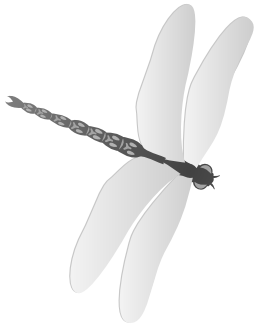


# APPENDIX

**Common Name**:
ARROYO WILLOW

**Scientific Name**:
*Salix lasiolepis*

**Size**: between 6 and 30 feet tall

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Riparian | Producer |

**Features**: The arroyo willow is a shrub or small tree with drooping branches, which are yellowish to red. Its slender, dark green leaves are two to five inches long. Its flowers grow in clusters, called catkins, and appear in the early spring before the leaves grow. Galls often appear on leaves as red bumps, caused by the sawfly, who lays eggs in the leaf tissue.

**Facts**: Willows will grow only where there is water. Their deep roots hold in soil and water, thereby reducing erosion. These native trees provide shade, shelter, and food for a variety of animals and plants, including the endangered bird Least Bell's Vireo. Willow bark contains salicylic acid, which is the main ingredient of aspirin. Native Americans used willow branches as arrow shafts and for house frames.

**Common Name**:
CALIFORNIA BUCKWHEAT

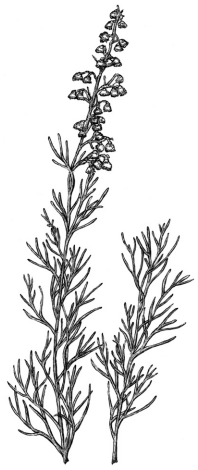
**Scientific Name**:
*Eriogonum fasciculatum*

**Size**:
3 feet high, 6 feet wide

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Upland | Producer |

**Features**: California buckwheat is a low-spreading shrub that displays large clumps of white flowers that develop into cinnamon colored seed heads during summer. The small, narrow, leathery leaves are in bundles all along the stems.

**Facts**: California buckwheat is an important plant in the coastal sage scrub community. The flowers, leaves, and seeds are food sources for smaller animals—such as birds, lizards, mice, and butterflies. It is a favorite of bees and makes an exceptionally fine honey. American Indians used California buckwheat for medicinal purposes—to relieve headaches and stomach trouble—and for food. Have you heard of "buckwheat pancakes"?



**Common Name**:
CALIFORNIA SAGEBRUSH
COASTAL SAGEBRUSH

**Scientific Name:**
*Artemisia californica*

**Size**:
between 2 and 5 feet tall

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Upland | Producer |

**Features**: The California sagebrush is a shrub with a woody base and soft, gray-green, needle-like leaves that grow in clusters along the stem. The leaves have a very distinctive fragrance.

**Facts**: California sagebrush, one of the dominant plants in a coastal sage scrub community, occurs throughout Southern California. It provides important habitat for animals that use its aromatic smell to mask their scent from predators. The leaves can be used for seasoning many foods, from tea to stew. American Indians used the plant to treat colds, stomach disorders, and bronchial problems, among other ailments.

**Common Name**:
CORDGRASS

**Scientific Name**:
*Spartina foliosa*

**Size**:
up to 4 feet at maturity

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Salt Marsh | Producer |

**Features**: Cordgrass is a tall grass that has creeping scaly rhizomes (roots) and numerous spike-like flower clusters. It grows in the mud between low and high tides.

**Facts**: Cordgrass is a halophyte, which means it is able to grow under saline conditions. It tolerates the salinity by excreting salt through glands on the leaf surfaces. Cordgrass also has hollow tubes in its stems that pass oxygen down the roots from the leaves, even when the plant is submerged for long periods of time. The tops of cordgrass break off in the fall, providing a rich food source for many marine animals. In Upper Newport Bay, elevated nitrogen levels from runoff help the cordgrass to grow taller than in other places, which makes it a superior nesting place for the Light-footed Clapper Rail. Cordgrass—*Spartina foliosa*— is threatened by competition and hybridization with smooth cordgrass—*Spartina alterniflora*—a non-native species.

**Common Name**:
ICE PLANT

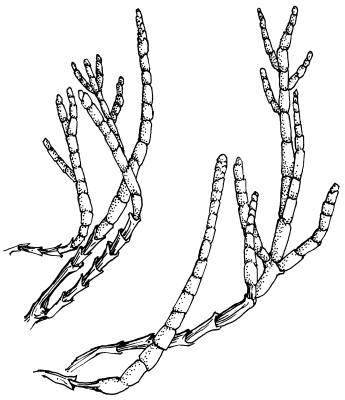
**Scientific Name**:
*Carpobrotus edulis*

**Size**:
Individual clones can grow to at least 165 feet in diameter.

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Non-native | Salt Marsh<br>Upland | Producer |

**Features**: Ice plant is a ground-hugging succulent with thick, fleshy leaves. Its yellow, pink, or white flowers are 3 to 4 inches across. This non-native plant spreads quickly by sending out new roots where each leaf meets the stem. One plant can form a dense mat covering a large area.

**Facts**: Ice plant is native to South Africa and was brought to California in the early 1900s for stabilizing soil along railroad tracks. Since that time, it has been widely planted for soil stabilization and landscaping and has virtually taken over the salt marsh areas in southern California. Ice plant is often stronger than native plants and competes directly with several threatened or endangered plant species for nutrients, water, light, and space. Ice plant also leaches salt into the soil, making it less suitable for native plants. There are several species of ice plant invading the Bay, including hottentot, sea fig, and others. In 2003, volunteers pulled over *17,000 pounds* of ice plant from the Upper Newport Bay area.



**Common Name**:
PICKLEWEED

**Scientific Name**:
*Salicornia virginia*

**Size**: 4 ft

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Salt Marsh | Producer |

**Features**: Pickleweed is a low-growing succulent with leafless, jointed stems and inconspicuous flowers. The branches are fleshy and segmented. The green stems turn pinkish-red in the fall. Pickleweed grows in extensive colonies in the middle zone of the marsh where the salinity of the soil is high. Dodder *(Cuscuta salina)*—an orange, stringy, parasitic plant—grows on pickleweed.

**Facts**: Pickleweed is a halophyte, a plant that is able to grow under saline conditions. Pickleweed does not require air passage to its roots, and it tolerates salt by concentrating it in its segmented stems, which turn red and fall off when they become full of salt. Although it does not require a saline environment to survive, it is usually out-competed by other plants in the less saline regions of the marsh. Pickleweed is used by Belding's Savannah Sparrow for nesting, perching, feeding, and shelter. Pickleweed seeds were a favorite Native American food. Today in Great Britain, the plant is used to make pickles.

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native<br>Endangered | Salt Marsh | Secondary Consumer |

**Common Name**:
BELDING'S SAVANNAH SPARROW

**Scientific Name**:
*Passerculus sandwichensis beldingi*

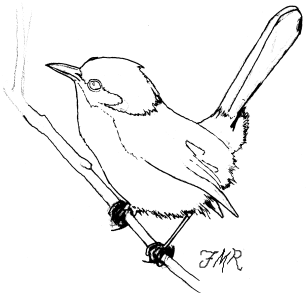
**Size**:
5.5 inches long

**Diet**:
carnivorous: insects

**Predators**:
domestic cats, red foxes

**Features**: This species of sparrow has dark streaks on its body and a yellow supercillium (eyebrow).

**Facts**: Belding's Savannah Sparrow nests in the pickleweed at the higher elevations of the Upper Newport Bay salt marsh, above the reach of the highest tide. It is adapted to drinking saltwater. This sparrow is non-migratory, which means it lives in the salt marsh all year. It is endangered by loss of habitat, meaning that it is illegal to impact any area where the species is known to occur. Belding's Savannah Sparrow is one of two wetland-dependent bird species endemic to coastal salt marshes in southern California.



| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native<br>Threatened | Upland | Secondary Consumer |

**Common Name**:
CALIFORNIA GNATCATCHER

**Scientific Name**: *Polioptila californica californica*

**Size**: 4 inches long

**Diet**:
carnivorous: insects

**Predators**: raccoons, foxes, cats, rodents, crows, scrub-jays, and snakes will eat eggs and young

**Features**: This tiny bird has a black tail with narrow white edges showing from below. Males are slate-blue on back, paler gray underneath, with a black cap in summer. Females are gray-brown. The Gnatcatcher uses its small beak to glean insects out of the air. The bird is easily identified by its song: a kittenlike *meeyew*.

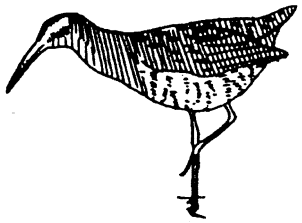
**Facts**: This nervous little bird is non-migratory, which means that it lives in Upper Newport Bay all year, and it dwells mainly in the coastal sage scrub. The removal of invasive plants improves habitat for this threatened bird. Pairs mate for life and share the tasks of nest building, raising and feeding their young, and driving off predators. A nesting pair can raise two to three broods of young in a season. Their territory is usually a one- to two-acre area that they do not leave during nesting season. Because of loss of habitat, the young may move only one or two miles to find a mate and a new territory.

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Mudflat<br>Salt Marsh<br>Riparian | Secondary Consumer |

**Common Name**:
GREAT BLUE HERON
**Scientific Name**:
*Ardea herodias*
**Size**: 4 feet tall;
wingspan to 6 feet;
weighs 5 pounds
**Diet:** carnivorous:
small fish, frogs, salamanders, lizards, snakes, crawfish, small birds, rodents, insects
**Predators**: bobcats

**Features**: The Great Blue Heron is a huge, long-legged, long-necked wader. It has special neck vertebrae that create an "S" shape, which allows the neck to curl up like a spring to attack prey. It also allows the heron to fold its neck while flying. Great Blue Herons are bluish gray in color with a black crown stripe on a whitish head.

**Facts**: This large heron is usually seen resting in the marsh or fishing in tidal creeks and the shallow waters of the mudflats at high tide. Great Blue Herons are one of the top predators of the Bay food chain. They are commonly seen standing motionless in freshwater or saltwater shallows waiting for small fish, frogs, or invertebrates to pass by. They use their massive bills to spear their prey, toss it into the air, and swallow it whole.

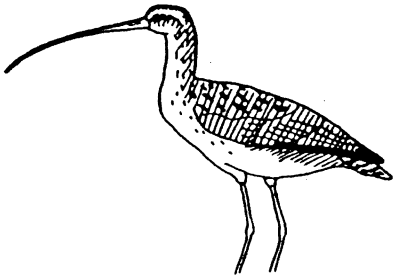


| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native<br>Endangered | Salt Marsh | Secondary Consumer |

**Common Name**:
LIGHT-FOOTED
CLAPPER RAIL
**Scientific Name**:
*Rallus longisrostris levipes*
**Size**: 14.5 inches long
**Diet**: carnivorous:
small crabs, clams, mussels, snails, worms, small fish, insects, mice, birds, eggs
**Predators**: raccoons, red foxes, rats, cats, skunks, hawks, falcons, herons

**Features**: The Light-footed Clapper Rail is a chicken-sized, brownish wading bird with a cinnamon-colored breast. It has long legs and toes for walking on the salt marsh grasses. It has a long, sturdy, slightly down-curved bill.

**Facts**: A secretive, elusive bird, the Light-footed Clapper Rail prefers areas with a dense cover of pickleweed and cordgrass. It uses hollow grasses to build a floating nest that it weaves into the surrounding vegetation so that the nest rises with the tide but doesn't float away. Parents will defend their nest, and you will commonly hear "clapping" calls as the young establish their pecking order. Clapper Rails are good runners, but they don't fly well. They are year-round residents at Upper Newport Bay. Nearly 70% of the Light-footed Clapper Rails in existence live in Upper Newport Bay.



| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Mudflats | Secondary Consumer |

**Common Name**:
LONG-BILLED CURLEW

**Scientific Name**:
*Numenius americanus*

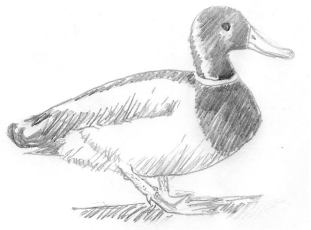
**Size**: 19 to 26 inches long

**Diet**: carnivorous: insects, worms, small crustaceans, mollusks

**Predators**: coyotes, red foxes, raccoons, snakes

**Features:** The long-billed curlew is the largest shorebird in North America. It is speckled brown with a small head, large body, and long, decurved bill (downward-curved, versus recurved, which is up-turned). The male and female look alike.

**Facts:** Curlews use their long bills to probe the mud for invertebrates and are able to reach a food niche that other shorebirds cannot. Curlews are migratory and spend only the winter in the Bay. When a predator threatens, male curlews will work together to defend their nests.



| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Mudflats | Primary and Secondary Consumer |

**Common Name**:
MALLARD DUCK

**Scientific Name**:
*Anas platyrhynchos*

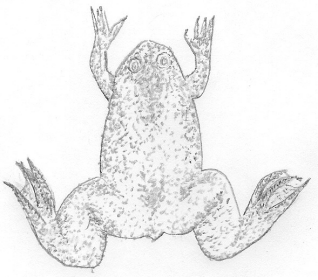
**Size**: male, 20-28 inches long; female smaller

**Diet**: omnivorous: corn, wheat, barley, bulrushes, wild rice, primrose, willow, seeds of water elm, oak, hackberry and other trees of swamps or river bottoms, mollusks, insects, small fish, tadpoles, freshwater snails, fish eggs, worms

**Predators**: Foxes, raccoons, cats; large fish will take ducklings

**Features**: Male Mallards have an iridescent green head, white neck band, rust-colored breast, very curly tail feathers, and bright orange webbed feet. The females are mottled brown for camouflage during nesting. Both sexes share a blue speculum (a bright blue rectangle of color) and a white bar on each wing. Like most ducks, the Mallard has webbed feet for swimming and a broad beak for scooping up plants and crustaceans and for straining water.

**Facts**: Mallards are known as "dabbling ducks," and unlike the "diving ducks," they just tip their heads under to feed. Mallards are agile fliers who can take off almost vertically, unlike the diving ducks who need a running start. Mallards are migratory and spend their winters in the Bay. The Mallard is the most common duck in North America. Introductions of non-native Mallards to UNB have resulted in a non-native hybridized species which can be seen in Big Canyon. Since signs have been posted to educate the public about the dangers of introducing and feeding ducks, the non-native populations are decreasing.



| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Non-native | Mudflats | Primary and Secondary Consumer Detritivore |

**Common Name**:
AFRICAN CLAWED FROG

**Scientific Name**:
*Xenopus laevis* (xenopus means "strange foot")

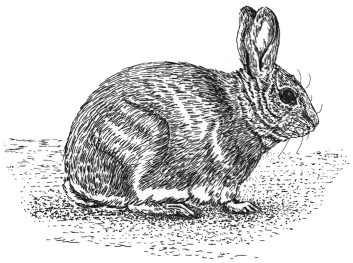
**Size**: Male, to 3 inches; female, to 6 inches.

**Diet**: omnivorous: aquatic insects, small fish, amphibians, tadpoles of its own and other frog species, detritus, anything it can get its claws on!

**Predators**: possibly great egrets

**Features**: This frog has unusually large, webbed hind feet with five long, webbed toes with dark claws on the three outer toes. It has brown skin with light brown spots, and a flat, wedge-shaped body. It has no eyelids, no visible eardrums, no teeth, no vocal chords or sac, and no tongue. Like a fish, it has a lateral line that detects vibrations in the water.

**Facts**: The African clawed frog was brought to America in the 1940s to test for pregnancy; when injected with the urine of a pregnant female, the frog produces eggs. Scientists have since found that all frogs have this capability. Crawling from puddle to puddle, clawed frogs invade golf course ponds, streams, ditches, and estuaries like Upper Newport Bay. This frog is salt tolerant and can live without food or water for up to a year by burying itself in mud and lowering its metabolism. It secretes an antibiotic, antifungal, antiparasitic, and antiviral substance that makes life possible in stagnant pools polluted by run-off. This substance is being studied for use as medicine in humans. These introduced frogs voraciously devour anything that crosses their path, including native frogs and fish, resulting in a huge disruption to the food web. Females are reproductively mature at 10 months and may produce up to 120,000 eggs in a lifetime, quickly over-taking native habitats. The importation or possession of clawed frogs is now illegal in many western states, including California.



| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Upland | Primary Consumer |

**Common Name**:
COTTONTAIL RABBIT

**Scientific Name**:
*Sylvilagus audubonii*

**Size**: 13 to 17 inches long; weighs 2 to 3 pounds; females are larger than males

**Diet**: herbivorous: 90% grass; also roots, bark, fruits, vegetables

**Predators**: coyotes, foxes, bobcats, hawks, owls, snakes, cats

**Features**: A small rabbit that is light tan to gray, with white underneath. The tail is rounded and looks like a cottonball. Cottontails have large hind feet and ears that are relatively short for rabbits.

**Facts**: Cottontails are active in the early morning, late afternoon, and at night, but may be seen at any time of the day. During the day, they may rest in the shade of large shrubs, in burrows, or within thickets. When startled or frightened, cottontails may freeze, scrunching down to blend into the surroundings, or they may run for cover. They run in a zig-zag pattern, at up to 20 miles per hour. This species has more athletic ability than many other rabbits; cottontails have been seen swimming and climbing trees to escape predators.
Females bear young year round. One cottontail mother may bear twenty to thirty young each year in four to five litters.

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Upland | Primary and Secondary Consumer |

**Common Name**: COYOTE

**Scientific Name**: *Canis latrans*

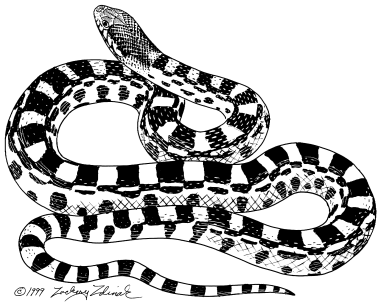
**Size**: 40 to 60 inches long; weighs 15 to 45 pounds

**Diet**: omnivorous: small mammals (cats, rabbits, squirrels, mice), fish, reptiles, birds, insects, fruits, vegetables

**Predators**: humans

**Features**: Coyotes are dog-like animals with brownish-gray fur, triangular ears, a bushy, black-tipped tail, and yellow eyes. Coyotes usually carry their tails straight down and rarely ever walk, preferring an easy lope or trot.

**Facts**: Coyotes can adapt their diet to whatever is available. Though they are predators that hunt both day and night for small mammals, they will also eat carrion, fruits, grasses, and human garbage. They have good vision and hearing and an acute sense of smell. While hunting, they can run at up to 40 miles per hour. Their adaptability enables them to survive in the suburban areas of large cities. As one of the few top predators that have survived urban encroachment, their ability to control small mammal populations makes them a very important link in the food web.



| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Upland | Secondary Consumer |

**Common Name**: GOPHER SNAKE

**Scientific Name**: *Pituophis melanoleucus*

**Size**: 5 to 6 feet long

**Diet**: carnivorous: rodents, gophers, rabbits, birds, eggs, lizards

**Predators**: hawks, foxes, coyotes

**Features**: A large, heavy snake with a yellow or cream background color and black, brown, or reddish-brown blotches on its back and sides. A dark stripe runs across its small head.

**Facts**: Gopher snakes usually hunt during the day by moving slowly through burrows and nests, using their keen sense of smell to find rodents, rabbits, or baby birds and eggs. They kill their prey by constriction and swallow it whole. If the weather is very hot, they will rest during the day and hunt at night. When a gopher snake is threatened, it hisses loudly and sometimes flattens its head and vibrates its tail, although it has no rattle. This behavior, along with the similarity in color and pattern, often causes them to be mistaken for rattlesnakes.

**Common Name**:
HUMAN BEING

**Scientific Name**:
*Homo sapiens*

**Size**: varies greatly; average 5 to 6-1/2 feet tall, 100 to 250 pounds

**Diet**: omnivorous: cows, pigs, chickens, fish, shellfish, fruits, seeds, vegetables

**Predators**: none

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Upland | Primary and Secondary Consumer |

**Features**: Humans are bipedal (two-legged) primate mammals with a highly developed brain, a capacity for articulate speech and abstract reasoning, and the ability to create and use complex tools.

**Facts**: Humans inhabited Upper Newport Bay over 9,000 years ago. Native Americans known as the Tongva (or Gabrielinos) were here 2,000 years ago, subsiding on fish and plants in the Bay. Humans are able to live in any climate or zone. They are at the top of the food chain. Their activities often cause changes in the environment. In Orange County, where Upper Newport Bay is located, the human population has exploded over the past 50 years, from 216,224 in 1950 to 2,978,800 in 2003—almost 14 times as many people—making it the fifth most populated county in the nation.

**Common Name**:
RACCOON

**Scientific Name**:
*Procyon lotor*

**Size**: 26 to 40 inches long; weighs 10 to 30 pounds

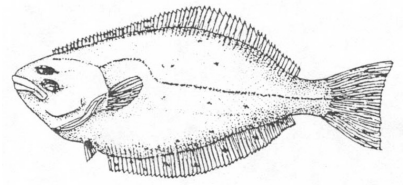
**Diet**: omnivorous: fish, shellfish, frogs, salamanders, insects, birds, eggs, mice, carrion, fruit, nuts, vegetation, corn, cat food, human garbage

**Predators**: bobcats, coyotes, foxes, owls, dogs, humans

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Upland<br>Riparian<br>Coastal | Primary and Secondary Consumer |

**Features**: Raccoons are easily recognized by the black "mask" across their eyes and bushy, ringed tail. Their long, coarse hair is grayish with black tips, and they have a broad head with a pointed snout. Their finger-like toes are long, thin, and flexible, making them able to handle objects very much like humans.

**Facts**: Raccoons are highly opportunistic and will eat just about anything they can get, which enables them to thrive in many cities as well as wilderness areas. Raccoons are typically active at night, looking for food and often "washing" or dipping their food in water. In some areas, raccoons have become pests, able to open doors and trash cans in their hunt for food.



**Common Name**:
CALIFORNIA HALIBUT

**Scientific Name**:
*Paralichthys californicus*

**Size**: up to 5 feet long; weighs up to 72 pounds

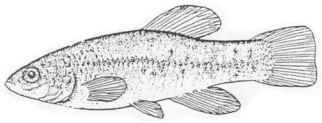
**Diet**: carnivorous: small fish, squid

**Predators**: sharks, sea lions, humans

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Open Water | Secondary Consumer |

**Features**: The California halibut is a flatfish, distinguished by its large mouth with sharp teeth and a line running along its side that arches up and over its fin. The upper side, where the eyes are, is brown to gray-green with splotches, and the underside is white. Like most flatfish, a halibut's eyes migrate from an initial left-right symmetric position to one side of the body. Whereas most flatfish are either right-eyed or left-eyed, California halibut can be both. In UNB, 68 percent of this species have their eyes located on the left side. If the eye does not migrate properly, the fish's brain doesn't turn off pigment production on the bottom side and both sides remain colored.

**Facts**: A California halibut can match its skin coloration to whatever bottom it lies on, and it can bury itself up to its eyes in the sand. Halibut feed by swimming in anchovy schools and even leap out of the water in pursuit of an anchovy. During spawning season, halibut migrate to shallower water to lay their eggs. When hatched, many halibut make their way to UNB and other wetland waters, where they spend their juvenile lives enjoying protection from open ocean predators. The largest halibut caught in the Bay weighed over 50 pounds! Halibut in Newport Bay have shown potentially dangerous levels of PCBs and DDT and may pose a health hazard if eaten, according to Orange County health officials.



**Common Name**:
CALIFORNIA KILLIFISH

**Scientific Name**:
*Fundulus parvipinnis*

**Size**: 2 to 4 inches long

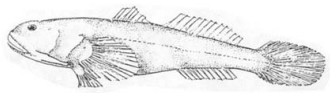
**Diet**: omnivorous: insects, amphipods, copepods, algae, worms, fish eggs, snails

**Predators**: herons, egrets, ducks, larger fish, humans (sportfishers use killifish as bait)

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Brackish Water | Primary and Secondary Consumer |

**Features**: The killifish is pale olive green with splotches on the upper surface. The fins are transparent, becoming bright yellow in the breeding season. The male has about 20 crossbars; the female has seven to eight. The killifish has a protruding lower jaw and a tilted mouth for surface feeding.

**Facts**: These small fish are commonly found in salt marshes. They tolerate a wide range of temperatures and salinities, from fresh to seawater, making them good bait fish. When disturbed, they often bury themselves head-first in the mud. While most fish have external fertilization, killifish have internal fertilization and give birth to live young. Killifish host the adult stage of a parasite that depends on the fish being eaten by a bird to complete its life cycle. To increase the chance that the killifish is eaten by a bird, the parasite infects the fish's brain, causing it to swim erratically at the surface to attract a bird's attention.



**Common Name**:
LONGJAW MUDSUCKER

**Scientific Name**:
*Gillichthys mirabilis*

**Size**: up to 4 inches long

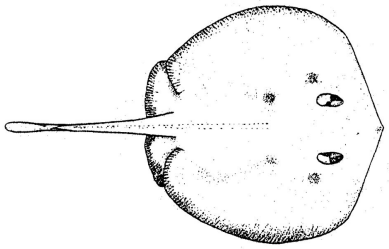
**Diet**: carnivorous: ghost shrimp, crabs

**Predators**: larger fish, egrets, herons, humans (sportfishers use the mudsucker as bait)

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Mudflats | Secondary Consumer |

**Features**: This fish is brownish to olive in color with dark spots. It has a large mouth with the upper jaw reaching as far back as the pectoral fin. The face is bluntly rounded. The pelvic fins unite to form a deep, pocketed cup which allows the fish to attach to the substrate.

**Facts**: Mudsuckers are adapted specifically for life on the mudflats. They are able to burrow into the mud and survive under extreme conditions of reduced oxygen and elevated temperature. Instead of breathing with gills like most fish, longjaw mudsuckers absorb oxygen from the air through veins in their mouths. Because of their ability to live many minutes or even hours without breathing, mudsuckers are being studied for a cure for sleep apnea, a disorder in which people stop breathing periodically during their sleep. Male mudsuckers build nests in mud banks and defend their territories by raising their fins, which turn black, opening their jaws wide, and pushing intruders with their mouths.



**Common Name**:
ROUND STINGRAY

**Scientific Name**:
*Urolophus halleri*

**Size**: up to 22 inches long

**Diet**: carnivorous: worms, crabs, clams

**Predators**: northern elephant seal, sharks

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Sandy Bay Bottom | Secondary Consumer |

**Features**: The round stingray gets its name from its flat, nearly circular body. The tail is longer than the body and contains a poisonous barb about halfway down its length. This ray is grayish brown on top, sometimes with white spots, and yellowish below.

**Facts**: Round stingrays lay motionless during the day and dig for worms and crustaceans at night. When the rays rest on the bottom they use their spiracles—"holes" on the top of their bodies—to breathe instead of their gills, which are located on the underside of their bodies. If stepped on, the stingray arches its tail and jabs the spine into the swimmer's foot or leg. The painful wound may be treated with hot water, which breaks down the neurotoxin released from the barb. The females are ovoviparous, which means eggs hatch inside the mother's body and she gives birth to live young. When the babies are born, they are rolled up in a cigar shape so that the mother is not harmed by the barb when she gives birth. Stingrays are born in shallow waters, where they stay until they are large enough—and brave enough—to venture into deeper seas.

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Open Water | Secondary Consumer |

**Common Name**: GRAY SMOOTHHOUND SHARK

**Scientific Name**: *Mustelus californicus*

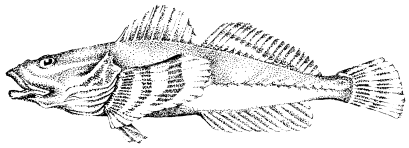
**Size**: 2 to 4 feet long; females are larger than males

**Diet**: carnivorous: worms, clams, crabs, shrimp, octopuses, small fish

**Predators**: humans

**Features**: This shark's body is long and slender, and its head has a long, flattened snout. Coloration is brown to dark gray above and whitish below. This counter-shading is an adaptation that helps camouflage; seen from below a white belly will blend with surface light, from above the dark body disappears into the background. The gray smoothhound shark has short, blunt teeth and small grinding plates that are well adapted to feeding on shellfish.

**Facts**: These sharks often form loose schools with leopard sharks. Sometimes called sand sharks, mud sharks, palomas, or dogfish, smoothhound sharks are found frequently in the Upper Newport Bay, usually near Newport Dunes or Big Canyon. They spend most of their lives in the protected waters of bays or estuaries, and are rarely found outside of this type of protected water. Females give birth to living young (viviparity) as opposed to laying eggs (oviparity).



| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Open Water Mudflats | Primary and Secondary Consumer |

**Common Name**: STAGHORN SCULPIN

**Scientific Name**: *Leptocottus armatus*

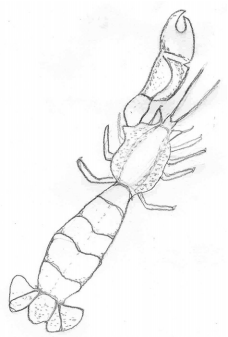
**Size**: up to 1 foot long

**Diet**: omnivorous: crustaceans, shrimp, mollusks, worms, small fish, plant material

**Predators**: egrets, herons, humans

**Features:** Sculpins have large depressed heads with large mouths. Their eyes are located high on the head. Their tapering bodies are elongated, scaleless, and slimy. The pectoral fins are yellow with dark crossbars, and the spiny dorsal fin has a large dark spot. The most striking characteristic of this species is an antler-like spine located just forward of the gill cover.

**Facts:** The Pacific staghorn sculpin can actually walk on its pectoral fins. To protect itself from predators, its body color blends with the environment, a defense mechanism known as crypsis. Other defense mechanisms include burying itself in the sand to hide or erecting its spines to warn-off predators.



**Common Name**:
BAY GHOST SHRIMP

**Scientific Name**:
*Callianassa californiensis*

**Size**: 4 to 5 inches long

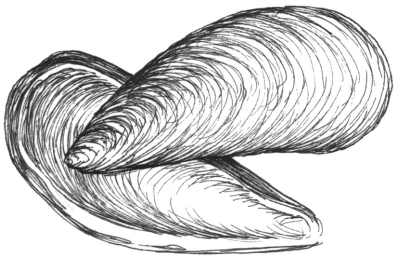
**Diet:** omnivorous: plankton, detritus

**Predators**: fish, sharks, shorebirds, humans (sport-fishers use a device called a slurp gun to suck the shrimp out of their burrows to use as bait)

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Mudflats | Primary and Secondary Consumer Detritivore |

**Features**: The soft shell of this shrimp is pale pink and orange. The adult males have one pincer that is much larger than the other. The ghost shrimp has four pairs of legs and a large fan-shaped tail.

**Facts**: This shrimp burrows constantly, forming ever-changing tunnels as deep as 30 inches with many branches. It extends its fourth pair of legs against the walls of its burrow for support while digging with the second and third pairs. Its tail is used to block burrow entrances for protection. It filters and ingests detritus and plankton from the continuous stream of mud that circulates through its burrow as it digs. Other invertebrates, such as pea crabs and scale worms, live commensally in the bay ghost shrimp's burrows, finding leftover food and protection from predators. The bay ghost shrimp can tolerate large changes in salinity and live without oxygen for more than five days by lowering its heart rate and respiration. Due to their burrowing activity, ghost shrimp play an important role in turning over and aerating the bottom sediments of Upper Newport Bay, similar to the earthworm's function on land.



**Common Name**:
BAY MUSSEL

**Scientific Name**:
*Mytilus edulis*

**Size**: 4 to 5 inches long, 2 to 3 inches wide

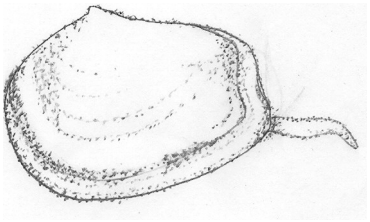
**Diet:** omnivorous: detritus, plankton

**Predators**: seastars, snails, crabs, ducks, sea birds, humans

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Mudflats | Primary Consumer Detritivore |

**Features**: The bay mussel is a bivalve (two-shelled) mollusk with a dark, blue-black shell. Mussels grow in large clumps on rocks and man-made structures such as piers and docks.

**Facts**: Mussels attach themselves to rocks and to each other by secreting a thick liquid that in saltwater forms thread-like fibers called "byssal threads." Byssal threads are an area of interest to scientists because they have a tensile strength similar to steel! The tangled mass of mussels and byssal threads forms homes for numerous small creatures.
As the bay mussel feeds, its shell opens slightly and tiny hairs, or cilia, beat rhythmically to draw in water carrying tiny particles of food. To collect enough food to survive, a mussel filters two to three quarts of water an hour, helping to clean the Bay of excess nutrients from run-off. Mussels will reproduce unchecked if their predators are removed. Mussels are cultivated extensively for food in Europe, but this delicacy is generally overlooked in California.



**Common Name**:
BENTNOSE CLAM

**Scientific Name**:
*Macoma nasuta*

**Size**: up to 2 inches long

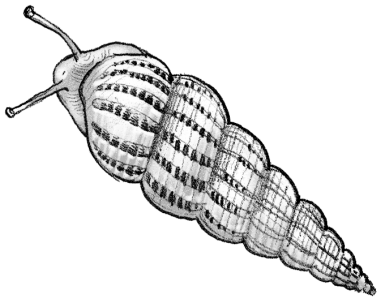
**Diet:** filter feeder: detritus, bacteria, plankton

**Predators**:
shorebirds, moon snail

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Mudflats | Primary Consumer<br>Detritivore |

**Features**: The bentnose clam is a bivalve (two-shelled) mollusk with a whitish shell. It has two white, very long siphons that become orange when contracted. This clam always lies on its left side with the bend in its shell turned upwards, following the curve of the siphons. When viewed edge-on, its shells are bent to the right side, giving it the name "bentnose clam."

**Facts**: This clam is commonly found buried four to six inches deep in Upper Newport Bay. It buries itself in the mud and sand with its muscular foot. When burrowing, it goes in at an angle, sawing back and forth like a coin sinking in water. It uses its siphons to sweep the bay floor like a vacuum, bringing seawater into its body and filtering out detritus and plankton for food. Native Californians made extensive use of the bentnose clam for food; many of their refuse piles of shells—called middens—contain more shells of this species than any other.



**Common Name**:
CALIFORNIA HORN SNAIL

**Scientific Name**:
*Cerithidea californica (cerith is Greek for 'horn')*

**Size**: 1-3/4 inches long

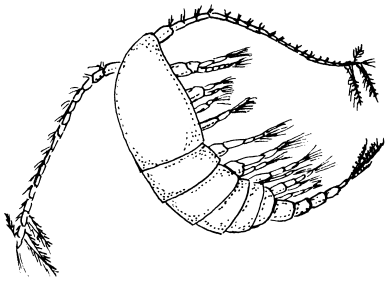
**Diet:** herbivorous: detritus and benthic diatoms (which form a dense mucus mat on the surface of the mud)

**Predators**:
killifish, shorebirds

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Mudflats | Primary Consumer |

**Features**: This snail is slender, from one to one and three-quarter inches long with a brown, spiral shell.

**Facts**: The California horn snail is the most common snail on the mudflats of UNB, often forming dense clusters exposed at low tide, as if someone spilled a package of chocolate chips on the mudflat. This snail has the important role of cleaning decaying plants and algae from the mudflats, upholding wetlands' reputation for high productivity. It is extremely tolerant of estuarine conditions, being able to survive for many days in fresh water. Studies have found the local population to be infected with numerous parasites that are transferred to the birds and fish feeding on the horn snails.

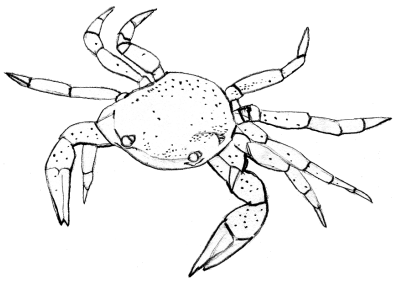


**Common Name**:
COPEPOD
*(means "oar feet")*
**Scientific Name**:
There are 10 orders and 4,500 species, example:
*Calanus finmarchicus*
**Size**:
microscopic to 1/4 inch long
**Diet:** plankton
**Predators**: mussels, fish and fish larvae, squid, sea birds, baleen whales, some seals

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Water in all zones | Primary Consumer |

**Features**: Copepods are tiny, shrimp-like crustaceans with a hard exoskeleton, ten jointed legs, and a segmented body. The legs are used for swimming and the abdomen functions like a rudder, to help copepods steer. Copepods have a single simple eye in the middle of the head (sometimes it is present only in the larval stage), which can differentiate between light and dark. They have two pairs of antennae; one pair is long and one pair is short.

**Facts:** Copepods comprise the largest group of zooplankton. Found almost everywhere there is water, copepods constitute the biggest source of protein in the oceans. Scientists have found up to 1,000 copepods in one liter of water when abundance peaks in September. Small fish feed on copepods and are in turn eaten by bigger fish, sea birds, and seals. Thus, copepods are the foundation for many aquatic food webs.



**Common Name**: LINED OR STRIPED SHORE CRAB
**Scientific Name**:
*Pachygrapsus crassipes*
**Size**: carapace up to 2 inches wide
**Diet:** omnivorous: algae and diatoms, dead animal matter, small live prey (limpets, snails, hermit crabs)
**Predators**: birds, rats, raccoons, humans

| Status: | Habitat: | Trophic Level: |
|---|---|---|
| Native | Salt Marsh Mudflats | Primary and Secondary Consumer Detritivore |

**Features**: This small crab has two claws tipped with small spoon-shaped cups to scrape algae off rocks. It has a hard shell that is green, black, or purple with horizontal stripes in green or white.

**Facts**: Abundant in crevices, mussel beds, and hard muddy shores, this crab has adapted to spending at least half its time on land by retaining water in its gill chamber. It submerges now and then to wet its gills and feed. To grow, crabs must periodically shed their shells (molt). To escape enemies, crabs can shed their legs or claws, which regenerate after a few molts. To defend itself, this crab runs quickly—sideways or backwards—or fights with its pincers. Combined with tidal action, the burrows dug by shore crabs will undercut the pickleweed on the banks and cause whole sections of salt marsh to collapse into the bay, expanding the mud flat habitat.

# APPENDIX B
## Species Common to Upper Newport Bay

### Plants

arroyo willow
black mustard
broadleaf cattail
bush sunflower
California sagebrush
California buckwheat
cordgrass
cottonwood
eel grass
elderberry
giant reed
ice plant
Laguna live-forever
mulefat
Myoporum tree
pampas grass
pepper tree
phytoplankton
pickleweed
prickly pear cactus
saltbush
salt grass
salt marsh bird's beak
sea lavendar
sweet fennel
toyon
yellow star thistle

### Birds

American Avocet
American Coot
Anna's Hummingbird
Belding's Savannah Sparrow
Black-necked Stilt
Black Skimmer
Brown Pelican
California Gnatcatcher
Common Yellowthroat
Cormorant
Eared grebe
Forster's Tern
Great Blue Heron
Great Egret
Light-footed Clapper Rail
Long-billed Curlew
Mallard Duck
Marbled Godwit
Marsh Wren
Northern Harrier
Osprey
Pintail Duck
Red-tailed Hawk
Red-winged Blackbird
Ring-billed Gull
Ruddy Duck
Snowy Egret
Turkey Vulture
Western Sandpiper
Willet

### Land Animals

African clawed frog
California ground squirrel
common king snake
cottontail rabbit
coyote
deer mouse
gopher snake
human
Pacific chorus frog
raccoon
red fox
southern alligator lizard
striped skunk
western fence lizard
western pond turtle
western rattlesnake

### Fish

barred sand bass
bat ray
bluegill
California killifish
California halibut
croaker
C-O turbot
deepbody anchovy
diamond turbot
smoothhound shark
leopard shark
longjaw mudsucker
mosquitofish
opal eye
round stingray
spotted bay bass
shiner surfperch
shovelnose guitarfish
staghorn sculpin
topsmelt

### Other Marine Animals

annelid worms
bay ghost shrimp
bay mussels
bentnose clam
California horn snail
scallops
striped shore crab
zooplankton

# APPENDIX C

## Environmental Organizations

The following is a brief list of organizations and agencies that offer programs related to wetlands, the coast, and/or the ocean. They may provide field trips, informational material, expert advice, or other resources. Contact the organizations directly for details. For an up-to-date, more extensive list of organizations, along with information about their programs, visit the California Coastal Commission's "Marine, Coastal & Watershed Resource Directory" at www.coastforyou.org.

### Southern California Focus

Acorn Naturalists
155 El Camino Real
Tustin, CA 92780
(800) 422-8886
*www.acornnaturalists.com*

Amigos de Bolsa Chica
16531 Bolsa Chica Street Suite 312
Huntington Beach, CA 92649
(714) 840-1575
*www.amigosdebolsachica.org*

Aquarium of the Pacific
100 Aquarium Way
Long Beach, CA 90802
(562) 590-3100
*www.aquariumofpacific.org*

Aquatic Adventures Science Education Foundation
1010 Santa Clara
San Diego, CA 92109
(858) 488-3849
*www.aquaticadventures.org*

Back Bay Science Center
600 Shellmaker Road
Newport Beach, CA 92660
(949) 640-9956
*www.backbaysciencecenter.org*

The Birch Aquarium at Scripps
9500 Gilman Drive, Dept. 0207
La Jolla, CA 92093
(858) 534-FISH
*www.aquarium.ucsd.edu*

Bolsa Chica Conservancy
3842 Warner Avenue
Huntington Beach, CA 92469
(714) 846-1114
*www.bolsachica.org*

Bolsa Chica Land Trust
5200 Warner Avenue #108
Huntington Beach, California 92649
(714) 846-1001
*www.bolsachicalandtrust.org*

Cabrillo Marine Aquarium
3720 Stephen White Drive
San Pedro, CA 90731
(310) 548-7562
*www.cabrilloaq.org*

The Catalina Island Marine Institute
P.O. Box 1360
Claremont, CA 91711
909-625-6194
*www.guideddiscoveries.org/cimisite/school.htm*

Catalina Environmental Leadership Program
P.O. Box 5083
Avalon, CA 90704
(800) 696-2267
*www.celp.net*

Chula Vista Nature Center
1000 Gunpowder Point Drive
Chula Vista, CA 91910
(619) 409-5900
*www.chulavistanaturecenter.org*

City of Newport Beach
Tide Pool Preservation Project
829 Harbor Island Drive
Newport Beach, CA 92660
(949) 644-3038
*www.city.newport-beach.ca.us/hbr*

Community Environmental Council
Watershed Resource Center
2981 Cliff Drive
Santa Barbara, 93109
(805) 682-6113
*www.communityenvironmentalcouncil.org*

Crystal Cove Interpretive Association
8471 Pacific Coast Highway
Laguna Beach CA 92651
(949) 494-3539
*www.crystalcovestatepark.com*

Defend the Bay
471 Old Newport Boulevard, Suite 200
Newport Beach, CA 92663
(949) 722-7822
*www.defendthebay.org*

Earth Resource Foundation
230 E. 17th Street, Suite 208
Costa Mesa, CA 92627
(949) 645-5163
*www.earthresource.org*

El Dorado Nature Center
7550 East Spring Street
Long Beach, CA 90815
(562) 570-1745
*www.ci.long-beach.ca.us/park*

Environmental Nature Center
1601 Sixteenth Street
Newport Beach, CA 92663
(949) 645-8489
*www.ENCenter.org*

Inside the Outdoors
Orange County Department of Education
200 Kalmus Drive
Costa Mesa, CA 92628
(714) 708-3885
*www.insidetheoutdoors.org*

Heal the Bay
3220 Nebraska Avenue
Santa Monica, CA 90404
(800) HEAL-BAY
*www.healthebay.org*

Heal the Ocean
P.O. Box 90106
Santa Barbara, CA 93190
(805) 965-7570
*www.healtheocean.org*

Long Beach Marine Institute
Box 281
6475 E. Pacific Coast Highway
Long Beach, CA 90803
(562) 431-7156
*www.longbeachmarineinst.com*

I Love A Clean San Diego
4891 Pacific Highway, Suite 115
San Diego, CA 92110
(619) 291-0103
*www.ilacsd.org*

Malibu Foundation
for Environmental Education
1471 S. Bedford Street #3
Los Angeles, CA 90035
(310) 652-4324
*www.malibufoundation.org*

Mountain and Sea Adventures
P.O. Box 5084
Avalon, CA 90704
(310) 510-2695
*www.mountainandsea.org*

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007
(213) 763-DINO
*www.nhm.org*

Santa Barbara Museum of Natural History, Ty Warner Sea Center
211 Stearns Wharf
Santa Barbara, CA 93101
(805) 962-2526
*www.sbnature.org/seacenter*

Newport Bay Naturalists and Friends
600 Shellmaker Road
Newport Beach, CA 92660
(949) 640-6746
*www.newportbay.org*

Ocean Institute
24200 Dana Point Harbor Drive
Dana Point, CA 92629
(949) 496-2274
*www.ocean-institute.org*

Orange County Coastkeeper
441 Old Newport Boulevard,
Suite 103
Newport Beach, CA 92663
(949) 723-5424
*www.coastkeeper.org*

Peter & Mary Muth
Interpretive Center
2301 University Drive
Newport Beach, CA 92660
(949)923-2290
*www.ocparks.com/unbic*

Roundhouse Marine Studies Lab
& Aquarium
End of the Manhattan Beach Pier
Manhattan Beach, CA 90266
310-379-8117
*www.roundhousemb.com*

San Diego Baykeeper
2924 Emerson Street, Suite 220
San Diego, CA 92106
(619) 758-7743
*www.sdbaykeeper.org*

San Dieguito River Park
18372 Sycamore Creek Road
Escondido, CA 92025
(858) 674-2270
*www.sdrp.org*

Santa Monica BayKeeper
P.O. Box 10096
Marina del Rey, CA 90295
(310) 305-9645
*www.smbaykeeper.org*

Santa Monica Bay
Restoration Commission
320 West 4th Street,
Suite 200
Los Angeles, CA 90013
(213) 576-6615
*www.santamonicabay.org*

Sea and Sage Audubon Society
P.O. Box 5447
Irvine, CA 92616
(949) 261-7963
*www.seaandsageaudubon.org*

Sea Camp San Diego
1380 Garnet Avenue
PMB E6
San Diego, CA 92109
(858) 268-0919
*www.seacamp.com*

SeaLab in Redondo Beach
1021 North Harbor Drive
Redondo Beach, CA 90277
(310) 318-7438
*www.lacorps.org*

Southern California Coastal Water
Research Project Authority
7171 Fenwick Lane
Westminster, CA 92683
(714) 894-2222
*www.sccwrp.org*

Southern California Marine Institute
820 South Seaside Avenue
Terminal Island, CA 90731
(310) 519-3172
*www.scmi.us*

Southern California Wetlands
Recovery Project
P.O. Box 22405
Santa Barbara, CA 93121
(805) 892-4858
*www.scwrp.org*

University of Southern California
Sea Grant Program
University Park, AMF 209
Los Angeles, CA 90089-0373
(213) 740-1961
*www.usc.edu/org/seagrant*

## Statewide Focus

Adopt-A-Watershed
P.O. Box 1850
Hayfork, CA 96041
(530) 628-5334
*www.adopt-a-watershed.org*

Algalita Marine Research Foundation
148 Marina Drive
Long Beach, CA 90803
(562) 598-4889
*www.algalita.org*

California Aquatic Science Education Consortium (CASEC)
*www.rain.org/casec*

California Center for Ocean Sciences Education Excellence (COSEE)
*www.cacosee.net*

California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105
(800) Coast-4U
*www.coastforyou.org*

California Coastal Conservancy
1330 Broadway, 11th Floor
Oakland, CA 94612
(510) 286-1015
*www.coastalconservancy.ca.gov*

California Department of Conservation
California Geological Survey
801 K Street, MS 12-30
Sacramento, CA 95814
(916) 445-1825
*www.consrv.ca.gov/cgs*

California Department of Fish and Game
1416 Ninth Street
Sacramento, CA 95814
(916) 445-0411
*www.dfg.ca.gov*

California Department of Water Resources
1416 Ninth Street
Sacramento, CA 95814
(916) 653-5791
*www.dwr.water.ca.gov*

California Native Plant Society
2707 K Street, Suite 1
Sacramento, CA 95816
(916) 447-2677
*www.cnps.org*

California State Parks
1416 Ninth Street
Sacramento, CA 95814
(800) 777-0369
*www.parks.ca.gov*

California Regional Environmental Education Community (CREEC) Network
*www.creec.org*

Keep California Beautiful
3914 Murphy Canyon Road, Suite A-218
San Diego, CA 92123
(858) 505-9936
(800) CLEAN-CA
*www.keepcaliforniabeautiful.com*

State Water Resources Control Board
1001 I Street
Sacramento, CA 95814
(916) 341-5250
*www.waterboards.ca.gov*

Surfrider Foundation
P.O. Box 6010
San Clemente, CA 92674-6010
(949) 492-8170
*www.surfrider.org*

The Ocean Conservancy
2029 K Street
Washington, DC 20006
(202) 429-5609
*www.oceanconservancy.org*

U.S. Geological Survey
Marine and Coastal Issues
345 Middlefield Road, MS 999
Menlo Park, CA 94025
(650) 329-5042
*walrus.wr.usgs.gov*

Water Education Foundation
717 K Street, Suite 317
Sacramento, CA 95814
(916) 444-6240
*www.watereducation.org*

Wyland Foundation
*www.wylandfoundation.org*

# APPENDIX D

## Southern California Wetlands
## 5437.55 Total Salt Marsh Acres

### San Diego County – 1908 acres

**Tijuana Estuary** – 615 acres
Tijuana Estuary Visitor Center (619) 575-3613
or (619) 575-2704
Tijuana River National Estuary Research
Reserve, *www.nerrs.noaa.gov/TijuanaRiver*

**San Diego Bay** – 300 acres
Chula Vista Nature Center (619) 409-5900
U.S. Fish and Wildlife Service,
Carlsbad Field Office (760) 431-9440

**Famosa Slough** – 6 acres
City of San Diego Department of
Parks and Recreation,
Open Space Management Division
(619) 533-6713
Friends of Famosa Slough (619) 224-4591

**Mission Bay** – 231 acres
City of San Diego Department of
Parks and Recreation (619) 525-8219
UC Natural Reserve System,
Kendall-Frost Reserve (858) 534-2077

**Los Penasquitos Lagoon** – 350 acres
Torrey Pines State Park (858) 755-2063

**San Dieguito Lagoon** – 118 acres
San Dieguito River Park (858) 674-2270

**San Elijo Lagoon** – 78 acres
San Diego County Parks and Recreation
(858) 694-3049
San Elijo Lagoon Conservancy
(760) 436-3944
California Department of Fish and Game,
San Diego Field Office
(858) 467-4202

**Batiquitos Lagoon** – 100 acres
Batiquitos Lagoon Foundation
(760) 931-0800
California Department of Fish and Game,
San Diego Field Office
(858) 467-4202
U.S. Fish and Wildlife Service,
Carlsbad Field Office (760) 431-9440

**Agua Hedionda Lagoon** – 14 acres
Agua Hedionda Lagoon Foundation
(760) 804-1969

**Buena Vista Lagoon** – 14 acres
California Department of Fish and Game
(858) 467-4201
Buena Vista Lagoon Foundation
(760) 727-3866
Buena Vista Lagoon Visitor's Center
(760) 439-BIRD

**San Luis Rey River Estuary**
Riparian and mud flats
San Diego County Department of
Parks and Recreation (858) 694-3024
San Diego Association of Governments
(619) 699-1900

**Santa Margarita River Estuary** – 81 acres
U.S. Environmental Protection Agency
(415) 947-8000
U.S. Fish and Wildlife Service,
Carlsbad Field Office (760) 431-9440
U.S. Marine Corps Base Camp Pendleton, Land
Management Branch (760) 725-9728

**Las Flores Lagoon** – 1 acre
U.S. Fish and Wildlife Service,
Carlsbad Field Office (760) 431-9440
U.S. Marine Corps Base Camp Pendleton, Land
Management Branch (760) 725-9728

**San Mateo Lagoon** – mostly riparian
U.S. Marine Corps Base Camp Pendleton, Land
Management Branch (760) 725-9728
California Department of Parks and Recreation,
Orange County District (949) 492-0802

## Orange County – 1514.9 acres

**Santa Ana River Mouth Estuary** – 59 acres
U.S. Army Corps of Engineers,
Los Angeles District (213) 452-3908/3333
Orange County Resources and Development
Management Department (714) 834-4643

**Upper Newport Bay** – 382 acres
Newport Bay Naturalists and Friends
(949) 640-6746
Orange County Harbors, Beaches and Parks
(949) 923-2290
California Department of Fish and Game
Regional Headquarters (858) 467-4201
California Department of Fish and Game,
Upper Newport Bay Ecological Reserve
(949) 640-9958
Orange County Resources and Development
Management Department (714) 834-4643

**Huntington Beach Wetlands**
125 acres: 11 restored/ 114 degraded
City of Huntington Beach Community Services
(714) 536-5486
Orange County Resources and Development
Management Department (714) 834-6192

**Bolsa Chica Wetlands** – 368 acres
City of Huntington Beach Community Services
(714) 536-5486
California Department of Fish and Game
(949) 640-9958
Amigos de Bolsa Chica (714) 840-1575
Bolsa Chica Conservancy (714) 846-1114
Bolsa Chica Land Trust (714) 846-1001

**Anaheim Bay** – 566 acres
City of Huntington Beach Community Services
(714) 536-5486
Seal Beach National Wildlife Refuge Visitor
Center (562) 598-1024
Seal Beach Naval Weapons Station
(562) 626-7215
City of Seal Beach (562) 431-2527

**Hellman Ranch** – 14.9 acres
Dave Bartlett, consultant to the major landowner
(714) 898-0600
California Coastal Commission,
Southern Coast Area Office
(562) 590-5071

## Los Angeles County – 698.7 acres

**Los Cerritos Wetlands** – 19.2 acres

**Jack Dunster Marine Reserve** – 1.4 acres
**Golden Shores Marine Reserve** – 6.4 acres
City of Long Beach
*www.longbeach.gov/park/facilities/parks*

**Ballona Wetlands** – 39 acres
Friends of Ballona Wetlands Education/Ecology Center (310) 306-5995

**Del Rey Lagoon**
**Malibu Lagoon** – 17.7 acres
Santa Monica Mountains
Resource Conservation District
(310) 455-1030
California Department of Parks and Recreation, Los Angeles County District (818) 880-0350
City of Malibu (310) 456-2489

## Ventura County – 1061.9 acres

**Mugu Lagoon** – 943.5 acres
Naval Base Ventura County Public Affairs Office
(805) 989-8094

**Ormond Beach Wetlands** – 100 acres
City of Oxnard –
Department of Community Development
(805) 385-7407

**Santa Clara River Estuary** – 5.2 acres
Ventura County Watershed Protection
(805) 654-2001

**Ventura River Estuary** – 13.2 acres
City of San Buenaventura (805) 654-7800
Ojai Valley Land Consevancy (805) 646-7930

## Santa Barbara County – 254.05 acres

**Carpinteria Salt Marsh** – 133 acres
City of Carpinteria (805) 684-5405
Land Trust for Santa Barbara County
(805) 966-4520
UCSB Natural Reserve System (805) 893-2401

**UCSB Campus Lagoon** – 1.75 acres
Cheadle Center for Biodiversity and Ecological Restoration (805) 893-2506
UCSB Office of Campus Planning and Design
(805) 893-8430

**Goleta Slough** – 101 acres
Cheadle Center for Biodiversity and Ecological Restoration (805) 893-2506
City of Santa Barbara - Planning Division
(805) 564-5470
Santa Barbara Municipal Airport
(805) 967-7111

**Devereux Slough** – 18.3 acres
Coal Oil Point Reserve - UCSB Natural Reserve System (805) 893-5092
Devereux School - Santa Barbara
(805) 968-2525

# APPENDIX E

## Correlations to California State Standards for Grade 9–12

| Activity | Science | English-Language Arts | History/Social Science | Mathematics |
|---|---|---|---|---|
| **Mapping Your Watershed** | B 6b<br>E 9a,c<br>I 1h | | | |
| **Wetland Habitats** | B 6e<br>I 1g | | | |
| **Explore a Wetland** | B 6a,b,e<br>I 1c,j,k | | | |
| **Wetland Webs** | B 6e,f | 9-10 R 2.3, 2.5<br>9-10 LS 2.2b,e; 2.3a,b,d,e,f; 2.6a,b,c<br>11-12 LS 1.8 | | |
| **Wetland Soil** | B 6d<br>I 1c,g,i,j,k | 9-10 R 2.3 | | |
| **Measuring Decomposition** | C 3a,e; 5a,d; 6d; 8a,b,c<br>B 6d,e<br>I 1a,c,g,j | | | AI 3.0, 15.0 |
| **Changes Over Time** | B 6b<br>E 9a,c<br>I 1d,i | | | |
| **Nonpoint Source Pollution** | B 6b<br>I 1a | 9-10 W 2.3a,b,c<br>11-12 W 2.3a,b,c | | |
| **Water Quality** | C 5a,d<br>B 6b<br>I 1a,b,c | 9-10 R 2.6 | | |
| **Pollution Observation** | C 5a<br>B 6b,d<br>E 7a<br>I 1c,d,g,j | | | |

| Activity | Science | English-Language Arts | History/Social Science | Mathematics |
|---|---|---|---|---|
| **Space for Species** | B 6a,b; 8b<br>I 1a,c,d,g,k | | | PS 8.0 |
| **Species in Peril** | B 6a,b,c; 8b | 9-10 R 2.2, 2.5<br>9-10 W 1.1,1.2,1.3, 1.4,1.5,<br>9-10 2.3a,b,c,d,e,f<br>9-10 LS 1.7, 2.2a,b,c,d,e,f<br>11-12 W 1.6,1.8<br>11-12 LS 1.8 | | |
| **Castaways Park** | B 6b<br>I 1m | 9-10 R 2.3, 2.5<br>9-10 LS 1.1, 1.6, 1.9, 1.12, 1.13, 2.5a,b,c,d<br>11-12 LS 1.6, 1.8, 1.11, 1.12 | D 12.7.5<br>E 12.1.3 | |
| **Seed Experiments** | C 5a,d<br>B 6b,e<br>I 1a,b,c,d | | | PS 6.0 |
| **Plant Monitoring** | B 6a,b,c,d,e; 8b<br>I 1a,g,j,k | 9-10 LS 2.2b,c,f; 2.6c<br>11-12 LS 1.8 | | PS 8.0 |
| **Wetlands Tradeoffs** | B 6b | 9-10 R 2.3, 2.5, 2.8<br>9-10 W 1.3, 1.5<br>9-10 LS 1.3, 1.6, 1.8, 2.5a,b,c,d<br>11-12 R 2.3, 2.4, 2.5, 2.6<br>11-12 LS 1.2, 1.3, 1.6, 1.8 | D 12.7.5<br>E 12.1.1, 12.1.3, 12.1.4 | |
| **Stewardship** | B 6a,b | 9-10 W 1.1, 2.3b,c,d,e,f;<br>9-10 2.5a,b,c,d<br>11-12 R 2.1<br>11-12 W 1.3, 1.4 | D 12.7.5<br>E 12.1.3 | |

**Science**: **C**=Chemistry; **B**=Biology/Life Sciences; **E**=Earth Sciences; **I**=Investigation and Experimentation
**English-Language Arts**: **R**=Reading; **W**=Writing; **LS**=Listening and Speaking
**History/Social Science**: **D**=Principles of American Democracy; **E**=Principles of Economics
**Mathematics: AI**=Algebra I; **PS**=Probability and Statistics