

Student Reading

Get to Know San Diego Shrublands

San Diego's Native Habitats

California and San Diego County in particular, are places unlike any other in the world, because there are so many **native habitats** that are found only in our region. A native habitat is an area that has everything an animal or plant needs to survive. It is also an area where animals and plants have survived for thousands of years. San Diego's native habitats include beaches, salt marshes, freshwater marshes and lagoons, grasslands, oak and pine forests in the mountains, stream sides, oak meadows, deserts and shrublands.

Thousands of living things make their homes in San Diego's native habitats. In fact, there is more



Figure 1: California quail taking shelter under a scrub oak.

biodiversity, or variety of living things, in San Diego than any other county in North America. San Diego County has so much biodiversity, scientists

consider it a **conservation** "hotspot." Our native habitats, and the plants and animals in them, need protection if they are to survive.

Shrubland Climate

Climate is the word scientists use to describe weather patterns in a particular place over hundreds of years. The climate of San Diego is called "Mediterranean." It is like the climate around the Mediterranean Sea, between Europe and Africa. Other places that have this climate are central Chile in South America, southwest Australia, and South Africa.

Mediterranean climates have wet winters and dry summers. Most of the yearly rain falls in the winter, leaving the rest of the year very dry. In San Diego, the average rainfall along the coast is less than 10 inches. Dry "Santa Ana" winds blow from the desert to the sea in the fall. Fires sometimes spread when these winds blow.

Shrubland Habitat

Shrublands are areas of land covered with different species, or kinds, of shrubs. They often grow in places trees don't grow, like steep hillsides. They shade the ground so other plants can't live under them. They grow so thickly that the ground is often completely covered with plants.

San Diego's shrublands include **chaparral** and **coastal sage scrub** habitats. Chaparral is the most common habitat in California. The name comes from the Spanish word "chaparro," meaning "place of the scrub oak." Plants in the chaparral habitat have thick, woody stems like trees and hard leathery leaves. They are usually between 4 and 20 feet tall.

Coastal sage scrub is found within 10 miles of the ocean. The plants have small, good-smelling leaves and have softer stems and leaves. They are smaller than chaparral plants, standing about 1 to 4 feet high. In the past, coastal sage scrub was the most common habitat in San Diego. People like to be near the ocean, so they built their homes and businesses in this habitat. Now there is only a little bit of this habitat left in San Diego. Around the world, coastal sage scrub is one of the most endangered habitats.



Figure 2: Toyon has straight toothy leaves.

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Shrubland Relationships

Plants and animals that live in shrubland habitats must be able to survive without much water during the hot dry summers. They must be able to protect themselves from the drying wind and burning fire in the summer and fall. They must also take advantage of heavy winter rainfall to grow and spread.



Figure 3: Woodrats can build lodges as tall as an adult male.

Shrubland Animals and Plants Need Each Other

Shrubland animals and plants depend on each other. Just like people, animals breathe in and breathe out carbon dioxide. Plants take in carbon dioxide and release oxygen. Animals depend on plants for food and shelter. Plants depend on animals to scatter seeds, pollinate flowers, and fertilize the soil.

The thick shrubs of the chaparral make good homes for animals. The California gnatcatcher and the wrentit build their nests in the shrubs. The California quail builds its nest on the ground under bushes for shelter.

Some animals make nests, dens, and burrows using chaparral plants. Wood rats make large “lodges” using sticks and twigs. Other animals, such as mice, lizards, and insects, move into these homes. The lodges are warm in winter and cool in the summer.

Many animals eat chaparral plants, too. In fact, every part of a plant is food for some animal. Brush rabbits, mule deer, and caterpillars all like soft plant leaves.

Seeds and acorns are a favorite of ground squirrels, mice, harvester ants, and scrub jays. Pocket gophers eat plant roots. Berries and other fruits are a tasty treat for birds, coyotes and raccoons. Even **decomposers** such as earthworms and darkling beetles eat dead plants and turn them into soil. Nothing goes to waste in the shrubland habitat.

The Shrubland Food Chain

In nature, a plant uses energy from the sun to make food. Later, the plant is eaten by an animal. That animal is, in turn, eaten by another animal. This cycle of eating and being eaten is called a **food chain**.

A food chain passes energy from one **organism**, or living thing, to another. For example, the black sage plant gets nutrients and water from the soil. It uses the sun’s energy to make its own food and grow. The seeds of the black sage are eaten by a quail. Then a bobcat eats the quail. When the bobcat dies, decomposers break down its body into nutrients, turning the body back into soil.

In the shrubland ecosystem, California buckwheat uses the sun’s energy to make food. The Western scrub jay and California mouse eat buckwheat seeds. The jay may be eaten by a Red-tailed hawk. The mouse may be eaten by a Gopher snake, which is eaten by a coyote.



Figure 4: Barn owl perched with its prey.

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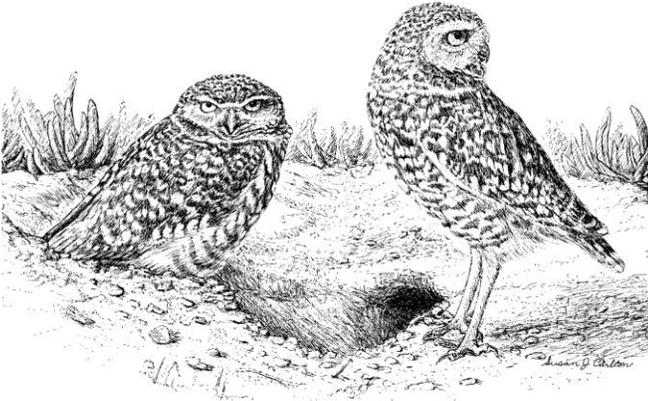


Figure 5: Burrowing owls guarding their nest.

Animals' Adaptations to Shrubland Habitats

Adaptations are physical qualities or behaviors that help animals and plants survive. Animals have adapted to the shrubland habitat in two different ways. First, their bodies are adapted, inside and out, to survive in low-water conditions and hot sun. These are called **physical adaptations**. Second, their behaviors, or the way they act, help them survive. These are called **behavioral adaptations**.

Physical Adaptations

Some shrubland animals are colored just like the plants around them. Wrentits, for example, are small brown birds that can blend in with dry shrubs.



Figure 6: California gnatcatcher perched on California buckwheat.

Coyotes are also light colored, with fur that can be grey, tan, or brown.

Nocturnal animals also have physical adaptations to help them

survive. Their bodies are adapted to help

them find food and avoid being eaten in the dark. Great horned owls, for example, have large eyes, sharp claws, and silent wings to help them catch mice at night. Kangaroo rats also have large eyes to see **predators** such as owls who want to eat them, and they have strong legs with large feet for leaping away quickly.

Shrubland animals also have adaptations inside their bodies. The western fence lizard, for example, has special kidneys that help save water. These small reptiles do not need to drink water at all. They get all the moisture they need from the insects they eat.

Behavioral Adaptations

Some animals, such as kangaroo mice and owls, are **nocturnal**; they are only awake at night. This behavior helps them survive because they can stay out of the sun and heat.



Figure 7: Western fence lizard warming itself on a boulder.

Other animals, such as gophers, burrowing owls, ground squirrels, toads, and snakes dig burrows underground, rarely coming outside. This behavior helps them survive in heat and wildfires.

Animals such as wood rats, build large nests to protect them from predators. Their nests may have many doors. This adaptation allows them to escape when they are in danger.

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Plants' Adaptations to Shrubland

Habitats

Plants living in shrubland habitats have also adapted to live in hot, dry conditions. Plants grow in the winter when the rain falls. They have adapted to need little water in the summer and to survive hot Santa Ana winds. Shrubland plants are even adapted to survive when wildfires sweep through the region.

Low Water Conditions and Santa Ana Winds

Plants that live in shrublands must be able to get along without much water. Deep roots help plants gather as much water as possible from far away. Some plants have roots that are three or four times as large as the plant above the ground.

Santa Ana winds can pull water from plants' tender leaves. The leaves of shrubland plants have adapted in a number of ways to prevent the plant from losing



Figure 8: Scrub jay collecting acorns.

water. Scrub oaks, for example, have a waxy or leathery coating on their leaves and stems that keep water in. Other plants, such as California

buckwheat, have tiny, hard, thin leaves that prevent water loss.

Some plants' leaves are turned away from the sun to prevent water loss. Toyon's leaves point straight up and laurel sumac's leaves are folded like tacos so the sunlight only hits the leaf edges.

A plant's color can help it stay cool too. Dark colors absorb sunlight. Light colors reflect it. Plants such as white sage and California sagebrush are light grey. This adaptation helps them reflect sunlight and stay cool in the heat.

Most shrubland plants are green all year round. But some shrubland plants, such as black sage, lose half their leaves when rainfall is especially low. This adaptation helps them prevent water loss through leaves. Black sage also has smaller leaves during **droughts**, or times of little rainfall. When rains increase, the leaves grow larger.

Some plants, such as yerba santa, have hairs that collect water from the air. Near the cloudy coast, fog can be a good source of water for these plants.

Wildfires

Wildfires burn the parts of shrubs that are above the ground. Shrubland plants survive wildfires in several ways. Some plants resprout from their deep roots and hardy stems after a fire. Laurel sumac and chamise sprout from their root collars between the root and stem. Within a month of a big fire, these shrubs have new stems and leaves.

Other plants sprout from seeds. Seeds of the ceonothus are cracked open in the heat of a wildfire and grow when the rain comes. Manzanita seeds open when they are exposed to the chemicals found in smoke and charred wood. When larger plants burn away, the new plants have nutrients and room to grow. Many beautiful wildflowers show up after a big fire. If the time between wildfires is too short, the shrubland habitat may not survive and weeds will take over.



Figure 9: Laurel sumac resprouting after a fire.

Vocabulary List

Adaptation: A physical or behavioral characteristic of a plant or animal that helps it survive in its natural environment.

Chaparral: The largest and most diverse plant community in San Diego County. Plants are composed of hard stemmed, leathery leaved shrubs.

Coastal Sage Scrub: Plant community named after the commonly-found coastal sagebrush. It is defined by waist-high shrubs on slopes or flats that receive much sunshine and little rainfall.

Conservation: The wise use or protection of natural resources.

Consumer: An organism that gets energy and matter by eating other organisms.

Decomposer: Bacteria and fungi that get energy from the matter in dead organisms and waste.

Ecosystem: A community of plants, animals, and their surroundings that depend on each other.

Energy: The capacity to do work or the source of power to do work.

Food chain: The path that energy takes from one organism to another in the form of food.

Habitat: The place where an organism lives and meets its needs.

Native: The plants, animals, and habitats that have existed in an area for thousands of years, before the arrival of Spanish settlers.

Naturalist: A person who studies or teaches about nature.

Non-Native Plants: Plants that did not originally grow in the geographic areas they now occupy.

Organism: A living thing, such as a plant, animal, or other life form that can grow and reproduce.

Predator: An animal that lives by killing and eating other animals.

Prey: An animal hunted or killed by another animal for food.

Producer: An organism that makes its own food.

Scat: Undigested foods and liquids that are not used by the body and are expelled.

Shrubland: A type of habitat that includes chaparral and coastal sage scrub plant communities.

Species: A living thing, such as a plant, animal, or other life form that can grow and reproduce.

Wildlife: Non-domesticated animals including but not limited to, insects, spiders, birds, reptiles, fish, amphibians, and mammals.