Vegetation

Ventura River Watershed

Vegetation Types	Acres	% of Watershed		Acres	% of Watershed
Mixed Chaparral	74,766.64	51.62	Water	2,913.43	2.01
Coastal Scrub	18,832.62	13.00	Valley Foothill Riparian	2,568.62	1.77
Oak Woodland	18,448.40	12.74	Montane Hardwood/Conifer Forest Sierran Mixed Conifer	2469.55	1.70
Annual Grassland	9,299.97	6.42	Barren	1,541.95	1.06
Urban	7,680.69	5.30	Desert Wash	670.96	.46
Crops and Pasture	5,625.68	3.88			

Ventura River Watershed Council

Data Source:
USDA Forest Service CalVeg Existing Data
South Coast 2002-2010
Map Created by
GreenInfo Network using Esri software,
July 2014 www.greeninfo.org

Figure 3.6.1.1.1 Vegetation Communities Map

Coastal Sage Scrub

Coastal sage scrub covers 13% of the watershed's land area. It is found at lower elevations (below 3,000 feet) and closer to the coast than chaparral. It may occur on a variety of slopes and aspects from nearly level hilltops to steep dry slopes.

Coastal sage scrub is dominated by low- to moderate-sized woody shrubs and sub-shrubs (1.6 to 6.6 feet tall). Plants are generally aromatic and drought-deciduous—dropping all their leaves during summer heat to help reduce moisture loss—with a sparse herbaceous layer below.

Coastal Sage Scrub Plant Species

Common coastal sage scrub plants in the watershed include purple sage, California sagebrush, coyote brush, prickly-pear, California buckwheat, black sage, white sage, coastal goldenbush, deerweed, sticky monkeyflower, chamise, Mexican elderberry, lemonadeberry, giant wild rye, and laurel sumac.

Coast Horned Lizard. State Species of Special Concern
Photo courtesy of Mary Meyer

Oak Woodland and Oak Savanna

Oak woodlands cover 13% of the watershed's land area. They are dominated by coast live oaks— large, tall (up to 90 feet) evergreen, wide-topped trees with spine-toothed, convex, dark green leaves. Oak woodlands form when these oaks are spaced closely enough to form an intermittent to continuous canopy. Oak savannas occur where coast live oak, along with valley oak, are more widely spaced, commonly with a grassland understory.

Oak Woodlands, Wills Canyon, Ventura River Preserve
Photo courtesy of Tania Parker

Definition: Oak Woodland

Per California's Oak Woodland Conservation Act (§ 1361 (h)), an oak woodland is "an oak stand with a greater than 10 percent canopy cover or that may have historically supported greater than 10 percent canopy cover."

Oak woodlands are both upland and riparian habitat. They tend to be found at lower elevations (below 4,000 feet) in valleys, and on steep, north-facing slopes, raised stream banks, and terraces. See "Riparian Woodlands" later in this section for a discussion of coast live oak riparian woodlands.

Oak woodlands are most common across the middle section of the Ventura River watershed, especially along Sulphur Mountain and Lion Canyon Creek, and on terraces and canyons along the Ventura River such as in the Foster Park area, and in Wills and Rice Canyons in the Ventura River Preserve.

Oak savannas are landscapes dominated by grasses and herbaceous plants with a scattering of oak trees. Oak savannas are found on lower elevation rolling foothills and open valleys and terraces, often in areas where grazing impedes regeneration of shrubs or other trees.

Coast live oak is considered to be the most fire-resistant California oak tree because of its evergreen leaves, thick bark and ability to sprout from the trunk and roots using food reserves stored in an extensive root system.

Oak Woodland and Oak Savanna Plant Species

Understory vegetation in oak woodlands can vary significantly depending on conditions such as soil type, elevation, and aspect. Common understory and co-dominant species include poison oak, snowberry, hummingbird sage, gooseberry, virgin's bower, monkey-flower, purple sanicle, California figwort, heart-leaved penstemon, California wild cucumber, southern California black walnut, toyon, California bay, California buckwheat, laurel sumac, basketbush, coyote brush, greenbark ceanothus, hollyleaf cherry, blue elderberry, and California blackberry. Many typical grassland species (described in the following section) are also common in the understory of oak woodlands. Grassland species commonly dominant the understory in oak savannas.

Annual Grassland

Grasslands cover about 6% of the watershed. This habitat is commonly found at elevations below 4,000 feet, especially on gradual slopes, flats, and coastal terraces, and as an understory in scrubland, woodland, and savanna habitats. Grasslands typically grow in well-developed, deeper, fine textured soils. Areas dominated by grasses are often in early successional stages, and over time tend to give way to scrublands or woodlands.

Grasslands are dominated by low-growing annual grasses and herbs. Perennial wildflowers, as well as naturalized annual forbs (broad-leaved herbs other than grasses), are important contributors to grasslands. Most of the watershed's grasslands are dominated by non-native species, especially where physical disturbance, such as mowing, grazing, repetitive fire, agriculture, or other disruptive means have altered soils and removed native seed sources.

Annual Grassland Plant Species

Native grassland species include needlegrasses, native fescues, native bluegrass, threeawn, melic grass, wild-rye, June grass, deer grass, California poppy, lupines, owls clover, blue dicks, and farewell-to-spring. Common non-native species include slender wild oats, ripgut brome, soft chess, red brome, hare barley, slender fescue, smilo grass, foxtail fescue, black mustard, shortpod mustard, Italian ryegrass, filaree, clovers, and Russian thistle.

Grasslands with Native Blue Dicks, Ojai
Photo Courtesy of Mary Meyer

Grasslands with Non-Native Mustard, Cañada Larga. Many grasslands have been invaded by non-native mustard, as seen on these hills.
Photo courtesy of Santa Barbara Channelkeeper

Montane Hardwood and Coniferous Forests

Montane hardwood and coniferous forests are found at the highest elevations of the watershed (above 4,000 feet), and cover less than 2% of the land.

Montane Hardwood and Coniferous Forest Plant Species

Montane hardwood and coniferous forests can be dominated by varying combinations of Douglas fir, ponderosa pine, Jeffrey pine, white fir, canyon live oak, incense cedar, and western juniper.

Coniferous Trees, Dry Lakes Ridge

3.6.1.2 Wetland and Riparian Habitats

Overview

While all native habitats have intrinsic value, wetland and riparian habitats are centrally important to watershed management because of the variety of critical functions they perform and the ecosystem niches they provide, and because of their sensitivity to impacts and the associated need for protection. This overview is followed by sections that describe the important wetland and riparian habitats located in the Ventura River watershed.

Wetland Habitats

Wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface (Cowardin et al. 1979).

The official definition of "wetland" differs among regulatory agencies, but all variations involve these three elements:

Wetland Hydrology: The presence of water at or above the soil surface for a period of the year sufficient to significantly influence the plant types and soil chemistry.

Hydric Soil: Soil that is wet long enough during the growing season to develop low-oxygen conditions.

Hydrophytic Plants: Plants adapted to saturated soil conditions (VCPD 2006a).

Wetlands perform many useful functions and provide valuable assets:

> **Water Storage.** Wetlands function like natural tubs or sponges, storing water and slowly releasing it. This process slows the water's momentum and erosive potential, reduces flood heights, and allows for ground water recharge, which contributes to base flow to surface water systems during dry periods. Although a small wetland might not store much water, a network of many small wetlands can store an enormous amount of water. The ability of wetlands to store floodwaters reduces the risk of costly property damage and loss of life.
>
> **Water Filtration.** After being slowed by a wetland, water moves around plants, allowing the suspended sediment to drop out and settle to the wetland floor. Nutrients from fertilizer application, manure, leaking septic tanks, and municipal sewage that are dissolved in the water are often absorbed by plant roots and

microorganisms in the soil. Other pollutants stick to soil particles. In many cases, this filtration process removes much of the water's nutrient and pollutant load by the time it leaves a wetland. Some types of wetlands are so good at this filtration function that environmental managers construct similar artificial wetlands to treat storm water and wastewater.

Since the 1780s California has lost 91% of its wetlands (Dahl 1990).

Biological Productivity. Wetlands are some of the most biologically productive natural ecosystems in the world, comparable to tropical rain forests and coral reefs in their productivity and the diversity of species they support. Abundant vegetation and shallow water provide diverse habitats for fish and wildlife. Aquatic plant life flourishes in the nutrient-rich environment, and energy converted by the plants is passed up the food chain to fish, waterfowl, and other wildlife and to us as well.

—*Functions and Values of Wetlands* (USEPA 2001)

California currently uses the U.S. Fish and Wildlife Service (USFWS) "Cowardin system" to classify wetlands into five basic types. These are the five categories used by the USFWS National Wetlands Inventory (NWI) program to map wetlands:

- Palustrine – Vernal wetlands, marshes, ponds, dune swales, seeps, springs, wet meadows, and riparian wetlands
- Lacustrine – Deepwater lakes and reservoirs
- Riverine – Streams, rivers, canals, etc.
- Estuarine – Saline and brackish estuaries
- Marine – Intertidal beaches and rocky habitats

The Ventura River watershed has wetlands in all five of these categories, as shown on the Wetlands & Riparian Habitats map (Figure 3.6.1.2.1). This map also includes riparian areas mapped by NWI. See "Riverine Wetlands and Riparian Habitats" later in this section for more information on the mapping of riparian areas.

Man-made reservoirs provide most of the wetland habitat in the watershed. The majority of the watershed's *natural* wetlands are associated with streams and rivers. The watershed also has coastal wetlands associated with its estuary and beaches. Other wetlands include ponds, freshwater marshes, seeps and springs, vernal wetlands, riparian scrub, and wet meadows.

Many of the watershed's wetlands can be hard to recognize because they are dry during part of the year. The type of plants growing in these wetlands is often the biggest indicator of the underlying soils and wetland conditions. As with all water resources in dry climates, these habitats are vitally important to wildlife.

Scalebroom: A flood storyteller and key insect feeder. Native scalebroom (not to be confused with the non-native Spanish broom) is an indicator of active alluvial systems in the Ventura River watershed. It germinates and establishes after flood events (or bulldozing). Therefore the size and distribution of scalebroom along a stream channel can be used to understand its flooding history.

Scalebroom also plays an essential ecosystem role. It produces abundant aromatic flowers in the fall, which attract and feed a wide variety of insects. This food source is especially important in supporting the food chain during the dry months of fall and extended droughts.

Photos and information courtesy of Mary Meyer

> Every California landscape has wetlands. They form where rainfall or runoff accumulates, or where groundwater saturates the topsoil. There are wetlands associated with desert playas, washes, and oases. Mountains and valleys have wet meadows, bogs, fens, sag ponds, vernal pools, and other kinds of wetlands along the shores of lakes, reservoirs, and ponds and on floodplains. The coastal landscapes have tidal flats and tidal marshes.
>
> —*Southern California Wetlands Recovery Project website* (SCWRP 2014)

Riparian Habitats

Riparian habitats (scrub and woodlands) are the water-dependent habitats adjacent to streams or other water bodies. These habitats serve as the transition between aquatic habitats and upland, or dry, habitats. Riparian habitats lack the amount or persistence of water usually present in wetlands, yet their connection to surface or subsurface water distinguishes them from adjacent uplands (USFWS 2009). Plants are

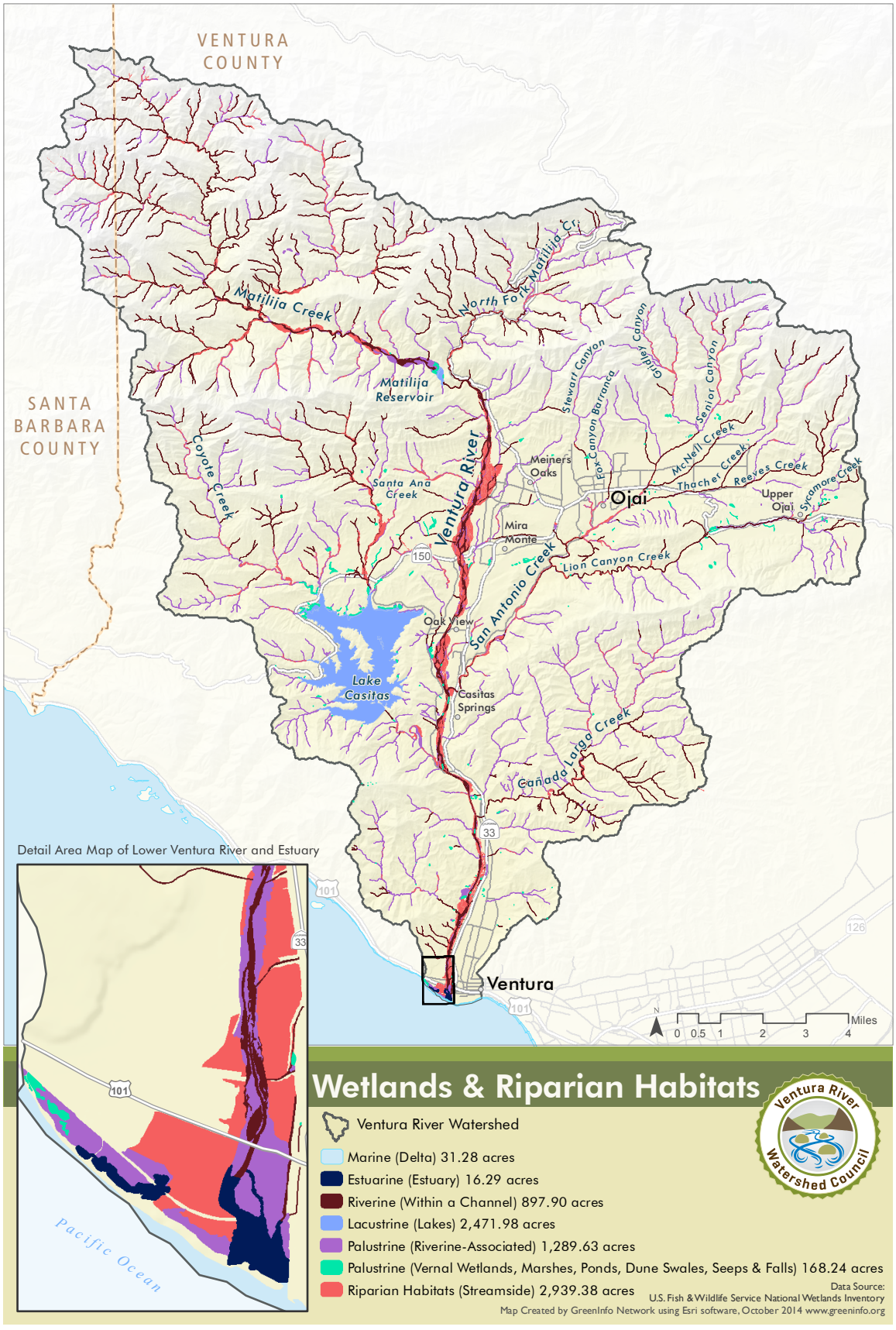


Figure 3.6.1.2.1 Wetlands & Riparian Habitats Map

often more abundant and diverse in riparian habitats than in uplands, especially in dry climates such as that of the Ventura River watershed. The majority of the watershed's wildlife species—including invertebrates (aquatic and terrestrial), fish, amphibians, reptiles, birds, and mammals—depend upon these areas for their survival. Riparian areas provide foraging, nesting, and cover habitat, and are used as migration corridors by various species of wildlife including small and large mammals, birds, and reptiles.

Riparian habitats perform many of the same useful functions as wetlands (described in "Wetland Habitats" above). Local regulators have found that protecting and expanding these natural habitats can sometimes be more economical than building and maintaining engineered facilities such as flood-control structures.

Riverine Wetlands and Riparian Habitats

The Ventura River and its many tributaries and drainages support hundreds of miles of riverine wetlands and riparian habitats—the watershed's most abundant natural wetlands.

In the following sections, the categories "riverine wetlands," "riparian scrub," and "riparian woodlands" are used to describe the ever-changing zone of riverine wetlands and riparian habitats.

The Riverine Wetland-Riparian Habitat Continuum

The Wetlands & Riparian Habitats map (Figure 3.6.1.2.1) indicates that the watershed has 898 acres of riverine wetlands, 1,290 acres of riverine-associated palustrine wetlands, and 2,939 acres of riparian habitats—a total of 5,127 acres.

In the NWI classification system used to create the map, "riverine wetlands" are wetlands within a stream or river channel; "riverine-associated palustrine wetlands" are typically bounded on one side by riverine wetlands and on the other by uplands; and "riparian habitats" are adjacent to stream channels but do not meet the definition of wetland.

The actual line between these categories is imprecise, especially since many of the watershed's stream channels are subject to flooding scour, erosion, drought, and other influences that can change the distribution of vegetation and the relative amount of wetland soils over time.

For example, the most recent mapping of Ventura County's wetlands by NWI was performed in 2004, a year before the big flood of 2005. The boundaries between these various riverine/riparian categories undoubtedly changed after that flood.

Riverine Wetlands

Riverine wetlands generally include the "active channel" of a river or stream system that contains the flow of water under non-flood conditions.

Because storm flows typically rip out vegetation in the active channel every year or every few years, riverine wetlands are characterized by non-persistent vegetation that reflects this unstable environment (Ferren et al. 1995). Perennial reaches support a greater variety of plants than intermittent or ephemeral reaches. While the active channels of most intermittent and ephemeral reaches are devoid of vegetation, perennial reaches support a variety of herbs, and floating and submerged vegetation.

Riverine wetlands provide essential habitat for many animals including fish, reptiles, and amphibians.

Ventura River's Dry Reach, Intermittent Riverine Wetland. The watershed's riverine wetlands are quite variable, ranging from intermittent stream/river reaches (sections) that usually flow only in the winter and spring, such as the "dry reach" (pictured above in its wet state), to perennial reaches that flow year-round.

Photo courtesy of South Coast Habitat Restoration

Upper Matilija Creek, Riverine Wetland, Bedrock and Boulders
Photo courtesy of Michael McFadden

Ventura River below Highway 150 Bridge, Riverine Wetland, Mixed Cobbles.
Riverine wetlands vary from upstream to downstream. Substrate in the channel centers changes from bedrock and large boulders in the upper reaches, to mixed cobbles and gravel in the middle reaches, to patchy boulders, cobbles, gravel, mud, and sand in the downstream reaches (Ferren et al. 1995).

Riverine Wetland Plant Species

Common herbaceous plants in riverine wetlands include: dotted water smartweed, willow-herb, water parsnip, water primrose, iris-leafed rush, water speedwell, and California bulrush. Submerged and floating aquatic plants, including leafy pondweed, fennel pondweed, horned pondweed, duckweed, duckweed fern, water cress, and green algae, grow in slow flowing channels.

Red-Legged Frog Egg Mass in Riverine Wetland, Casitas Springs Levee Pool, 2014. Federally Threatened, State Species of Special Concern
Photo courtesy of Chris Lima

Southwestern Pond Turtle Hatchlings in Riverine Wetland, Lion Creek, 2010. State Species of Special Concern
Photo courtesy of South Coast Habitat Restoration

Two-Striped Garter Snake in Riverine Wetland, 2013.
State Species of Special Concern
Photo courtesy of South Coast Habitat Restoration

Coast Range Newt in Riverine Wetland, 2013.
State Species of Special Concern
Photo courtesy of South Coast Habitat Restoration

Great Blue Heron in Riverine Wetland.
State Special Animal
Photo courtesy of Don DesJardin

Riparian Scrub

Riparian scrub is found immediately adjacent to intermittent and perennial streams and rivers, where there is periodic inundation, but scouring flows occur infrequently. This plant community is dominated by shrub-sized plants and fast-growing mid-sized trees; full-sized trees generally do not become established due to the frequency of disturbance by floodwaters. Plant density and height vary depending upon the amount of moisture and sunlight in the channel. This community provides habitat for a variety of small birds.

Several types of scrub habitats (sometimes found together) are common along the watershed's streams and river: alluvial scrub, mulefat scrub, and southern willow scrub.

Alluvial Scrub, Ventura River Bottom. This habitat type occurs primarily on variously elevated alluvial benches that are protected from regular flooding by topography, but may be subject to some infrequent flooding or inundation. Upland plant species may also be found growing periodically on alluvial scrub terraces. Ground cover between shrubs is open with variable cover of native and non-native annuals and herbaceous perennials. It is likely that these areas were washed over by high flows sometime in the past several decades.
Photo courtesy of Mary Meyer

Alluvial Scrub Plant Species

Alluvial scrub vegetation is dominated by scalebroom, California buckwheat, yerba santa, chaparral yucca, California sagebrush, white sage, prickly pear, redberry, lemonadeberry, mountain mahogany, sugarbush, and hollyleaf cherry.

Mulefat Scrub, Ventura River

Mulefat Scrub Plant Species

Mulefat, the dominant plant species in mulefat scrub, often occurs in pure stands or with a sparse ground layer of vegetation that may include mugwort. Typical secondary species include scalebroom and narrow-leaf willow.

Southern Willow Scrub, Ventura River above Main Street Bridge. The southern willow scrub plant community consists of dense stands of broad-leaved deciduous shrubs and small trees growing immediately adjacent to streams and rivers.

Photo courtesy of Santa Barbara Channelkeeper

Southern Willow Scrub Plant Species

Dominant plants in southern willow scrub include arroyo willow, narrowleaf willow, and shining willow. Other common native species include mulefat, Douglas' nightshade, and mugwort. Mulefat and arroyo willow are both examples of plants that can resprout from underground stems after disturbance.

Belted Kingfisher in Riparian Willow Woodland. Riparian habitats provide foraging and breeding areas for a large diversity of species, such as green herons, belted kingfishers, swallows, and warblers.
Photo courtesy of Allen Bertke

Riparian Woodlands

Riparian woodlands occur along perennial and intermittent streams in areas that are less frequently and less intensely disturbed by flood events than areas with riparian scrub habitat. With less scouring, trees in riparian woodlands have a chance to mature. Riparian woodlands can tolerate some flooding and are reliant on the relatively shallow groundwater associated with streams and rivers. In areas where non-seasonal streams flow out of the mountains and onto flat grasslands, the riparian woodland community may be relatively broad. In higher elevations, where water flows down a narrow passageway confined by geographical features, this community may be only a few meters in width. Riparian woodlands may also occupy the margins of man-made lakes and reservoirs.

Riparian corridors in the watershed support two general riparian woodland types: cottonwood-willow-sycamore and coast live oak.

Cottonwood-Willow-Sycamore Riparian Woodland

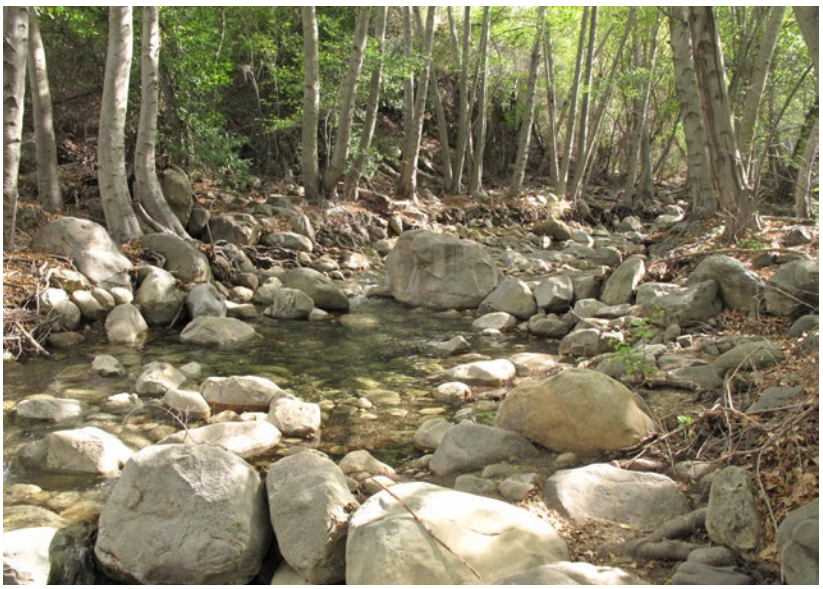
The cottonwood-willow-sycamore riparian woodland comprises a mix of mature broad-leaved, deciduous trees that are tolerant of flooding. Each tree species grows best under slightly different conditions, as illustrated below. Broad-leaved shrubs grow in openings and under tree canopies in riparian woodlands.

Cottonwood-Willow-Sycamore Riparian Woodland Plant Species

Common plant species in cottonwood-willow-sycamore riparian woodlands include Fremont and black cottonwood, red willow, yellow willow, arroyo willow, shining willow, California sycamore, white alder, scalebroom, mulefat, toyon, arroyo willow, elderberry, nightshade, and coyote brush. Numerous vines, including poison oak, virgin's bower, California blackberry, and wild cucumber, may grow in these areas.

Cottonwood-Willow-Sycamore Riparian Woodland, Matilija Creek.
Wet: Fremont and black cottonwood, both broad-leafed deciduous trees, typically grow on floodplains that are temporarily flooded and on low terraces. California sycamore is one of the watershed's tallest trees and grows on terraces that are infrequently flooded. These large trees depend on occasional flooding for seedling and sapling establishment, but since flooding is infrequent, the trees can grow very large. This photo from Matilija Canyon shows black cottonwoods in fall color intermixed with California sycamores; the trees are located on a terrace away from the active channel.
Photo courtesy of Mary Meyer

Cottonwood-Willow-Sycamore Riparian Woodland, Ventura River.
Wetter: Red, yellow, arroyo, and shining willow are fast growing trees that are good indicators of riparian habitat. They are the watershed's most common riparian forest species, found on the edge of active channels as well as on floodplain terraces where they can reach the shallow groundwater. Arroyo willow has the widest range of occurrence as it can withstand drier conditions than the other willows.
Photo courtesy of Santa Barbara Channelkeeper



Cottonwood-Willow-Sycamore Riparian Woodland, Murrieta Creek.
Wettest: White alder grows along permanent watercourses where their roots remain in saturated soil year-round. White alder is an excellent indicator of a perennial stream.
Photo courtesy of Santa Barbara Channelkeeper

Coast Live Oak Riparian Woodland

Coast live oaks dominate this type of riparian woodland, which is found on the banks of small streams, on high terraces away from active channels, on erosional deposits along the margins of canyon bottoms, and on the lower slopes of canyon sides.

Coast Live Oak Riparian Woodland, Wills Creek, Ventura River Preserve
Photo courtesy of Ojai Valley Land Conservancy

Coast Live Oak Riparian Woodland Plant Species

Coast live oak is an evergreen species that is not tolerant of extended flooding. Other common trees, shrubs, and vines found in this plant community include arroyo willow, Fremont cottonwood, valley oak, California sycamore, bigleaf maple, California bay, Mexican elderberry, mulefat, Pacific blackberry, gooseberry, snowberry, poison oak, California sagebrush, coyote brush, horsetails, and mugwort.

Lakes and their Marshes

Lakes occur in well-defined basins that are usually permanently flooded. Like most lakes in coastal southern California, the two lakes in the watershed, Lake Casitas and Matilija Reservoir, are artificial. Together, these lakes support 2,472 acres of lacustrine wetlands. The shores of these lakes also support roughly 50 acres of freshwater marsh wetlands (palustrine wetlands). Stock ponds, usually created behind small dams on streams, are another form of lacustrine wetland found in the watershed.

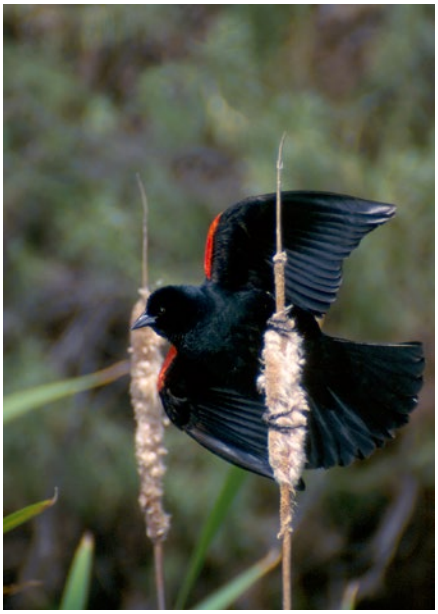
Lake Casitas

Lake Casitas Final Resource Management Plan Environmental Impact Statement (URS 2010) and its appendices, which contain comprehensive descriptions of Lake Casitas and its biological resources, provided the information for these highlights of the lake's wetland habitats and wildlife.

Lake Casitas is the largest inland body of water in Ventura County. Surrounded by wilderness, the lake has become a very important aquatic resource for a wide variety of wildlife, but most notably for birds. The California Audubon Society recognizes Lake Casitas as one of 147 "Important Bird Areas" in the state—areas that provide essential habitat for breeding, wintering, and migrating birds (Audubon 2014). Many birds have come to depend on the lake's open water, protected bays, vegetated shallows, and freshwater marsh habitats. The lake supports some species that occur nowhere else in inland Ventura County. Past bird counts have identified over 160 different species at Lake Casitas (CMWD 2014a).

Freshwater marshes occur along the shore of the lake, especially in coves and channels where the bottom slopes gradually into deeper water. The largest freshwater marsh consists primarily of California bulrush and is located along the edge of the lake near Coyote Creek. The lake's reedy marsh areas dry up when the lake level is low, but can provide important habitat for wildlife when the water from the lake reaches the bulrushes.

Virginia rails and soras inhabit some of the larger patches of cattails and bulrushes in the winter. The shoreline marshes also provide important habitat for grebes, least bitterns, red-winged blackbirds, and smaller passerines (such as common yellowthroat, song sparrow, and marsh wren). Some of the diving, dabbling, and wading birds found at the lake include western and Clark's grebes, doublecrested cormorants, herons, egrets, lesser scaups, ruddy ducks, and wood ducks. The mudflats and patches of wetland vegetation around the lake provide habitat for green herons, pied-billed grebes, American coots, plovers, avocets, stilts, phalaropes, killdeers, and spotted sandpipers.



Red-Winged Blackbird
Photo courtesy of Don DesJardin

Green Heron, Lake Casitas
Photo courtesy of Allen Bertke

Some of the raptors known to breed at the lake include white-tailed kites, red-shouldered hawks, red-tailed hawks, Cooper's hawks, American kestrels, and bald eagles. Visiting species include ospreys, northern harriers, sharp-shinned hawks, golden eagles, peregrine falcons, prairie falcons, zone-tailed hawks, ferruginous hawks, and merlins. Barn owls, great horned owls, northern pygmy owls, short-eared owls, and burrowing owls have been observed at the lake.

White-Faced Ibis, Lake Casitas. State Species of Special Concern
Photo courtesy of Allen Bertke

Wood Duck, Lake Casitas
Photo courtesy of Allen Bertke

Osprey, Lake Casitas. State Watch List
Photo courtesy of Allen Bertke

In addition to the many bird species at the lake, it is not uncommon for visitors to see deer, raccoons, rabbits, opossums, coyotes, skunks, and squirrels.

Lake Casitas is also known as a premier fishing lake in the region. Lake Casitas contains a warmwater fishery that includes bass (primarily largemouth), catfish, sunfish, and crappie. These species are non-native and were introduced when the lake was formed, but now have largely self-sustaining populations (Cardno-Entrix 2012).

The lake has historically been stocked with rainbow trout and other species of fish. Stocking was discontinued in 2013 because of concerns that non-native fish could escape and impact protected species if the Casitas dam spilled into downstream waters potentially used by protected aquatic species such as steelhead. The California Department of Fish and Wildlife, together with federal regulators, are currently evaluating each stocking situation to determine if stocking can be resumed in the future.

Steelhead (anadromous rainbow trout) are no longer present in Lake Casitas and its upstream tributaries, because Casitas dam precludes seaward and spawning migration. It is possible that residualized stocks of steelhead remain in Coyote and Santa Ana creeks in non-anadromous, resident form (URS 2010).

Matilija Reservoir

Matilija Reservoir, located on Matilija Creek, provides both lake and freshwater marsh wetland habitat. The reservoir is now largely full of sediment, and though there is still considerable surface area, water depth is very shallow.

Freshwater marsh wetlands surround part of the lake. Emergent wetland plants around the lake include bulrush, smartweed, nutsedge, and rush species (USACE 2004).

Like Lake Casitas, Matilija Reservoir's lake and marsh wetland habitats are used by a wide variety of migrating and resident birds. Southwestern pond turtles, a California species of special concern, have been found at Matilija Lake. The lake is also home to large numbers of non-native aquatic predators such as largemouth bass (USACE 2004), bullfrogs, and crayfish, which prey on juvenile turtles.

Matilija Reservoir, Lake and Marsh Wetlands
Photo courtesy of Mary Meyer

Coastal Wetlands

The watershed's coastal wetlands include intertidal habitats (marine wetlands), an estuary, and dune swales. As indicated on the Wetlands & Riparian Habitats map (Figure 3.6.1.2.1), coastal wetlands include 31 acres of marine wetlands and 16 acres of estuarine wetlands. Dune swales, a type of palustrine wetland, comprise about two acres (Ferren et al. 1990). Ferren et al. (1990) mapped estuarine habitats at a finer scale and estimated that the estuary contained 28 acres of estuarine wetlands surrounded by over 50 acres of palustrine wetlands. As with riverine and riparian wetlands, the boundaries of estuarine wetlands are in a regular state of flux.

Intertidal Wetlands

Intertidal (or marine) wetlands in the watershed include sandy and rocky intertidal habitats.

Ventura River Delta, Rocky Intertidal Wetland. Rocky intertidal wetland habitats consist of rock and cobble deposited by the Ventura River and distributed by ocean waves, tides, and currents. Rocky intertidal habitat is often battered by waves and is underwater during high tides and exposed to air during low tides.
Photo courtesy of Rick Wilborn

Intertidal Wetland Plant Species

The sand along exposed beaches is continually reworked and moved around by waves, making establishment by attached plants impossible at lower levels. However, plants such as beach saltbush and red sand verbena may become established higher on the beach.

Plants in the rocky intertidal zone attach themselves to rocks but must withstand intense wave action and the stress of drying out during low tides. A variety of algal species live in these habitats, possessing different levels of tolerance to flooding and desiccation. The lower intertidal area exhibits the greatest algal species diversity (Capelli 2010). Rockweed and feather boa kelp can be seen within the intertidal zone, and surfgrass grows at elevations only exposed on the lowest tides.

Marbled Godwits, Sanderlings, and Egrets Feeding in Sandy Intertidal Wetland. In sandy intertidal areas, waves bring food and oxygenated water to the organisms living within the sand. Additionally, freshwater aquifers along the coast drain to the ocean through beach sand, carrying nutrients and sometimes contaminants, to the shore.
Photo courtesy of Dave Hubbard

Invertebrate animals are extremely abundant on sandy beaches, but are not usually visible because they live under the sand. Sand crabs and bean clams live low on the beach. At night, beach-hoppers emerge from their burrows higher on the beach to eat kelp that has washed up at high tide. The abundance of invertebrate life provides important food for shorebirds. Sandy beaches provide nesting habitat for endangered California least terns and western snowy plovers. Some of the animals supported by rocky intertidal habitats include invertebrates, barnacles, striped shore crabs, shorebirds (especially black turnstones and ruddy turnstones), egrets, herons, and gulls.

Black Turnstone, Rocky Intertidal Wetland
Photo courtesy of Don DesJardin

Animals associated with the intertidal habitats include mole crabs, clams, and bristle worms, which bury themselves in the sand between cobbles and feed on particles brought in by the waves. These animals, in turn, are fed upon by shorebirds during low tides and by fish during high tides (USACE 2004).

Ventura River Estuary

The watershed is home to the Ventura River estuary. Estuaries occur along the coast where fresh water from rivers meets the salt water from the sea. Estuaries are complex ecosystems. Water can enter the system from river flows, tides, waves, groundwater, seeps, and springs; the amount and movement of this water can be quite variable. Estuaries trap nutrients from freshwater and saltwater sources and disperse them through tidal movement and currents. This brackish water environment and regular influx of nutrients supports a high diversity of life. Many species of birds, fish, and other wildlife depend upon estuarine habitats to live, feed, and reproduce.

Ventura River Estuary, February 2014. The estuary extends from the ocean to the area between the Highway 101 bridge and the Main Street bridge upstream (Ferren et al. 1990). It is a lagoon type of estuary, separated from the ocean by a sandbar that generally remains closed off from the ocean. Water periodically breaches the sandbar. The second mouth of the estuary, not shown in this photo, is further west.

Photo courtesy of Rick Wilborn

The following excerpt provides an overview of the Ventura River estuary wetland:

> The Ventura River Estuary is characterized by (1) short periods of tidal flushing when the mouth is open and longer periods of pending and lagoon formation when the mouth is closed by a sandbar; and, (2) a year-round inflow of fresh water that is the result of upstream surface flows, rising groundwater, and the discharge of effluent from the Ojai Valley Sanitary District. Because there is perennial freshwater runoff into the estuary, hypersaline conditions apparently are not reached at the surface of the estuary. The estuary is tidally flooded by brackish water when the mouth is open, and is flooded by slightly brackish or fresh surface water when the mouth is closed. Freshwater inflow also determines the depth of the estuary, the extent of areas flooded during ponding, and pattern of salinity and temperature stratification (J.J. Smith 1987).
>
> In addition to the main estuary, the Ventura River has [a] second mouth to the west which is flushed by runoff typically only during large flood events. This second mouth can also receive marine water when storm waves top the cobble and sand berm that blocks the mouth. Under these conditions, the second mouth is not a typical estuary.... The hydrology of the second mouth estuary and associated lagoons and isolated pools appears to be closely linked to the rise and fall of the water table in the delta. The primary influence on this rise and fall is whether mouth of the main estuary is closed and the system is experiencing lagoonal conditions. The higher the lagoon, the more hydrologically connected the entire system becomes.
>
> —*Wetlands of the Central and Southern California Coast and Coastal Watersheds: A Methodology for their Classification and Description* (Ferren et al. 1995)

Estuary Plant Species

The open water habitats of the Ventura River estuary contain a mixture of river and seawater and support algae and aquatic plants such as duckweed and pondweed. Near the river mouth, brackish marsh supports pickleweed, alkali heath, and California bulrush. Moving inland, this habitat transitions to freshwater marsh with cattails and bulrushes. Farther inland the habitat transitions to riparian scrub dominated by native willows.

Breached Sandbar, Ventura River Estuary, September 2014. The sandbar that impounds water at the mouth of the Ventura River opens and closes depending on the interactions between river flow and wave action. Winter storm flows often scour out the sandbar, allowing regular tidal flows into the estuary for a period of time. Occasionally the mouth opens during the summer (Ferren et al. 1995).

Estuaries teem with an array of life including invertebrates (clams, shrimp, crabs, snails, and worms) and the vertebrates that prey on them (fish, birds, and mammals).

Pelicans, Ventura River Estuary

Photo courtesy Santa Barbara Channelkeeper

Ventura River Estuary Cove
Photo courtesy of Santa Barbara Channelkeeper

The Ventura River estuary supports many resident and migratory birds: waterbirds, including ducks, waders, and shorebirds, as well as songbirds and raptors. Bird surveys conducted in 1991/1992 identified 233 native bird species using the estuary and surrounding wetland habitats, six of which were special status species and 37 of which were water-associated species (Hunt & Lehman 1992). Belding's savannah sparrow, a state-listed endangered species, has been observed in Seaside Wilderness Park adjacent to the estuary (Ferren et al. 1990). This sparrow nests only in estuary salt marsh habitat.

> The estuary is used by [a] large number of waterbirds, whose densities vary seasonally and daily with fluctuating water levels. The largest numbers of birds are typically found when water levels in the estuary are relatively low, exposing mudflats and adjacent aquatic habitats. Moderate numbers of waterfowl are found on-site from mid-fall through early spring, gulls and terns use the area year-round for resting and bathing (as do a small number of Brown Pelicans (*Pelecanus occidentalis*), and large numbers of shorebirds are present when water levels are low, exposing mudflats utilized for feeding. Regionally declining and/or endangered species that frequent this site include the Osprey (*Pandion haliaetus*) and Peregrine Falcon (*Falco peregrinus*) (rare visitors), Snowy Plover (*Charadrius alexandrinus*) (small numbers are found on

the sandy shores and mudflats, primarily in late summer), and Least Tern (*Sternaantillarum*) (which utilize the estuary area for feeding, resting and bathing, often occurring for extended periods in late summer accompanied by fledged young).

—*Vertebrate Resources at Emma Wood State Beach and the Ventura River Estuary, Ventura County, California: Inventory and Management* (Hunt & Lehman 1992)

Cormorants and Coots, Ventura River Estuary

Photo courtesy of Stephanie Grumbeck, Brooks Institute of Photography

Ventura River Estuary History

The Ventura River estuary was once much larger than it is today. The following excerpts from a historical study of the watershed's habitats demonstrate the dynamic nature of the estuary before it was constrained by development:

> Historically, the estuary consisted of a large willow-cottonwood riparian forest with numerous distributary channels, a tidal lagoon and tidal flat, salt marsh, high marsh transition zone, and a number of small seasonal ponds within the marsh.
>
> The Ventura River mouth has shifted location numerous times over the past several hundred years, from the hills west of the river mouth to Figueroa Street in Ventura. Many of these former river mouth areas are still susceptible to flooding. A brackish lagoon, formerly at the site of what is now the Derby Club across from Seaside Park, marked the route of one of these former river mouths.
>
> One notable feature in the Ventura River delta was a brackish lake to the west of the end of Figueroa Street. The lake marked a former outlet of the river, and covered about 2.5 acres of open water and 9 acres of marsh. This lake and former river mouth were also the site of a Chumash village, Mitsqanaqan.
>
> At least three types of coastal estuarine systems are represented on the Ventura shoreline: seasonally or intermittently closing freshwater-brackish estuaries associated with the Santa Clara and Ventura river mouths, dune-dammed non-tidal lagoons associated with now-abandoned Santa Clara River mouths, and the large, more open wetland system at Mugu. These features formed a near-continuous sequence of coastal wetlands from Mugu Lagoon all the way to the Ventura River mouth: the eastern edge of the Ventura River floodplain was separated from the northwestern edge of the Santa Clara River floodplain (today's Ventura Marina area) by less than one mile.

—*Historical Ecology of the lower Santa Clara River, Ventura River and Oxnard Plain: an analysis of terrestrial, riverine, and coastal habitats* (Beller et al. 2011)

The Ventura River estuary provides important primary and nursery habitat for several visiting and resident fish species, including topsmelt, prickly sculpin, and California killifish, as well as for sensitive species such as the southern California steelhead and tidewater goby.

> The sandbar at the mouth of the estuary is periodically breached by heavy outflows and high tides associated with storm events. Once opened, the river can receive adults of anadromous species attempting to spawn in the estuary (e.g., Topsmelt) as well as species that breed in fresh water upstream (e.g., Pacific Lamprey, Steelhead, California Killifish). Continuous freshwater inflows to the estuary are critical to maintaining the low salinity levels in the upper portions of the estuary favored by the Tidewater Goby. Preservation of these features and maintenance of good water quality are crucial to the continued survival of these resident anadromous and catadromous species in the Ventura River.
>
> —*Vertebrate Resources at Emma Wood State Beach and the Ventura River Estuary, Ventura County, California: Inventory and Management* (Hunt & Lehman 1992)

Dune Swales

Dune swales are low areas that occur between the crests of coastal dunes. Dune swales typically do not hold ponded water but are areas where the sand surface intersects the shallow groundwater table and the soil remains saturated with fresh water for most or all of the year. Wetland plants colonize these moist areas.

Dune swales can be found at Seaside Wilderness Park, located south of Emma Wood State Beach Group Camp and the railroad tracks.

Dune Swale Plant Species

Vegetation species characteristic of dune swales include beach-bur, whiteleaf saltbush, and evening primrose. Dune swales are threatened by non-native species such as iceplant, sea rocket, and European beach grass, which can alter the natural movement of sand.

Special status species present or once present in the area, such as least tern, western snowy plover, and the California legless lizard, commonly utilize coastal dune native vegetation. The dune swale wetlands provide habitat for numerous small mammals that rely on a relatively continuous cover of vegetation for protection from predators.

Vernal Ponds and Lakes

Vernal wetlands occur in small depressions underlain by impenetrable soils. Vernal means "spring," and these wetlands generally hold standing water, usually rainwater, for only part of the year. This seasonality is a defining feature of vernal wetlands, which usually go through four phases each year: 1) a dry phase during the summer and fall, 2) a wetting phase after rains begin, 3) a flooded phase in the winter, and 4) a drying phase. Vernal wetlands may remain without surface water for several years during droughts. They are mostly found in areas with a Mediterranean climate (wet winter/dry summer).

Today, only a small percentage of vernal wetlands remain in southern California. In the Ventura River watershed, vernal wetlands are closely related to geological features such as faults. These wetlands are often found in the depressions formed by synclines, the down-folded limbs of faults, and at geologic structural knots (the intersection of several faults). These wetlands occur where the subsurface is impermeable, typically in relatively level landscapes such as the floors of wide valleys, plains, or coastal mesas that are not connected to drainages, such that the water slowly evaporates after rainfall ends.

Vernal wetlands types are classified based on depth, duration of the flooding phase, and the types of plants and animals present. From wettest to driest, the types are known as vernal lakes, vernal ponds, and vernal pools.

Remains of Mirror Lake (Vernal Lake), Mira Monte. Mirror Lake, the only example of a vernal lake in Ventura County, had an incredibly rich plant community, supporting several rare and endemic species of plants. Cumulative development impacts have altered the natural processes of the wetland to such a degree that it no longer functions as a vernal lake. Mirror Lake is associated with the Oak View Fault Zone (Ferren et al. 1995).
Photo courtesy of Dave Hubbard

Vernal Pond and Lake Plant Species

Wide variation in the length of possible wet periods and isolation from similar habitats generates a highly variable plant community. Vernal wetlands may contain common species such as spike-rushes and toad rush, as well as vernal wetland specialists such as woolly marbles and California orcutt grass. The unique hydrology and geographic isolation of vernal wetlands tend to support rare and endemic species, making protection of these areas especially important for the preservation of local and regional biodiversity.

Vernal wetlands provide important breeding grounds for frogs, toads, and salamanders and act as stopover points for migratory waterfowl and shorebirds. Aquatic invertebrates tend to be plentiful and may include several types of small crustaceans (e.g., fairy shrimp and clam shrimp), as well as aquatic insects.

Because the plants and animals of vernal wetlands are very sensitive to even minor alterations in hydrology, the functioning of these wetlands can be drastically altered by minor changes in the surrounding landscape.

Vernal Pond, Besant Hill School
Photo courtesy of Michael McFadden

Freshwater Marshes

Freshwater marshes are wetlands that occur in areas with still or slow-moving shallow water and nutrient-rich mineral soils. Some freshwater marshes may be permanently flooded while others may have standing water for only part of the year. Freshwater marshes receive their water from rain, adjacent lakes, or rivers. Due to the rich mineral soil, these wetlands drain slowly. Freshwater marsh soils remain anaerobic (without oxygen) essentially year-round.

Ventura River by Casitas Springs Levee, Freshwater Marsh

In the Ventura River watershed, freshwater marshes are usually small and scattered. They can be found on the margins of ponds and lakes, in the floodplains of slow moving streams and the Ventura River, in geologic depressions and drainages, along the margins of the estuary, and in artificial impoundments such as stock ponds.

Freshwater Marsh Plant Species

Freshwater marshes tend to have non-woody vegetation. They are dominated by perennial grass-like plants such as common cattail and California bulrush. Other rushes, sedges, spike-rushes, and horsetails may also be common. Freshwater marshes also support plants such as willow-herbs, watercress, yerba mansa, pond lily, biennial sagewort, mosquito fern, and species of duckweed, and pondweed, and smartweed. The vegetation can grow very dense and quite tall.

The luxuriant, bright green growth of freshwater marshes in summer can show a strong contrast with neighboring, non-wetland, plant communities that may drop their leaves or turn brown during summer drought. The contrast reverses during the rainy season when other plants grow

new leaves while freshwater marsh plants die back for the winter. In the spring, marsh plants re-sprout from their roots and produce large amounts of above-ground shoots and leaves. In addition to its important roles in nutrient recycling and soil conditioning, freshwater vegetation is an important source of nesting material for birds and small mammals.

Common Yellowthroat
Photo courtesy of Allen Bertke

Great Egret. State Special Animal
Photo courtesy of Allen Bertke

California Tree Frog
Photo courtesy of Chris Brown

Freshwater marshes support a wide diversity of wildlife. Birds associated with this habitat include red-winged blackbirds, song sparrows, common yellowthroats, and great egrets. Less common birds include least bitterns and sora rails. Amphibians such as tree frogs depend on the still water for breeding. The extended presence of surface water into the dry season is important for nesting birds and for mammals.

Ojai Meadows Preserve, Restored Freshwater Marsh
Photo courtesy of Rick Wilborn

Ojai Meadows Preserve

The Ojai Meadows Preserve, located at the northwest edge of the City of Ojai just west of Nordhoff High School, is the site of a significant wetlands restoration project. Historically, water naturally drained to the property, which once contained approximately five acres of freshwater marsh wetlands (Condor Environmental 2004). While surrounding developments altered drainage patterns, the site and the adjacent highway were still subject to flooding during big rain events.

The Ojai Valley Land Conservancy acquired the property in 2000 and, with considerable help from the community, began restoring the wetland. A central focus of the restoration was restoring the historical flood management function of the wetland thereby reducing flooding of adjacent properties and roads. A variety of other native habitat types are also being restored on the 57-acre preserve.

Seeps and Springs

Seeps and springs are wetlands found where groundwater is forced to the surface, typically by faults or bedrock layers. These widely scattered wetlands support diverse and often lush vegetation.

Springs are recognized by the presence of flowing surface water while seeps are areas of saturated soil with very little or no flowing water. While the amount of flowing water or area of saturated soil may vary during the year, these wetlands are typically wet year-round due to the subterranean nature of the water sources. Water from springs and seeps may support other types of wetlands; it is not uncommon to see ponds, freshwater marshes, wet meadows, or riparian wetlands downstream of these perennial water sources.

Springs and seeps may be found anywhere from high slopes in the interior mountains right down to sea level. Springs typically occur in steep rocky terrain where emerging water does not immediately percolate into the surrounding impermeable substrate. Seeps may be found on a variety of slopes, including rock faces. Soils associated with seeps tend to hold a great deal of water and be permanently saturated.

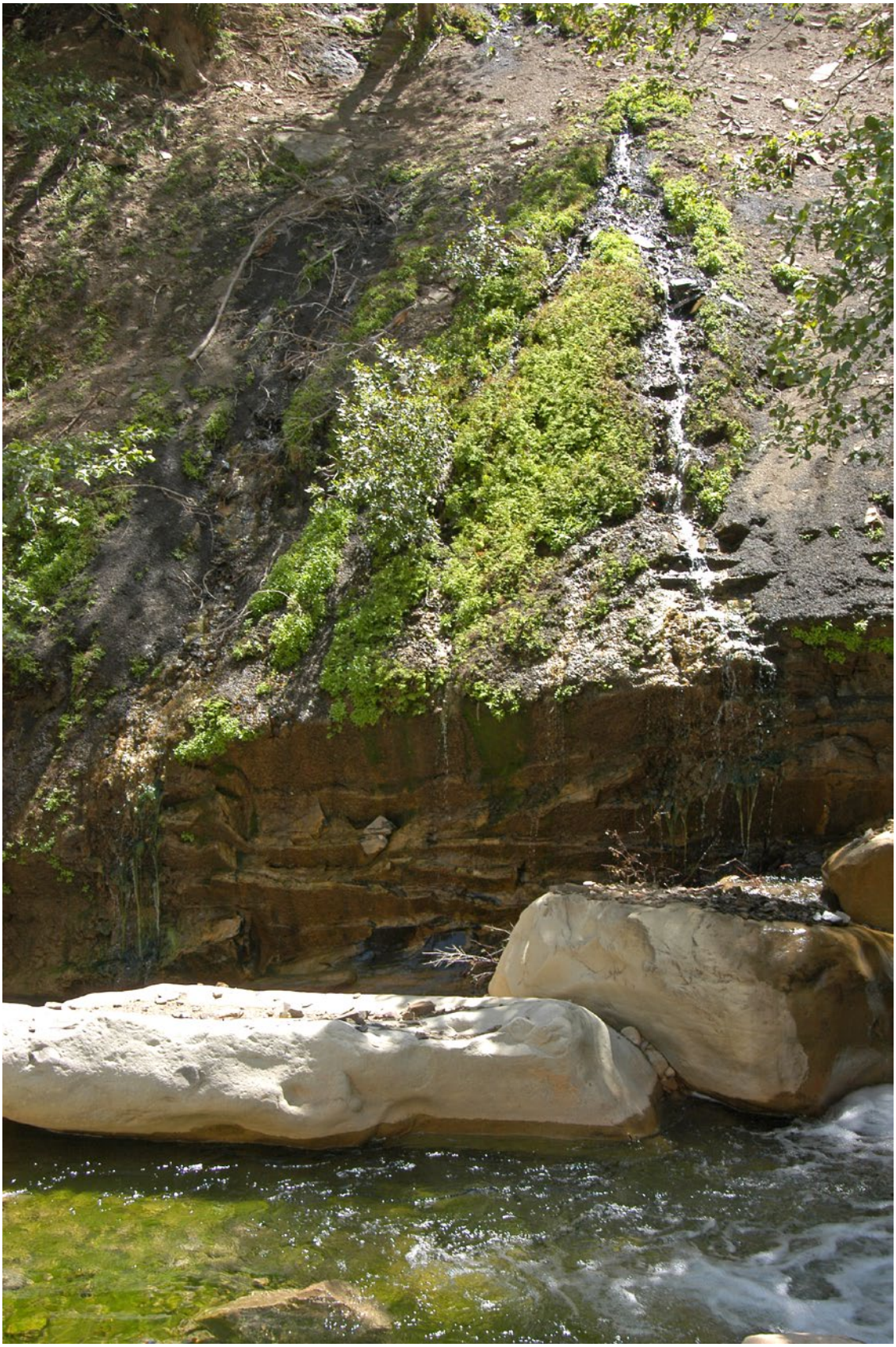
An excellent example of a forested seep may also be seen at Wheeler Gorge along Highway 33.

Seep and Spring Plant Species

Vegetation found in springs is limited by the steep rocky terrain characteristic of this wetland type. Rocks covered with flowing water support algae, mosses, liverworts, and lichens. When there is sufficient soil structure to support rooted plants, herbaceous species such as southern maidenhair fern, scarlet monkey-flower, Indian paintbrush, and rothrock lobelia, may be present.

Seeps vary widely in the vegetation they support. Some are meadow-like and dominated by low sedges (common spike-rush and *Carex* species) and rushes (Mexican rush, brown-headed rush and common rush). Others seeps may support California bay, willow, and bigleaf maple forests with an understory of species such as coastal wood fern, dense-flowered spike-primrose, California rose, creeping wild ryegrass, stream orchid, columbines, and woolly hedge nettle.

Bellyache Falls, Freshwater Spring, Highway 33, Ojai. Bellyache Falls is a freshwater spring located below Dry Lakes Ridge along Highway 33 in the upper watershed. A spigot used to fill water containers previously existed at the site.



Seep, Matilija Canyon

Photo courtesy of Michael McFadden

3.6.1.3 Sensitive/Special Status Habitat

California Condor, Federal and State Endangered Species
Photo courtesy of Martin Fletcher

Federal Critical Habitat

The federal Endangered Species Act requires designation of critical habitat when a species is listed as endangered or threatened. Critical habitat is a specific area that has the physical or biological features essential to conservation of the species. This may include areas not currently occupied by the species but that will be needed for its recovery. Critical habitat has been designated for five animal species in the Ventura River watershed: southern California steelhead, California red-legged frog, tidewater goby, southwestern willow flycatcher, and California condor. In total, these habitats comprise 25,397 acres and 48 miles of river and tributaries (see Figure 3.6.1.3.1 Critical Habitat map).

When activities that involve a federal permit, license, or funding are likely to adversely modify the area of critical habitat, the US Fish and Wildlife Service or the US National Marine Fisheries Service (depending which agency has jurisdiction over the species) can require amendments to those activities for the protection of the listed species.

State Sensitive Vegetation Communities

In addition to individual plant species (discussed later in this section), plant communities are also recognized as being sensitive and threatened. These vegetation communities, or "alliances," are ranked in California according to their degree of imperilment (as measured by rarity, trends, and threats), based on NatureServe's global (G) and state (S) status categories. (NatureServe, an international nonprofit conservation organization, is an authority on rare, endangered, and threatened ecosystems.) Vegetation alliances with state ranks of S1, S2, and S3 are considered to be highly imperiled in California. Though not associated directly with legal protections, vegetation communities with these rankings are recognized as important by local, state, and federal agencies (VCPD 2014a).

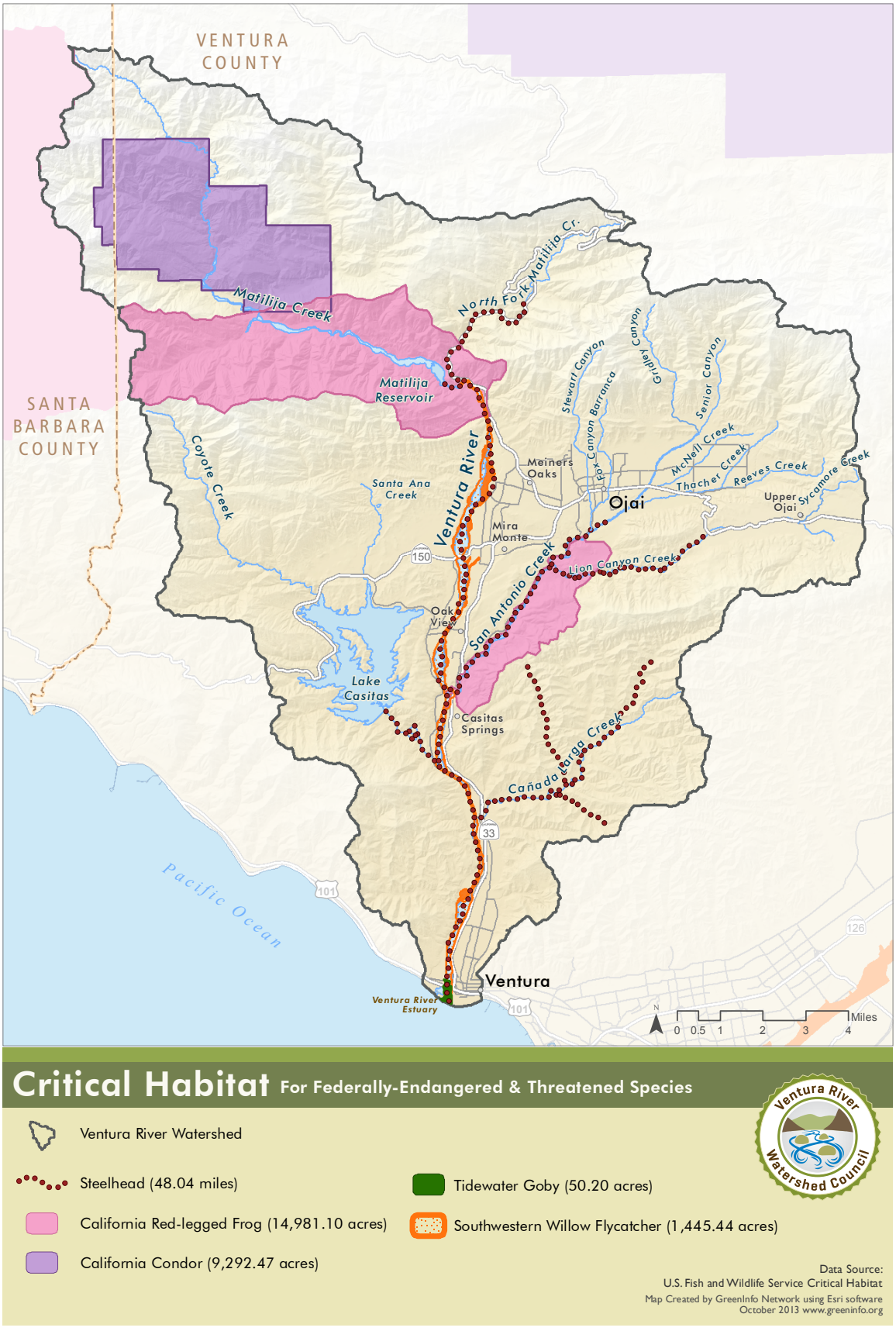


Figure 3.6.1.3.1 Critical Habitat Map

The state's mapping and ranking of alliances is still incomplete, however the following special status habitats are known to occur in the watershed (Meyer 2014):

Table 3.6.1.3.1 State Sensitive Vegetation Communities

Vegetation Community	Status[1]	Vegetation Community	Status[1]
Alluvial fan chaparral	G2 S2.1	Purple needle grass grassland	G3 S3?
Ashy buckwheat scrub	G3 S3	Red willow thickets	G3 S3
California bay forest	G4 S3	Scale broom scrub	G3 S3
California brittle bush scrub	G4 S3	Southern arroyo willow riparian forest	G2 S2.1
California sycamore woodlands	G3 S3	Southern coastal salt marsh	G2 S2.1
California walnut groves	G3 S3	Southern cottonwood willow riparian forest	G3 S3.2
California walnut woodland	G2 S2.1	Southern mixed riparian forest	G2 S2.1
Big pod ceanothus chaparral	G3 S3.2	Southern riparian scrub	G3 S3.2
Chamise - white sage chaparral	G3 S3	Southern willow scrub	G3 S2.1
Coastal and valley freshwater marsh	G3 S2.1	Sycamore alluvial woodland	G1 S1.1
Coastal brackish marsh	G2 S2.1	Thick leaf yerba santa scrub	G3 S3
Freshwater seep	G4 S3.2	Toyon chaparral	G5 S3
Giant wild rye grassland	G3 S3	Transmontane freshwater marsh	G3 S2.2
Hairy leaf ceanothus chaparral	G3 S3	Venturan coastal sage scrub	G3 S3.1
Hoary leaf ceanothus chaparral	G3 S3.2	Vernal marsh	G2 S2.1
Lemonade berry scrub	G3 S3	White sage scrub	G4 S3
Native grassland	G3 S3.1	Yellow willow thickets	G4 S3?

1. NatureServe Conservation Status Ranks:

G1 or S1 - Critically Imperiled

G2 or S2 – Imperiled

G3 or S3 - Vulnerable to extirpation or extinction

A question mark (?) denotes an inexact numeric rank due to insufficient samples over the full expected range of the type, but existing information points to this rank.

Locally Important Plant Communities

The Ventura County General Plan calls for protection of "significant biological resources" in Goal 1.1.5, which states: "Preserve and protect significant biological resources in Ventura County from incompatible land uses and development. Significant biological resources include endangered, threatened or rare species and their habitats, wetland habitats, coastal habitats, wildlife migration corridors, and *locally important species/communities*." Whether or not a plant community qualifies as "locally important" is determined on a case-by-case basis as part of environmental review associated with a development, with the exception of oak woodlands. The Ventura County Board of Supervisors, as part of their adoption of an Oak Woodland Management Plan, explicitly deemed oak woodlands to be a locally important plant community (VCPD 2014a).

3.6.1.4 Habitat Connectivity/Wildlife Movement

Rivers and streams serve as an interconnected road and highway network for the natural world. In urban areas where habitats become fragmented by roads and development, the network of rivers and streams is critical for the movement of aquatic and terrestrial species. The connectivity of these vital habitats is important to animals not only for food availability, but also for reproduction and genetic vigor. These connections are especially important for species, such as mountain lions, that require extensive areas to survive.

Many species in the watershed are dependent upon the stream network to travel between habitats during part or all of the year. When streams and rivers flow during the rainy season, fish, frogs, turtles, and other aquatic species are able to travel through the water (unless impeded by a barrier). Terrestrial species such as bobcats, deer, coyotes, and fox are able to use the riparian habitat adjacent to streams and rivers to migrate throughout the year.

Bobcat using Ventura River Corridor, Steelhead Preserve, 2013
Photo courtesy of Rich Reid

The following excerpt from an environmental assessment of a project in the Ventura River floodplain provides a thorough overview of the role of the river in habitat connectivity:

> The Ventura River and its associated drainages provide important connections between wilderness areas of the Santa Ynez foothills, the Los Padres National Forest, Sulphur Mountain, and the Pacific Ocean. The broad diversity of vegetation and physical topography in this area provides a mechanism for dispersal, supports wildlife travel routes, and allows habitat connectivity for a range of species from steelhead to neo-tropical song birds. Carnivores and ungulates (i.e., coyote, bobcat, bear, and deer), in addition to small less mobile species, also utilize the river and adjacent uplands for movement and dispersal.

Bear Print, Oso Trail, October 2014

Wildlife movements can be classified into three basic categories: dispersal (e.g., juvenile animals moving from natal areas or individuals expanding ranges); seasonal migration; and movements related to home range activities (e.g., foraging for food or water, defending territories, or searching for mates, breeding areas, or cover).

Habitat fragmentation, whether natural or human-induced, can create a mosaic of habitat patches separated by barriers that may be permeable or impermeable to wildlife movement. How a species responds to a fragmented landscape largely depends on its body size. For example, large ground dwelling (i.e., flightless) animals, such as mountain lions, coyotes, grey fox, and badgers, routinely move large distances across extensive home ranges that encompass multiple habitat patches, compared to small ground-dwelling wildlife, such as brush rabbits, ornate shrews, pocket gophers, meadow voles, and Pacific tree frogs, whose relatively small home ranges may include only a portion of a single habitat patch.

Movement corridors are physical connections that allow wildlife to move between patches of suitable habitat. Simberloff et al. (1992) and Beier and Loe (1992) correctly state that, for most species, we do not know what corridor traits (length, width, adjacent land use, etc.) are required for a corridor to be useful. But, as Beier and Loe (1992) also note, the critical features of a movement corridor may not be its physical traits but rather how well a particular piece of land fulfills several functions, including allowing dispersal, plant propagation, genetic interchange, and recolonization following local extirpation.

The following terms are frequently used in discussing wildlife movement corridors:

- Dispersal Corridors - Corridors which are relatively narrow, linear landscape features embedded in a dissimilar matrix that links two or more areas of suitable habitat;
- Habitat Linkages - Linkages which are broader connections between two or more habitat areas;
- Travel Routes - Routes which are landscape features, such as ridgelines, drainages, canyons, or riparian corridors that are used frequently by animals because they provide the least topographic resistance to movement and provide access to water, food, cover, or other necessary resources;
- Wildlife Crossings - Crossings which are small, narrow, typically man-made features, such as tunnels, culverts,

underpasses, etc., that allow wildlife to bypass a barrier. The latter represent "choke points" along a movement corridor (Meffe and Carroll, 1997).

Undisturbed landscapes contain a variety of movement corridors, habitat linkages, travel routes, wildlife crossings and other habitat features that facilitate wildlife movement through the landscape and contribute to population stability. The relative size and characteristics of these features differ for species that use them. Wildlife use will depend on the ability of these features to provide adequate space, cover, food, and water, in the absence of obstacles or distractions (e.g., man-made noise, lighting) that could interfere with wildlife movements. Human-induced habitat fragmentation increases the number of wildlife crossings or choke points in a landscape.

California Tree Frog, Matiljia Creek
Photo courtesy of Mary Meyer

Long Tailed Weasel, Ojai Meadow Preserve
Photo courtesy of Martin Fletcher

Riparian corridors, streams, rivers, and other such linear landscape elements are generally assumed to function as wildlife movement "corridors" between habitat patches, however, as the movements of wildlife species are more intensively studied using radio-tracking devices, there is mounting evidence that many wildlife species do not necessarily restrict their movements to some obvious landscape element, such as a riparian corridor. For example, recent radio-tracking and tagging studies of Coast Range newts (Trenham, 2002), California red-legged frogs (Bulger et al., 2002), southwestern pond turtles (Hunt et al, 1993), and two-striped garter snakes (Rathbun et al., 1992) found that long-distance dispersal in these species involved radial or perpendicular movements away from a water source with little regard to the orientation of the actual riparian corridor. Similarly, carnivores do not necessarily use riparian corridors as movement corridors (Newmark, 1995; Beier, 1993, 1995; Noss, et al., 1996).

However, in the proposed project region many of the east-west linkages are limited and the north-south linkages between the coastal hills and the Santa Ynez mountains area and other open space areas are increasingly tenuous because of urban and agricultural development adjacent to the floodplain. One of the only unconstrained habitat linkages is the Ventura River floodplain which provides the critical feature of wildlife corridors in the region. Therefore, the Ventura River and floodplain provide both passage and dispersal corridors for a variety of both common and sensitive species.

—*California River Parkways Trailhead Project, Initial Study* (Aspen Environmental 2010)