paws. Usually found in or near kelp forests, they rarely come ashore. They rest by wrapping themselves in kelp to keep from drifting away. Sea otters eat abalone, urchins, snails, octopus, crabs and other shellfish, often placing a rock on their chest to pound open hard-shelled prey. Lacking blubber, they burn calories quickly and may eat up to 25 percent of their body weight each day. They depend on their thick, water-resistant fur to stay warm. Fur traders seeking their lush pelts hunted the otters to near-extinction in the 1700s and 1800s. The population has grown very slowly over the years, and is still threatened by oil spills, pollution and other human disturbances.

WHALES, DOLPHINS AND PORPOISES

Whales, dolphins and porpoises are divided into two groups: toothed and baleen. Baleen whales, such as blue, gray and humpback whales, have hundreds of comb-like plates with stiff bristles growing from the upper jaw to strain small food from huge mouthfuls of water. Toothed whales, including dolphins, porpoises, sperm whales and orcas, use sharp, pointed teeth to catch fish and other large prey.

Gray Whale

The most commonly seen baleen whale in the sanctuary, California gray whales migrate 12,000 miles each year from feeding grounds in the Bering Sea to calving lagoons in Baja California and back. Grays travel close to shore in small groups, passing south along the sanctuary's coast from late November to mid-February and north again from February to mid-May.

Humpback Whale

Both humpback and blue whales visit sanctuary waters in the summer and fall, attracted here by their prey—great swarms of krill. Humpbacks, like this one, also dive for schools of squid, anchovies or sardines.

Killer Whale

Killer whales, or Orcas are seen year-round in the sanctuary, but most frequently in the spring, corresponding to the migration of mother gray whales and calves. Killer whales patrol the canyon edges searching for grays—feeding upon their calves.

Common Dolphin

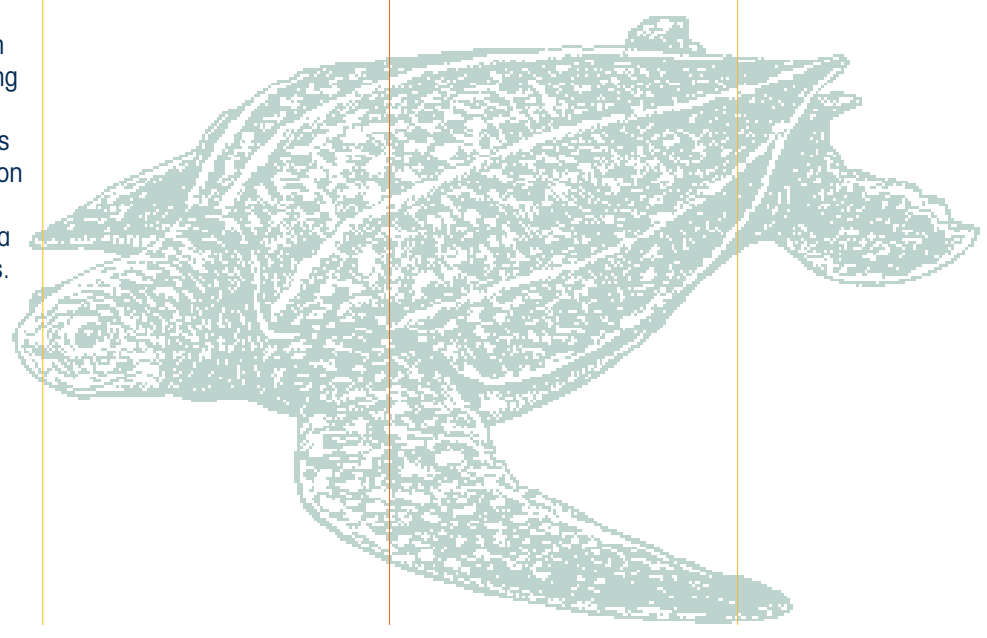
Common dolphins are very social, traveling in pods of up to 2,000 animals. These active dolphins are often seen riding the bow wave of boats, leaping high into the air, or even somersaulting. Other types of dolphins and porpoises found in the sanctuary include Dall's porpoise, pacific white-sided dolphins, Risso's dolphins and bottlenose dolphins.

TURTLE TALES

Although other species of sea turtles may be sighted occasionally in sanctuary waters, the leatherback, the largest turtle in the world, is the most regular visitor here. Leatherbacks arrive here in the summer and fall to feast on jellies.

Leatherback turtle

(Endangered)
Seeing a leatherback turtle is a rare treat since they spend most of their time underwater. The deepest diving animals known, with the largest geographic range of any reptile, leatherbacks are found in all the world's oceans. A great mystery is where leatherbacks spend their time in the open sea. Accidental entanglement in fishing nets, over-harvesting of eggs and adults, and disturbance at nesting sites has reduced their population in the Pacific Ocean by 95 percent, making them a highly endangered species.



BOUNTIFUL BIRDS

They come in all shapes and sizes, and stand alone in marshes or fly in flocks of thousands out at sea. The sanctuary is situated along the Pacific Flyway, the path taken by birds during their migration between southern wintering grounds and northern breeding sites. About 130 different marine birds are found in the sanctuary. Based on their habitat and food, marine birds are usually divided into two groups: shorebirds and waders, and seabirds. Shorebirds and waders, such as sandpipers, plovers, avocets, herons and egrets, forage along wetlands and beaches of the sanctuary. Some seabirds, like albatrosses, storm-petrels, and shearwaters, remain far out at sea where they feed and rest, coming ashore only to breed. Coastal seabirds stay closer to shore and include the brown pelican, loons, cormorants, scoters, grebes and gulls.

Snowy plover

(Threatened)
These diminutive shorebirds winter and nest along sandy beaches and tidal flats. They hunt for small invertebrates found in beached seaweed and other wrack. Plover nests are just a mere depression in the sand, and the parents incubate the eggs around the clock for 28 days. Once the chicks hatch, the male cares for them. Because beaches are popular recreational sites, plovers and their nests are vulnerable to human disturbance. Habitat loss and predation by introduced species, such as the red fox, have also contributed to a serious decline in the snowy plover population.

Great blue heron

Over four feet (1.2 meters) tall with a wingspan of up to seven feet (2.1 meters), these herons have long legs, a large blue-gray body, and a long, elegant neck. Although graceful when walking or flying, they flap their wings awkwardly in takeoffs and landings. Herons are noisy in their nests, but wade silently through wetlands, standing frozen before lunging for fish, crabs and other prey. They are seen often at Elkhorn Slough.

Pelagic Cormorant

Like most diving birds, cormorants are skilled at fishing, but unlike them, their feathers have no natural water-proofing oils. A cormorant's feathers soak up water, helping it dive deep, but it must spend a lot of time perched on rocks, spreading its wings to dry them. Three kinds of cormorants inhabit the sanctuary. The smallest species, the pelagic cormorant, can dive to 180 feet (55 meters) to catch small fishes.

Brown pelican

(Endangered)
Easily recognizable by their large pouch, pelicans are often seen flying in flocks above the ocean searching for schooling fish like sardines or anchovies. With their keen eyesight, they can spot fish from heights of 20 to 60 feet and will abruptly dive for them. After a successful dive, a pelican drains the water from its pouch and swallows the fish headfirst. Their dramatic population decline in the 1960s was traced to the pesticide DDT, which caused their eggshells to become thin and fragile. When DDT was banned in 1972, the population began to rebound, but still remains endangered along the Pacific Coast.

Sooty shearwater

Seen flying offshore in flocks of hundreds of thousands near rich feeding grounds, or resting on the water in tight flocks, sooty shearwaters are the most abundant seabird in the sanctuary from May through September. This wide ranging seabird nests on sub-Antarctic islands off New Zealand, Tasmania, and Chile before migrating north to spend the winter in warmer Northern Hemisphere seas. Sooties are attracted here by an abundance of prey, including sardines, rockfishes, squid, and krill.

FABULOUS FISHES

Unless you go diving or are a lucky fisherman, you might not see them, but more than 150 kinds of bony fishes and 33 types of cartilaginous fishes (sharks, skates and rays with skeletons made of cartilage instead of bone) live in the sanctuary. Some are residents, like halibut, rockfish and leopard sharks. Others, like tuna, travel the sea. Each fish is specially adapted to its habitat: Kelp greenlings hide in kelp forests, rockfish and lingcod take refuge in rocky reefs, sanddabs and sole camouflage on sandy bottoms, and big, strong swimmers like albacore, swordfish and white sharks find plenty of room in the open ocean.

Rockfish

Rockfish live in kelp forests, rocky reefs and in deep submarine canyons. More than 70 species are fished along the Pacific Coast and marketed as "rockcod" or "red snapper." Most rockfish grow slowly and have a very long life span. Some species may live more than 100 years. Because they grow slowly and live so long, rockfish mature late and don't breed until they're seven to 20 years old, making them vulnerable to overfishing.

Sanddabs

Practically invisible when still, these small bottom-dwellers camouflage perfectly with the sandy or muddy seafloor. With their flat bodies and both eyes on the same side of their head, sanddabs are designed to hide on the bottom, watching for approaching predators or prey.

Salmon

Salmon are anadromous—born in freshwater, but living their adult lives at sea, returning to their birth streams and rivers to spawn. The sanctuary is home to three species—chinook, steelhead, and coho. Unlike steelhead and coho, chinook salmon don't spawn in tributaries running into the sanctuary, but they're the most economically important salmon for sport and commercial fishing. They use the sanctuary's rich ocean habitat extensively during their one to four years at sea. With historic runs at an all time low, some subspecies, like the Sacramento River winter-run are endangered or threatened. Steelhead and coho salmon are also threatened, mainly due to loss or damage of their freshwater habitats.

White Shark

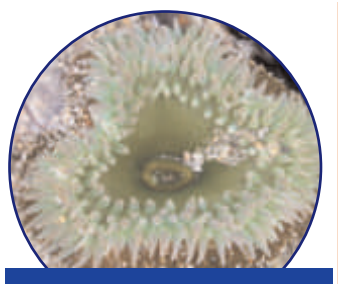
The largest predatory fish on Earth, white sharks are surrounded by myths and legends, playing an important role in many cultures. Little is known about where they breed, how long they live, or where they travel. Scientists believe they spend a lot of time cruising offshore waters, alone or in pairs, but their solitary habits and remote wanderings make them difficult to study. Although their population is low worldwide, adult white sharks are relatively abundant off central California, attracted here by large colonies of seals and sea lions upon which they feed. Despite a fierce reputation, white sharks rarely attack people.

TIDEPOOL TREASURES

The rocky shores and tidepools of the sanctuary are a great place to watch ocean life without even getting wet! At low tide you might see tidepool sculpins darting away, sea stars clinging to rocks or hermit crabs scurrying about. Bright green surfgrasses and colorful forms of red and brown seaweeds carpet the rocks. Sanctuary tidepools are one of few places in the world where so many kinds of organisms live in such a small area—creating a treasure chest of life waiting to be explored.

Black turban snail

Several hundred black turban snails can be seen grouped together in crevices and shaded areas, or in shallow pools. Sea otters, rock crabs, ochre sea stars eat these common snails, while hermit crabs use their empty shells for a protective house.

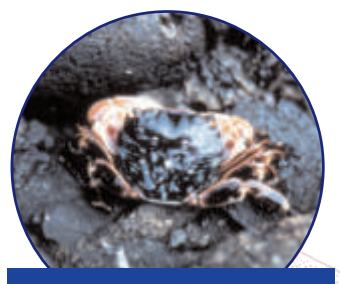


Aggregating anemone

These beautiful flowerlike animals use stinging cells on their tentacles to paralyze small prey. Because aggregating anemones can rapidly clone themselves—literally split in half—they're very abundant. If exposed to air, anemones contract in size and retract their tentacles. Sticky bumps on their bodies collect sand and bits of shells, which provide camouflage and prevent them from drying out.

Ochre sea star

You'll find colorful ochre stars in an array of hues—yellow, orange, dark brown or deep purple. These voracious predators use hundreds of tiny suction-cup feet under each arm to pry open mussels, barnacles and other prey. After opening the shells, they slide their stomach inside, digesting the animal. Ochre stars can cling tightly and motionless on a rock for weeks on end.



Lined shore crab

Lined shore crabs abound in tidepools and will scramble sideways for shelter if you approach, or press themselves into crevices to hide. They spend a lot of time out of water, primarily eating algae, which they scrape off rocks with their claws. Shore crabs are a favorite food of sea gulls. If a gull grabs a crab's leg, the crab can shed the leg and dash away. In time, it will grow a new one.

For information about the sanctuary area above Año Nuevo Point, call (650) 712-8909

For information about the sanctuary area below Año Nuevo Point, call (831) 647-4201

POINTS OF INTEREST

Tidepools Fitzgerald Marine Reserve (11,13), Año Nuevo (18), Natural Bridges (40), Pacific Grove shorelines (58, 59, 61), Carmel Point (71), Point Pinos (55)

Dunes Point Año Nuevo (18), Waddell Creek (20), beaches between Pajaro and Moss Landing (45), Salinas River Mouth (51), Ft. Ord to Monterey (56)

Wetlands Rodeo Lagoon (2), Pillar Point Marsh (12), Pescadero Marsh Natural Preserve (16), Elkhorn Slough (46); also at the mouths of the San Lorenzo (33), Pajaro (44), Salinas (52), Carmel (73), and Big Sur rivers (82), and Limekiln (90) and Salmon creeks (94)

Wharves Santa Cruz Municipal Wharf (37), Capitola Wharf (30), Monterey Municipal Wharf (67)

Harbors Half Moon Bay (Pillar Point) (12), Santa Cruz (31), Moss Landing (50), Monterey (64)

Lighthouses/Lightstations Point Bonita (4), Point Montara (11), Pigeon Point (17), Santa Cruz (West Cliff Dr.) (35), Point Pinos (Pacific Grove) (55), Point Sur (80)

Water recreation sites The four harbors (12, 31, 50, 64), Elkhorn Slough (48), Cannery Row (63)

Long walks Greyhound Rock (21), New Brighton to Seacliff Beach (28), Salinas River (51), Andrew Molera (81), Pfeiffer Big Sur (85)

Public beaches/crowds Santa Cruz Main Beach (34), Capitola (30), Lover's Point (58)

Windsurfing Waddell Creek (20), Scott Creek (22)

Swimming/paddling "Main" city beaches (30, 34, 58, 69); the stretch between New Brighton and Seacliff (27); Wm. R. Hearst Memorial State Beach (98)

Surfing Ocean Beach (San Francisco) (8), Pacifica (10), Half Moon Bay breakwater (14), Mavericks (EXPERTS ONLY) (13), Año Nuevo (18), Waddell Creek (20), Scotts Creek (22), Steamer Lane (39), Cowell's Beach (36), Pleasure Point (38), Capitola (30), Moss Landing (47), Carmel Beach (73), Andrew Molera (83)

Scenic/vista points Point Bonita/Marin Headlands (4), Point Montara (11), Pigeon Point (17), Año Nuevo (18), Davenport (23), West Cliff Drive (Santa Cruz) (35), Elkhorn Slough (48), Ocean View Blvd. (Pacific Grove) (61) 17 Mile Drive (in Pebble Beach) (70), Point Lobos (74), Hurricane Point (79), Point Sur Lightstation (80), Pfeiffer Beach (85), Sand Dollar Beach (91), Point Piedras Blancas (96)

Coastal walks/hikes Golden Gate National Recreation Area/Marin Headlands (1), Pescadero Marsh Reserve (16), Año Nuevo State Reserve (19), Wilder Ranch State Park (25), West Cliff Drive (Santa Cruz) (35), Elkhorn Slough National Estuarine Research Reserve (48), Ocean View Blvd. (Pacific Grove) (61), Point Lobos (74), Andrew Molera State Park (81), Julia Pfeiffer Burns State Park (87), Ragged Point Trail and Overlook (95)

Scenic drives San Francisco 49-Mile Drive (city and coastal) (9) Hwy. 1 from San Francisco to Santa Cruz (15), West Cliff Drive (Santa Cruz) (35), Ocean View Blvd. (Pacific Grove) (61), 17-Mile Drive (Pebble Beach, fee charged) (70), Hwy. 1 between Carmel and Cambria (a long, winding drive) (88).

POINTS OF INTEREST, cont.

Birds Marin Headlands (3), Pillar Point Marsh (12), Pescadero Marsh Preserve (16), Año Nuevo (18), Moss Landing/Elkhorn Slough (49), Carmel River (72), Point Lobos (74), Soberanes Point (77).

California sea lions Pier 39 in San Francisco (5), "seal rocks" in San Francisco (near the Cliff House) (7) and Santa Cruz (Lighthouse Point) (41), Santa Cruz Municipal Wharf (37), Monterey Harbor breakwater (66).

Harbor seals Elkhorn Slough (48), Ocean View Blvd. in Pacific Grove (61), offshore rocks along Big Sur coast (84).

Northern elephant seals Año Nuevo State Reserve (19), Piedras Blancas (96).

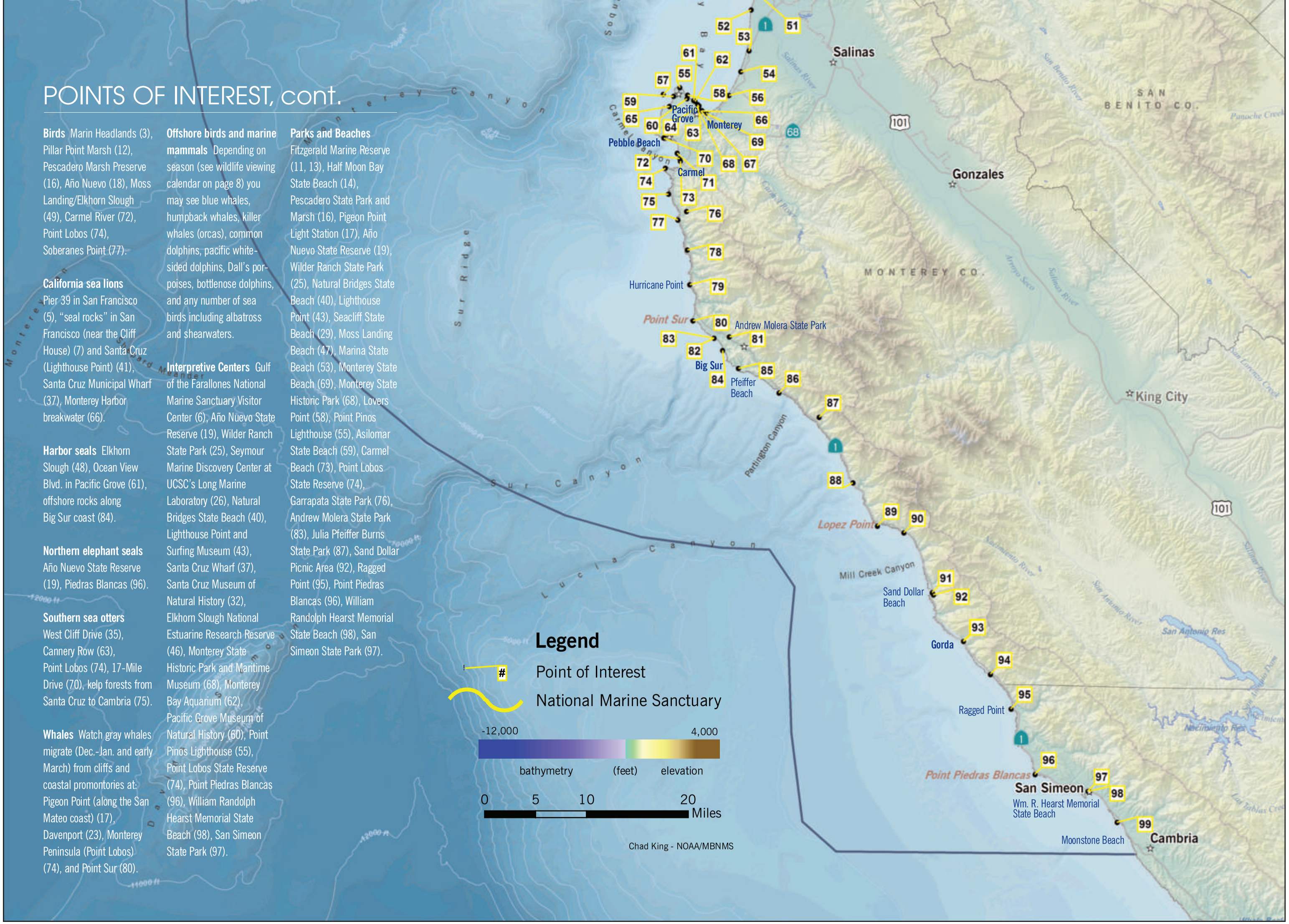
Southern sea otters West Cliff Drive (35), Cannery Row (63), Point Lobos (74), 17-Mile Drive (70), kelp forests from Santa Cruz to Cambria (75).

Whales Watch gray whales migrate (Dec.-Jan. and early March) from cliffs and coastal promontories at: Pigeon Point (along the San Mateo coast) (17), Davenport (23), Monterey Peninsula (Point Lobos) (74), and Point Sur (80).

Offshore birds and marine mammals Depending on season (see wildlife viewing calendar on page 8) you may see blue whales, humpback whales, killer whales (orcas), common dolphins, pacific white-sided dolphins, Dall's porpoises, bottlenose dolphins, and any number of sea birds including albatross and shearwaters.

Interpretive Centers Gulf of the Farallones National Marine Sanctuary Visitor Center (6), Año Nuevo State Reserve (19), Wilder Ranch State Park (25), Seymour Marine Discovery Center at UCSC's Long Marine Laboratory (26), Natural Bridges State Beach (40), Lighthouse Point and Surfing Museum (43), Santa Cruz Wharf (37), Santa Cruz Museum of Natural History (32), Elkhorn Slough National Estuarine Research Reserve (46), Monterey State Historic Park and Maritime Museum (68), Monterey Bay Aquarium (62), Pacific Grove Museum of Natural History (60), Point Pinos Lighthouse (55), Point Lobos State Reserve (74), Point Piedras Blancas (96), William Randolph Hearst Memorial State Beach (98), San Simeon State Park (97).

Parks and Beaches Fitzgerald Marine Reserve (11, 13), Half Moon Bay State Beach (14), Pescadero State Park and Marsh (16), Pigeon Point Light Station (17), Año Nuevo State Reserve (19), Wilder Ranch State Park (25), Natural Bridges State Beach (40), Lighthouse Point (43), Seacliff State Beach (29), Moss Landing Beach (47), Marina State Beach (53), Monterey State Beach (69), Monterey State Historic Park (68), Lovers Point (58), Point Pinos Lighthouse (55), Asilomar State Beach (59), Carmel Beach (73), Point Lobos State Reserve (74), Garrapata State Park (76), Andrew Molera State Park (83), Julia Pfeiffer Burns State Park (87), Sand Dollar Picnic Area (92), Ragged Point (95), Point Piedras Blancas (96), William Randolph Hearst Memorial State Beach (98), San Simeon State Park (97).



Legend

! # Point of Interest

National Marine Sanctuary

-12,000 4,000

bathymetry (feet) elevation

0 5 10 20 Miles

Chad King - NOAA/MBNMS

Kids Pages

Sea otters are fun to watch. They turn somersaults, swim on their backs, and use a rock to break open shellfish. Keeping our sanctuary clean helps sea otters and other ocean animals stay healthy. Here are some activities to help you learn more about sea otters and how to protect their ocean home.

Let's Clean Up The Beach

Trash may look harmless, but it can injure or kill marine animals. If they mistake garbage for food, animals may eat it and die. Or they can get tangled in trash and drown. Circle the objects that can harm ocean animals.

Activities and images on this page used with permission of Friends of the Sea Otter, www.seaotters.org/. © 2004, Positive Publishing USA, www.pospub.com

You Can Be A Sea Otter Too!

To make this otter mask, you need crayons, scissors and string.

1. Make a copy of the otter's face on this page if you want to save this page.
2. Color with crayons before you cut it out. Sea otters are usually light brown with a pink mouth and a black nose.
3. Cut out the face and eyes.
4. Punch one hole below each ear.
5. Measure a piece of string to fit around your head. Tie one end of the string through a hole under each ear.

Now YOU look like a sea otter!

Word Search

Why are Sea Otters a Threatened Species and How Can You Help Them?

F O S T E N L L I G R V E H O R
U R I D H A O L N C G B P G I S
Z T E Y K E M I C A R P O O L N
J U S H T P F T G V K J L A S Y
E S D H A B I T A T M E L V P R
W B O V S B O E R J H U U Z I A
T C A I O E I R I Y U F T J L U
M R Z C A J B L O K H U I R L T
Q E K W T D O P I J R O O D J C
A C O N S E R V A T I O N F V N
D Y D H L I R A G D A V O N E A
S C O E Y G U I X O H T G Q H S
P L A S T I C B A G S F I I K O
O E M L J T P S T Y R O F O A M
N P W R F E R B M K S N V O N I
K A D V O C A C Y X F I D N W H

See if you can find and circle the words listed. They are hidden vertically, horizontally, and diagonally—some are even spelled backwards.

HARMFUL	HELPFUL
OIL SPILL	CARPOOL
LITTER	CONSERVATION
PLASTIC BAGS	RECYCLE
STYROFOAM	SANCTUARY
BACTERIA	ADVOCACY
GILL NETS	HABITAT
POLLUTION	REHABILITATION

This activity used with permission of Friends of the Sea Otter, www.seaotters.org/.

Protecting Marine Life– You Can Make a Difference!

Each of us can play a role in protecting our oceans and marine life. Here are some ways you can make a difference:

- Pick up trash. Participate in clean ups or organize one yourself. And never release helium balloons, which can end up in the ocean and harm marine life.
- Don't dump waste into storm drains. Everything poured or washed into storm drains flows directly into creeks, rivers, and ultimately, the ocean.
- Choose and eat seafood that's caught or farmed in ways that support healthy oceans.
- Join a marine conservation group and support their efforts to protect the oceans.
- Volunteer! Get directly involved with a marine conservation or environmental organization.
- Stay informed about ocean issues.
- Tell your friends, family members and legislators about the need for improved conservation efforts.
- Consume fewer resources. Reduce, recycle and reuse!

Threatened & Thriving in the Monterey Bay National Marine Sanctuary

The Monterey Bay National Marine Sanctuary is one of the best places in the world to see the southern sea otter, which can be found around kelp forests and along rocky shorelines. Once hunted to near extinction for its luxurious fur, the sea otter population is still threatened by environmental toxins and disease. Sea otters are often seen resting in giant kelp. Kelp forests provide food and habitat for a variety of invertebrates and fish. Some of the largest kelp forests in the world thrive in the Sanctuary's waters.

DID YOU KNOW?

The leading cause of oil pollution in the ocean is NOT from tanker accidents - it's from citizens. Each year 350 million gallons of oil from roads, parking lots, driveways and storms drains wash into waterways and the ocean. This is 30 times more than from the largest tanker spill!

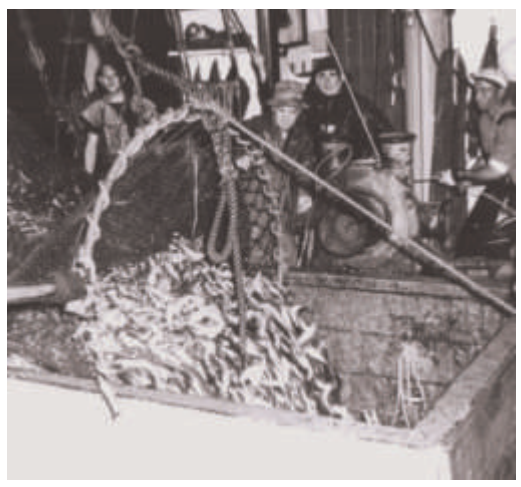
A Window to the Past

The Ocean Shapes Our Cultural History

The rich waters of the Central Coast have been a source of food, transport, trade, and livelihood for people for over 10,000 years. The native Ohlone, earliest human inhabitants, lived off the land and water, and had a plentiful supply of fish, birds, shellfish, and mammals. Over the past 250 years, the Central Coast has drawn people from around the world seeking economic opportunities like fur trading, fishing, and whaling, as well as land-based enterprises such as farming, logging, quarrying, and ranching. As a result, we now enjoy a vibrant blend of cultures including Ohlone, Spanish, Italian, Japanese, Chinese, Russian, Central European, and Vietnamese, among others, who enjoy the mild winters and dry summers of our Mediterranean climate.

Fishing at the "ranch." Point Sur was known as the "ranch" to the local rockfish fishermen. This 32-foot jig boat was owned by the Giamanco family.

Before Europeans arrived on the scene, Ohlones hunted seals and other marine mammals, caught fish and invertebrates, and depended upon native plants such as acorns for food and willows for basket making. Historic piles of shells (middens) left by early inhabitants show they ate a substantial amount of shellfish, including abalone, mussels, clams, snails, and limpets. Because their population was relatively small and they took only what they needed, their effect on the environment was probably minimal.



US LIBERATOR braling sardines, circa 1945.

AA FERRANTE with 70 tons of sardines. September 29, 1945.

Monterey Bay was first discovered and mapped by Europeans when Sebastian Cabrillo sighted "Bahia de los Pinos" in 1542, followed by Sebastian Vizcaino, who dropped anchor here in 1602 during his search for a protected harbor for Spain's lucrative Manila galleons trade. Vizcaino's expedition named the harbor after the viceroy of Mexico, Don Gaspár de Zúñiga y Acevedo, Count of Monte Rey, who had dispatched the expedition.

The area remained largely unchanged until Gaspar de Portola led an expedition here in 1770, after which the Spanish began their immigration into the area. By the late 1770s, Spanish missionaries, the Franciscans, had established their mission system throughout the state, opening up the area to waves of immigrants and visitors. The Spanish relied heavily on non-native livestock such as cattle and pigs, and imported non-native plants such as mustard and wheat, drastically altering the local environment. They bought pelts of southern sea otters from Russians and Indians, exporting them throughout the world, so the once abundant sea otters were scarce by the late 1800s.

Native Indian tribes also suffered from the arrival of Europeans through exploitation of their labor, prohibition of cultural and social habits, and introduction of European diseases, against which they had no resistance. Native Ohlone still live in the area, and though few in number, enrich our culture today by carrying on their traditions.

New England whalers, Portuguese shore-whalers, and fishermen from China, Italy, and Japan all came to harvest the healthy supplies of abalone, squid, whale, seal, fish, shark and kelp along the Central Coast. At various times over the past 200 years, over-harvesting caused the near-extinction of many of these species. Now the hunting of some species, like seals and whales is prohibited, while the harvest of others, such as salmon or squid, is regulated.

Today, like the Ohlone, we recognize the need to use our natural resources responsibly so they are sustainable over time. We are learning more about how to ensure the survival of animals and plants, and protect their natural habitats. The marine sanctuary program is committed to balancing the economic needs of a growing population with preservation of a healthy marine environment both today and for the future.

Shipwrecks

RHODERICK DHU.
April 22, 1909, Moss Beach.

Many shipwrecks lurk in the deep, dark waters of the sanctuary. Clipper ships, schooners, and steamers have all fallen prey to the Central Coast's rocky shoreline and foggy or stormy weather. More than 140 large shipwrecks have been documented in the sanctuary between 1845 and 1935. In one of the worst maritime disasters in California, a passenger steamer, the *San Juan*, was rammed by an oil tanker off Pigeon Point in 1929. Altogether 75 men, women, and children were lost, most trapped while asleep below deck.

The dirigible USS *Macon*, a 6,500,000 cubic foot rigid airship was built in 1933 to conduct strategic searches over vast distances expected in a Pacific war. In 1935, 23 months and 54 flights later, the USS *Macon* encountered a storm off Point Sur while returning to Moffet Field. A violent gust tore off her upper fin, causing damage that brought her down into the sea. The crew of 83, clad in life jackets and prepared with life rafts, jumped into lifeboats, and all but two survived. The USS *Macon* sank in deep water, ending the Navy's controversial program of rigid airship operations.

How's the Water?

Relatively pristine waters in the sanctuary support a wealth of marine life. But water quality of the sanctuary is only as good as the watersheds that drain into it. A watershed is a land area in which runoff flows downhill into specific tributaries. Mountain ridges separate watersheds, directing the flow into streams and rivers and eventually to the ocean. Watersheds covering 7000 square miles of land drain into sanctuary waters. Most watersheds are named after the large rivers to which they drain (e.g., San Lorenzo, Salinas or Carmel River). In cities, urban runoff is a leading cause of water pollution. Urban areas contain up to 90 percent hard surfaces such as rooftops and pavement. Rather than soaking into the ground, water runs off hard surfaces and joins with oil, fertilizers, pesticides, detergents, bacteria, pet waste, and other pollutants before entering storm drains leading into the ocean. In rural agricultural areas, sediments containing pesticides and herbicides are washed into rivers and streams draining into the sanctuary.

Overall, sanctuary water quality remains fairly good, especially in offshore waters. Coastal waters are more susceptible to elevated levels of pollutants such as oil, detergents, nitrates or pesticides. Some beaches may temporarily close or be posted as showing elevated levels of bacterial contamination (from human or animal waste). A "beach closure" results from a sewage spill. A "beach warning" occurs when bacteria levels exceed specified standards indicating the water may be contaminated with human or animal waste. A rain advisory is issued when significant rainfall has the potential to increase bacterial levels in the ocean. Do not swim if the beaches are posted with any of these warning signs.

Citizen Watershed Monitoring

More than 400 volunteers keep an eye on water quality by monitoring sanctuary watersheds and beaches, collecting water quality samples, or determining flow and sediment load in streams. The sanctuary sponsors a variety of citizen monitoring activities.

A Window to the Future

Scientists Unravel Secrets of the Sea

Just like many visitors and residents, marine researchers are drawn to the Monterey Bay area by one of the most productive combinations of marine life found anywhere in the world. For over 200 years, the Monterey Bay area has provided inspiration not only for scientists, but for authors, poets, and artists as well. In the novel Cannery Row, author John Steinbeck based his character 'Doc' on Ed Ricketts, a beloved and eccentric marine scientist who owned Pacific Biological Laboratories. In 1939, Ricketts published an elegantly written textbook, Between Pacific Tides, which described for the first time the teeming life in tidepools of the Central Coast. Since then, many more species have been discovered and books written about the fascinating marine life of the area, but his book remains a popular classic today.

The Pacific Coast's first marine research facility, Stanford University's Hopkins Marine Station, was established more than 100 years ago. Over the past 25 years it has been joined by three more universities, numerous private and public research institutions, and a variety of federal and state agencies all focused on marine issues. Now with over 40 marine research organizations located in and around Monterey Bay, this area has perhaps the highest concentration of marine scientists anywhere in the world. Researchers in the sanctuary contribute to local and global efforts to better understand and preserve the marine environment.

Here is a sampling of Monterey Bay area research groups:

Sanctuary Integrated Monitoring Network researchers combine talents to understand sanctuary health through long-term monitoring of marine habitats and by assessing the impact of both natural processes and human activities. Monitoring data and interactive maps are available at www.mbnms-simon.org/.

Monterey Bay Aquarium Research Institute conducts deep-sea research spanning fields such as marine biology, ecology, chemistry and geology. They operate three research vessels, as well as remotely operated vehicles and autonomous underwater vehicles (underwater robots), scientific moorings, sea-bottom instruments, and other tools for gathering data throughout the water column.

Long Marine Laboratory at University of California, at Santa Cruz is known throughout the world for its innovative research on marine mammals, but lab scientists conduct studies on environmental toxicology, invertebrate biology and marine ecology as well.

Moss Landing Marine Laboratories researchers affiliated with the California State University system investigate the unique biological, chemical and physical properties of the Monterey Bay and neighboring Elkhorn Slough.

Other research groups in the Monterey Bay region include the National Marine Fisheries Service, Naval Postgraduate School, California Department of Fish and Game, National Undersea Research Program, Elkhorn Slough National Estuarine Research Reserve, California State University Monterey Bay and U.S. Geological Survey, among others.

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Santa Cruz, CA 95060 (831)420-1630

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San Simeon, CA 93452 (805) 927-2145

Web sites for reference and further information:
Monterey Bay National Marine Sanctuary (http://www.montereybay.noaa.gov)
National Marine Sanctuary Program (www.sanctuaries.nos.noaa.gov)
SIMoN (www.mbnms-simon.org/)
Citizen Watershed Monitoring (http://montereybay.noaa.gov/monitoringnetwork/welcome.html)

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Many thanks to the contributors who provided information from the interpretive centers, parks, non-profit organizations, chambers of commerce, and other organizations appearing in this guide.

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You Can Prevent Water Pollution!

Protecting the sanctuary includes reducing land-based pollution that flows into the sea. Here are some ways you can prevent pollution from entering storm drains and flowing into creeks, wetlands, rivers and the ocean:

- Never dump chemicals, oil, debris or other waste into storm drains!
- Recycle used motor oil and antifreeze, and inspect your car regularly to prevent leakage.
- Wash your car on unpaved surfaces, or better yet, take it to a car wash.
- Landscape as much of your yard as possible. Planted areas absorb rainwater, while bare soil and concrete promote runoff.
- Take unwanted toxic chemicals like paint, solvents and pesticides to your local hazardous waste site. Use these products sparingly, and use non-toxic products whenever possible.
- Use herbicides, pesticides and fertilizers sparingly and don't apply them if rain is forecast. Consider using organic gardening techniques instead, or plant native species that require less water.
- Don't wash down driveways, sidewalks or patios—sweep them instead.
- Pick up animal waste regularly and dispose of it in the trash.

Get Out and Do It!

Things to do in and around the Sanctuary

Tired of sitting in the car? Want to get out for some fresh air and exercise? In addition to spectacular scenery, for those wanting more adventure, there's plenty to do in the Monterey Bay National Marine Sanctuary. For information and equipment rentals, check the phone book for shops specializing in your activity, or ask your hotel concierge.

ON THE WATER

Boating is a popular way to experience the Central Coast's wonders, and anybody can join a chartered vessel to go whale watching, fishing, sailing or cruising the beautiful coastline. Visit one of the sanctuary's four harbors to find out about boat rentals and charter trips.

Kayaking is another great way to enjoy the outdoors and see wildlife. Good kayaking spots include Elkhorn Slough and the coastal waters of San Simeon, Monterey, Pacific Grove, and Santa Cruz. Check the phone book for rentals and classes.

To protect sensitive wildlife, **motorized personal watercraft** (jet skis) are restricted in the sanctuary and may only operate in four areas adjacent to the harbors, where launch ramp signs are posted explaining the regulations.

Recreational fishing is a popular activity; both hook-and-line (from boats, wharves, or the shore) and spearfishing are permitted. Group charters operate from the four harbors, so try your luck at reeling in salmon, halibut, mackerel, or lingcod. *Note: Anyone age 16 or older needs a license to fish from a boat or shore (but not public piers and wharves). You may purchase a license from most sporting goods stores.*

IN THE WATER

If being on the water isn't enough, you'll want to join the area's many divers, swimmers, and surfers and get in it. Just remember, the sanctuary's waters are chilly, from 46° to 60° Fahrenheit (8° to 15.5° Celsius).

Because these waters are more protected and kelp forests abound, the most popular **scuba diving** and **snorkeling** spots are along Cannery Row in Monterey, Lovers Point in Pacific Grove and Point Lobos State Reserve south of Carmel. Many dive shops provide lessons, guided trips and gear rental.

Despite the chilly waters, **swimming** or playing in the surf is always an adventure. See the map for a list of good swimming beaches. Strong currents make it imperative to follow swimming advice posted on beach signs.

The Central Coast is a world-renowned **surfing** area featuring the famous Steamer Lane off Lighthouse Point in Santa Cruz. Cowell Beach, next to the Santa Cruz Wharf, is a good beginners beach and lessons are available. The sanctuary also has great **windsurfing** and **kiteboarding** sites: both Waddell and Scott Creek beaches, north of Santa Cruz, provide excellent wind and wave conditions.

ON LAND

Tidepooling is a great way to get up close with some of the sanctuary's smaller creatures without getting wet. If you sit quietly and look closely you'll see much more. See map for tidepool locations.

Hundreds of **walks** and **hikes** will immerse you in breathtaking scenery. More information on trails (including level of difficulty) is available at the following sites. Day use fees apply to some parks.

Marin Headlands—The Golden Gate National Recreation Area (north of the Golden Gate Bridge) has miles of hiking trails to Muir Woods, Muir Beach, Tennessee Valley, Rodeo Beach, Point Bonita Lighthouse, and a visitor center at Fort Barry Chapel. (415) 331-1540

South of the Golden Gate Bridge—"Coastal Trail," about 12 miles long, leads south past the Cliff House and to Fort Funston. Information is available at Fort Point, Presidio Visitor Center, Cliff House, or Fort Funston. (415) 556-8371

Pescadero Marsh Preserve—Short, easy trails meander through serene wetlands, offering good birding opportunities. The Sequoia Audubon Trail is 2 miles round-trip. Docent-led tours are available on weekends. (415) 879-2170

Año Nuevo State Reserve—The Año Nuevo Point Trail (permit required) leads to the beaches where elephant seals come to mate, give birth, and molt. Other trails don't require permits. (415) 879-2025 or 879-0227

Wilder Ranch State Park—A 6,000-acre park with 33 miles of trails and a historic ranch. The Ohlone Bluff Trail is 2.5 miles (round-trip) and skirts the cliffs. Inland from Wilder is Gray Whale, a hiking and biking spot with beautiful trails and vistas. (831) 423-9703

West Cliff Drive, Santa Cruz—Walk, bicycle, or skate on 2.5 miles of paved pathway along the cliff from the Municipal Wharf to Natural Bridges State Park, home of the annual monarch butterfly migration.

Elkhorn Slough National Estuarine Research Reserve—Located in the middle of Monterey Bay, five miles of hiking trails around the slough lead to overlooks for viewing wildlife, especially birds. (831) 728-2822

Monterey Peninsula Recreational Trail—A paved pedestrian/bicycle path running from Seaside to Pacific Grove. The coastal stretch from Del Monte Beach to Lovers Point travels past Cannery Row and the Monterey Bay Aquarium.

Ocean View Boulevard, Pacific Grove—With spectacular views, an unpaved walking path leads you along the rocky coastline from Lovers Point toward Asilomar State Beach.

Point Lobos—Enjoy Monterey cypress trees along seven miles of trails. The 1,200-acre reserve includes the turquoise waters of China Cove, kelp forests, rocky shores, and tidepools. (831) 624-4909

Garrapata State Park—(Eight miles south of Carmel.) West of Hwy 1, a hike to Soberanes Point affords views of Point Sur. To the east, the steep Rocky Ridge trail offers views of Monterey Bay. (831) 624-4909

Andrew Molera State Park—Fifteen miles of hiking trails. To the east, a steep trail leads up to a redwood grove. To the west, follow the Big Sur river to Molera beach. (831) 667-2315 (Big Sur Station)

Julia Pfeiffer Burns State Park—From the east edge of the parking lot, Ewoldsen Trail is a 4.5-mile loop in and out of redwoods, climbing 1,600 feet to superb views of the south coast. (831) 667-2315 (Big Sur Station)

Ragged Point Trail and Overlook—The grassy area and overlook are located on a high terrace above the ocean. From there, a steep trail leads past a waterfall to a small beach.

Moonstone Beach Drive—A boardwalk provides public access to Moonstone Beach, Cambria where harbor seals and seabirds bask on offshore rocks. Whales, dolphins, sea lions, and sea otters may also be seen. Leffingwell Landing has picnic areas and launch ramp for boats or kayaks to visit kelp beds and rocky shorelines.