

*Wildlands of the Santa Clara River Watershed:
Restoring and Maintaining the Integrity and Health of the River and its Watershed*



Oh, come to the mountains,
the first flush of day
is seen on the mount
from the valley far away.
There's health on the mount,
where the merry wind blows,
that can ne'er be found in the
valley below.

~Logan K. Rayburn
Acton Rooster Newspaper, Acton, CA
November 15, 1904

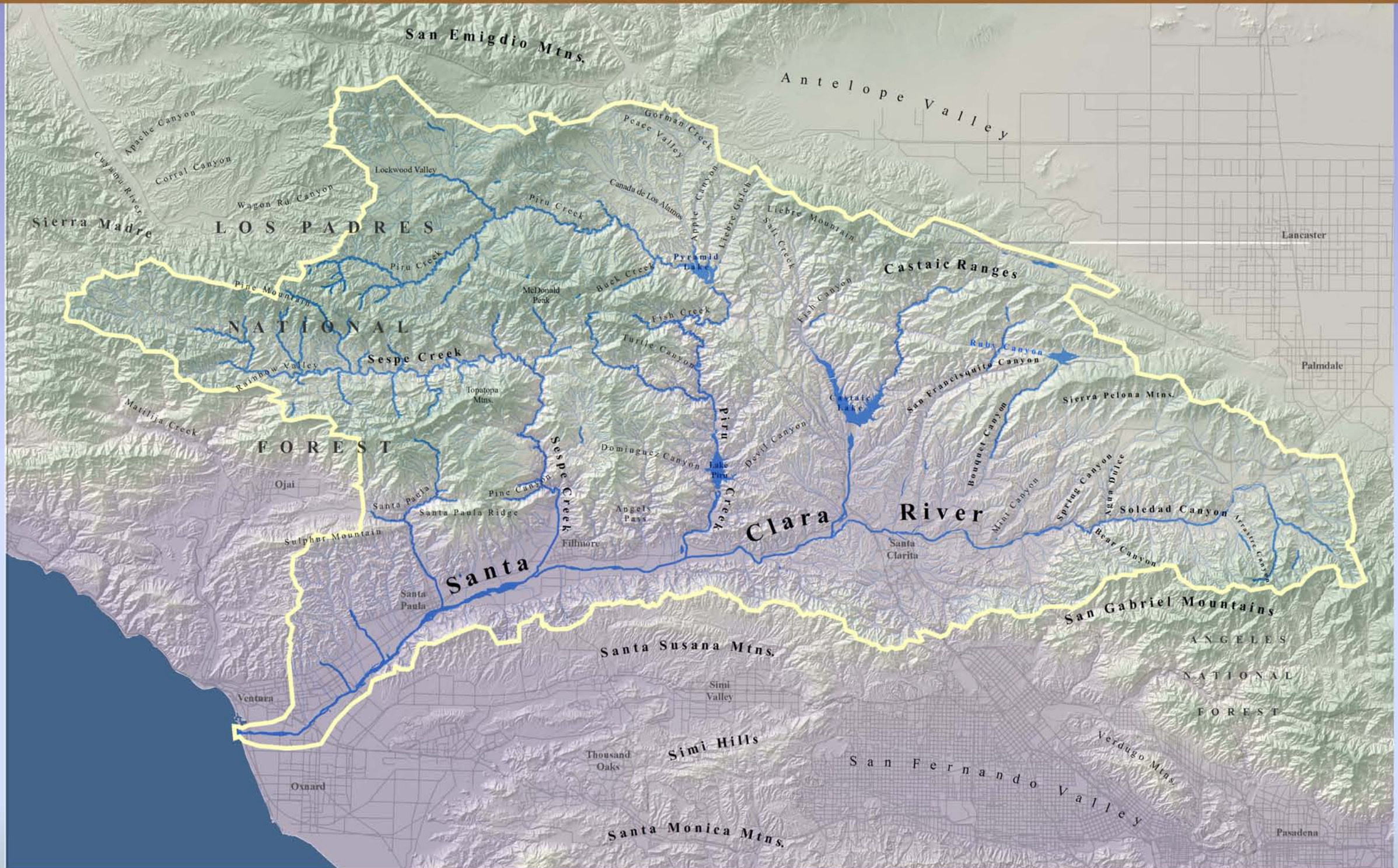
Produced by South Coast Wildlands
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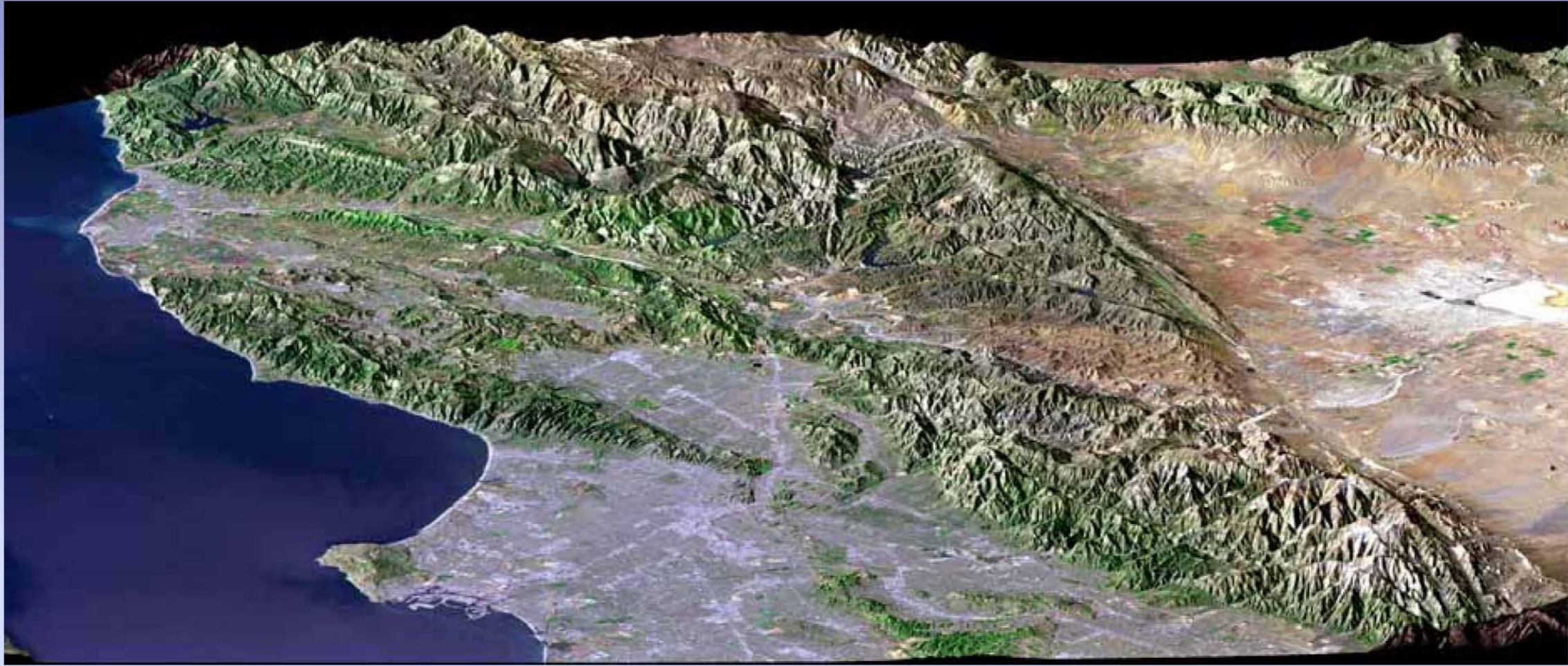
Cover Photo of the Santa Clara River
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What is a Watershed?



A Watershed is all the land that "sheds" its runoff water into a particular river, stream, or creek. Watershed boundaries are delineated based on topography with the drainage area defined by a series of ridge tops. A drop of water falling on top of the ridge will flow by gravity into a particular watershed, such as the Santa Clara River Watershed shown above outlined in yellow. A watershed also includes groundwater aquifers that discharge to and receive discharge from streams, wetlands, ponds and lakes.

The Santa Clara River Watershed



The Santa Clara River Watershed drains 1,600 square miles of the San Gabriel, Castaic, Santa Susana, and Sierra Madre mountains. As one of the last free flowing natural riparian systems left in southern California, the Santa Clara River supports a diversity of aquatic, semi-aquatic, and terrestrial organisms providing breeding sites, traveling routes, and other resources for wildlife. The Santa Clara River and its tributaries provide essential ecosystem services such as natural flood control, recharge of groundwater basins, and nutrient cycling, helping to sustain the river to its estuary at the coast. Habitats in the upper watershed and headwater streams that can help sustain the River in perpetuity are still largely intact, allowing for the natural flow of biological and ecological processes that are necessary to support rich riparian systems and recharge groundwater basins.

As in any river system, the greater hydrology of the Upper Santa Clara River Watershed is an integral part of the entire watershed. Changes that negatively impact upper watershed hydrology will, in turn, negatively affect the entire watershed. Human activities in the upper watershed such as urban and industrial development, construction of roads and other impervious surfaces can have adverse impacts on the entire system. Through thoughtful planning, these impacts can be avoided or minimized and the entire watershed can be protected for future generations.

Whereas millions of dollars are being spent to restore the Los Angeles and San Gabriel Rivers, which are lined with concrete from the mountains to the sea; the Santa Clara River is still relatively wild, supporting a diversity of species, and providing a multitude of ecosystem services that should be maintained. Protection of the River and its tributaries is of the utmost importance.

Restoring and Conserving the Santa Clara River Watershed

Restoring and conserving the biodiversity, water quality and quantity of the watershed and River will also help to preserve the quality of life for existing and future human and non-human residents of the watershed. The need for watershed stewardship has been recognized by a number of agencies and organizations and a number of river-related plans are currently under way: One Valley – One Vision seeks to address the future growth of the Valley and the preservation of natural resources. A second plan, the Santa Clara River Enhancement and Management Plan addresses the Santa Clara River flood plain. A third plan, still in its early stages, is a watershed-wide study of flood management and sediment issues by Los Angeles County, Ventura County and the Army Corps of Engineers. Although these plans will certainly address aspects of the sustainability of the watershed, immediate restoration and conservation action is also necessary. The goal of this book is to inform the community about the ecological significance of their watershed to ignite passion and stir action for protecting the last free flowing river in southern California.



Looking up the Santa Clara River
© Andrew M. Harvey VisualJourneys.net

Threats to the Ecological Health of Our Watershed

The ninth annual report of the U.S. Council on Environmental Quality (1978) states, “no ecosystem is more essential than the riparian system to the survival of the nation’s fish and wildlife”. Despite their importance to biological communities, over 90% of the historic wetland and riparian vegetation in southern California has been eliminated or severely altered by urban and agricultural activities. Coastal watersheds, such as the Santa Clara River Watershed, have suffered due to dams, diversions, channelization, flood control activities, residential, industrial, and agricultural development, livestock grazing, and other land disturbances. The extensive loss and degradation of riparian habitats has resulted in declines in wildlife and plant populations that depend wholly or in part on riparian systems. The growing demand for residential, commercial, and industrial space is exerting increasing pressure on the Santa Clara River Watershed. And, it is unlikely that the pressure for development in the watershed will diminish due to the growing population in this region. Although habitat loss and fragmentation are the biggest threats to biodiversity, through thoughtful planning, impacts in the watershed such as those shown below can be avoided or minimized and the entire watershed can be protected for future generations.



Large-scale aggregate mining in the River



Concrete bank stabilization



Stream channelization



Agriculture in the floodplain of the River



Flood control & habitat destruction



Illegal Off-road vehicles in the River

Protect Our Watershed – Be a Good Steward

The hydrologic cycle has been operating for billions of years, from the lower atmosphere to several miles beneath Earth's surface. As such, the hydrology of the Santa Clara River Watershed is a highly intricate system. Precipitation that reaches the watershed may follow several different pathways, including interception by plants; collection on the surface, forming overland flow to streams; transpiration and evaporation from land and water; infiltration to the ground; and gravitational water moving to subsurface groundwater. Groundwater is the largest potential freshwater source, larger than all surface lakes and streams combined. Yet, despite its obvious importance, groundwater is widely abused by pollution and over consumption in quantities beyond natural replenishment. When surface water is polluted, groundwater inevitably becomes contaminated because it is recharged from surface water supplies. Where the water table intersects the surface, it creates springs, lakes, and rivers. Groundwater may sustain river flows in dry periods. Earth's streams and rivers contain only 0.0001% of all freshwater, yet streams and rivers are the portion of the hydrologic cycle on which wildlife and plants most depend.

Development has significantly altered the way rainwater is channeled through the watershed. Roads, development, and the associated stormwater drainage systems have created huge areas of impervious surfaces where once there were natural habitats and streams capable of absorbing precipitation. Understanding how water runs off impervious surfaces and makes its way into streams and rivers also helps explain how pollutants move through a watershed. Rain also carries oil, gasoline and brake shavings from roadways as well as air pollutants, fertilizers, pesticides and animal waste throughout the watershed.

What we can do to be Good Stewards of Our Watershed:

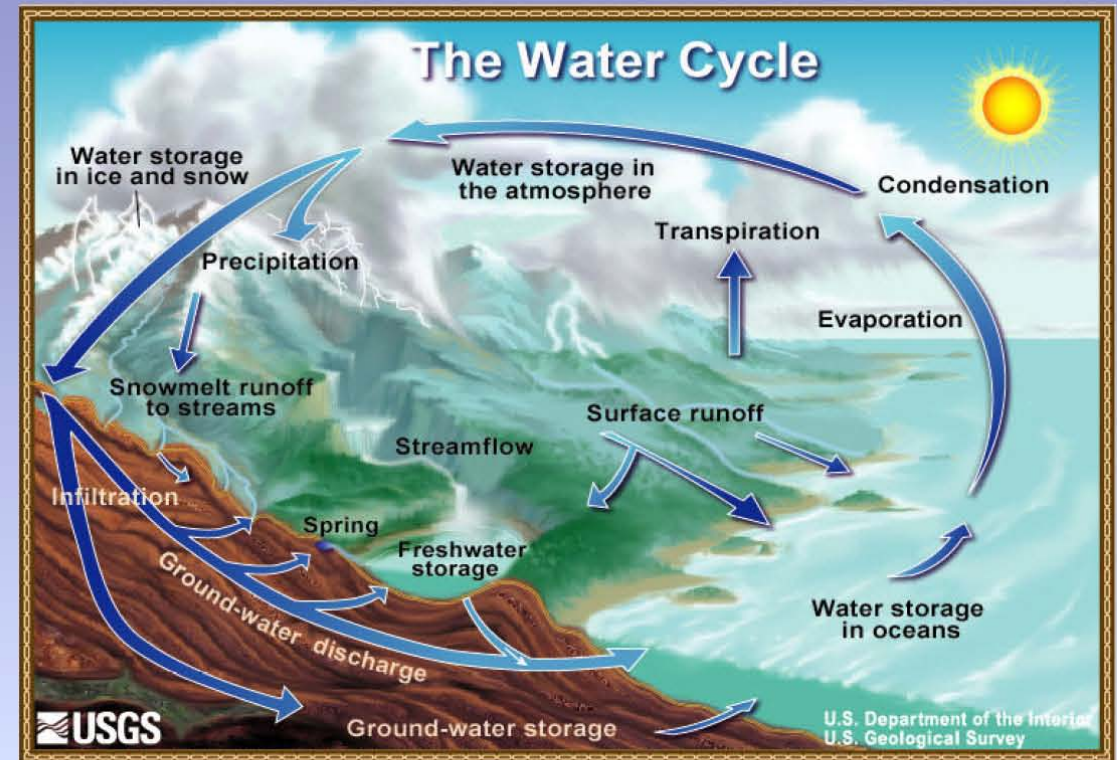
Pick up after your pooch. Pet waste impacts stream, river and ocean water quality, posing health risks to humans and animals. It also reduces oxygen levels in the water and contributes to algal growth, which can choke out desirable native plants, affecting fish and other aquatic organisms.

Landscape with native plant species. For those that live in or adjacent to the floodplain of the SCR or its tributaries, native plant species require less water, no chemicals, and provide resources for wildlife. They also provide erosion protection during high flows and recover quickly when floodwaters subside.

Don't Plant Escape Artists. Some ornamental plants, such as pampas grass, tamarisk, giant cane, and ivy have a propensity for spreading, and can outcompete native plant species.

Use compost and organic soil amendments instead of chemical fertilizers. Add leaves, lawn trimmings, and vegetable matter to a compost pile to make fertilizer. Pull weeds before they flower to reduce the need for herbicides.

Encourage infiltration. If planning to construct walkways, patios, driveways, or stormwater drains, consider alternatives that maximize permeable surface area.



Practice water conservation. Every drop we save contributes to maintaining a healthy watershed. For example, use a rain barrel to collect and store rooftop runoff, which can be used for lawn and garden watering, car washing, and even window cleaning.

Wash cars on permeable surfaces (gravel, grass, etc.); use biodegradable soaps. Outdoor car washing can result in high loads of nutrients, metals and hydrocarbons, as the detergent-rich water flows down the street and into the storm drain.

Eliminate the use of pesticides. They can impact aquatic and non-aquatic organisms and contaminate drinking water supplies. Insecticides such as diazinon and chlorpyrifos can be harmful to wildlife even at very low levels.

Keep septic systems operating correctly. Have septic systems inspected annually and have them pumped-out at least once every three years.

Contact the appropriate agencies. Work in drainages often requires permits. Contact the Department of Fish and Game and Army Corps of Engineers for more information.

Teach children. They will be fascinated by nature and inspired to conserve our natural resources.

Habitat Diversity in Our Watershed

The Santa Clara River Watershed is extremely diverse, supporting numerous distinct natural communities. Habitat types in the watershed include coastal sage scrub, chaparral, oak woodland, grassland, and riparian communities. In the eastern part of the watershed there is a shift to a more xeric landscape characterized by desert scrub, with scattered juniper, pinyon pine and Joshua tree woodlands. Several sensitive natural communities occur in the watershed, including alluvial fan sage scrub, southern cottonwood willow riparian forest, southern riparian scrub, southern sycamore alder riparian, freshwater marsh, coast live oak riparian forest, vernal pool, mainland holly-leaved cherry woodland, valley needlegrass grassland, and coastal sage scrub. These habitats are among the rarest and most sensitive ecosystem types in the United States. This rich mosaic of natural communities supports a diversity of native plant and wildlife species.



Coastal sage scrub



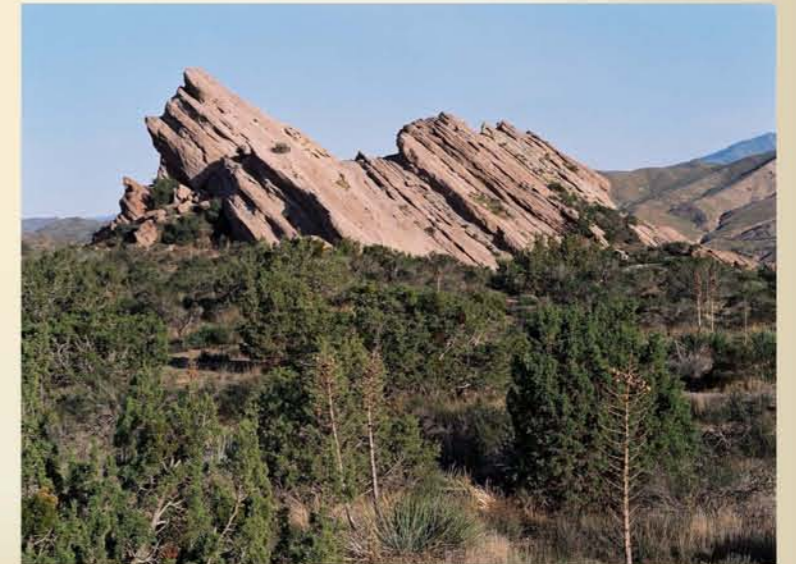
Riparian forest



Chaparral



Oak woodland



Juniper woodland

Vegetation Communities in Our Watershed



- | | | | | | |
|---|---|---|---|---|--|
| ■ Closed Cone Pine - Cypress | ■ Alkali Scrub | ■ Desert Wash | ■ Blue Oak Foothill Pine | ■ Annual Grass | ■ Agriculture - Crops |
| ■ Montane Hardwood Conifer | ■ Desert Scrub | ■ Montane Riparian | ■ Blue Oak Woodland | ■ Chamise - Redshank Chaparral | ■ Barren |
| ■ Eastside Pine | ■ Joshua Tree | ■ Saline Emergent Wetland | ■ Coastal Oak Woodland | ■ Coastal Scrub | ■ Eucalyptus |
| ■ Jeffrey Pine | ■ Juniper | ■ Valley Foothill Riparian | ■ Montane Hardwood | ■ Mixed Chaparral | ■ Urban |
| ■ Ponderosa Pine | ■ Pinyon - Juniper | ■ Water | ■ Valley Oak Woodland | ■ Montane Chaparral | |
| ■ Mixed Conifer | ■ Sagebrush | | | | |
| ■ Subalpine Conifer | | | | | |

Habitat for Threatened, Endangered & Sensitive Species

The Endangered Species Act of 1973 is Federal legislation that was enacted to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and animals. The State enacted similar legislation in 1984, passing the California Endangered Species Act.

Over 117 threatened, endangered or sensitive plant and wildlife species or communities have been recorded in Our Watershed, including 18 mammals, 27 birds, 10 reptiles, 6 amphibians, 5 fish, 3 invertebrates, 29 plants, and 19 sensitive plant communities. Of these, 18 are federally listed, 2 are candidates for listing, and 14 are state listed. In addition to providing habitat for rare and endangered species, the watershed provides live-in and move-through habitat for numerous native species that may be less extinction prone but that nevertheless require extensive wildlands to thrive.

Listed Species: a species, subspecies, or distinct population segment that has been added to the Federal and or State list of endangered and threatened wildlife and plants.

Endangered Species: an animal or plant species in danger of extinction throughout all or a significant portion of its range.

Threatened Species: an animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Sensitive Species: a species of special concern that might be in need of conservation action. This may range from a need for periodic monitoring of populations and threats to the species and its habitat, to the necessity for listing as threatened or endangered.



Slender-horned spineflower (*Dodecahema leptoceras*) has the distinction of being the most critically endangered plant in southern California; it is listed as federally and state endangered. A population occurs in alluvial fan sage scrub habitat in Bee Canyon in the upper watershed.



Slender mariposa lily (*Calochortus clavatus* var. *gracilis*) is a species of concern. It is considered fairly endangered throughout its range by the California Native Plant Society. The lily has been recorded in chaparral habitat in San Francisquito, Mint, and Bee Canyons in the upper watershed.



Salt marsh bird's beak (*Cordylanthus maritimus maritimus*) is federally and state listed as endangered and considered rare throughout its range by the California Native Plant Society. This plant is restricted to coastal salt marsh habitat and has been recorded in the watershed near the coast.



Nevin's barberry (*Berberis nevadensis*) is also federally and state listed as endangered and considered rare throughout its range by the California Native Plant Society. This species has been recorded in coastal sage and chaparral habitats in San Francisquito Canyon in the upper watershed.

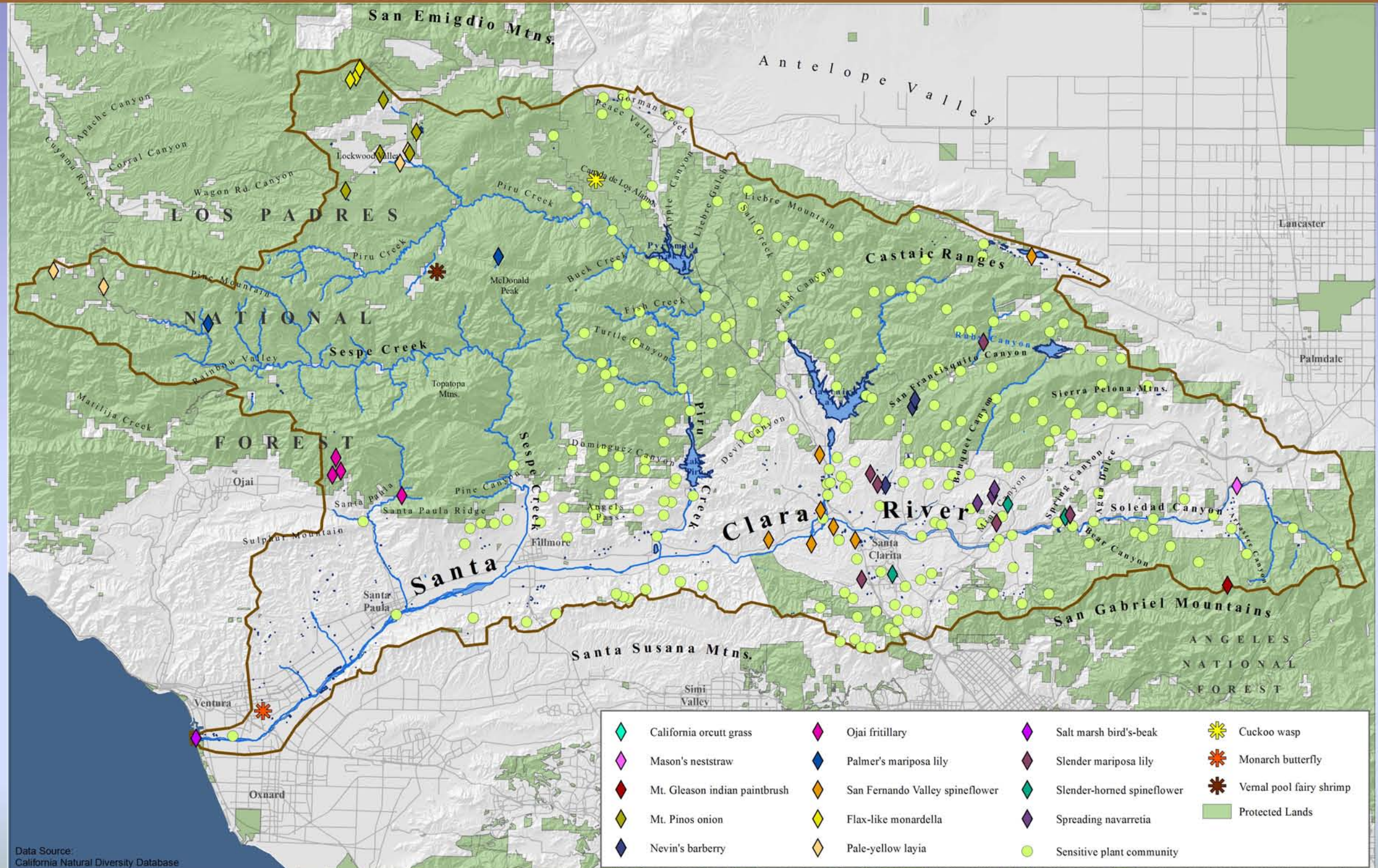


Monarch butterfly (*Danaus plexippus*) Millions of Monarchs migrate south for the winter, most traveling 1,800 miles to Michoacan, Mexico, while some overwinter in Cuba, and California. Roosting trees in Mexico are being logged; resulting in a decrease in the global population. Wintering sites are restricted in California and therefore vulnerable to local extinctions.



Vernal pool fairy shrimp (*Branchinecta lynchi*) is a federally threatened crustacean. This species has been recorded in vernal pool habitats in the watershed on Los Padres National Forest.

Recorded Occurrences of Listed and Sensitive Invertebrates, Plants & Communities



Data Source:
California Natural Diversity Database

Habitat for Listed & Sensitive Amphibians, Reptiles & Fish



California red-legged frog (*Rana aurora draytonii*) is federally listed as threatened and is a California species of concern. The red-legged frog has been recorded at a number of sites along the River, and in several tributaries throughout the watershed.



Coast horned lizard (*Phrynosoma coronatum blainvillei*) is a federal and state species of special concern. This species has been recorded throughout the watershed, with most occurrences along the River and in Soledad, Bee, Spring, and Tick canyons.



Unarmored three-spine stickleback (*Gasterosteus aculeatus williamsoni*) is federally and state listed as endangered. All of the remaining naturally occurring populations are in the upper watershed, in the Santa Clara River, and Escondido and Arrastre Creeks.



Mountain yellow-legged frog (*Rana muscosa*) is federally listed as endangered and is a California species of concern. This highly imperiled species has been observed in Sespe and Piru Creeks in the lower watershed on Los Padres National Forest.



Southwestern pond turtle (*Actinemys marmorata pallida*) is federally and state listed as a species of special concern. The pond turtle has been recorded along the River, and on Los Padres National Forest in Sespe and Piru Creeks and their tributaries.



Arroyo chub (*Gila orcutti*) is a federal and state species of concern. The chub has been recorded in the Santa Clara River, and in Santa Paula, Sespe, and Agua Dulce Creeks, and likely occurs in Escondido Creek too.



Arroyo toad (*Bufo californicus*) is federally listed as endangered and is a California species of concern. This species has been recorded in Santa Paula, Sespe, and Piru Creeks, and along the River in the upper watershed.



Coastal western whiptail (*Cnemidophorus tigris multiscutatus*) is federally listed as a species of special concern. The whiptail occurs in semi-arid desert to open woodland communities; it's been recorded in Piru Canyon, near Peace Valley, and along the River.



Western spadefoot toad (*Spea hammondi*) is a federal and state species of concern. The spadefoot toad has been recorded in several drainages near the City of Santa Clarita and along the River in the upper watershed.

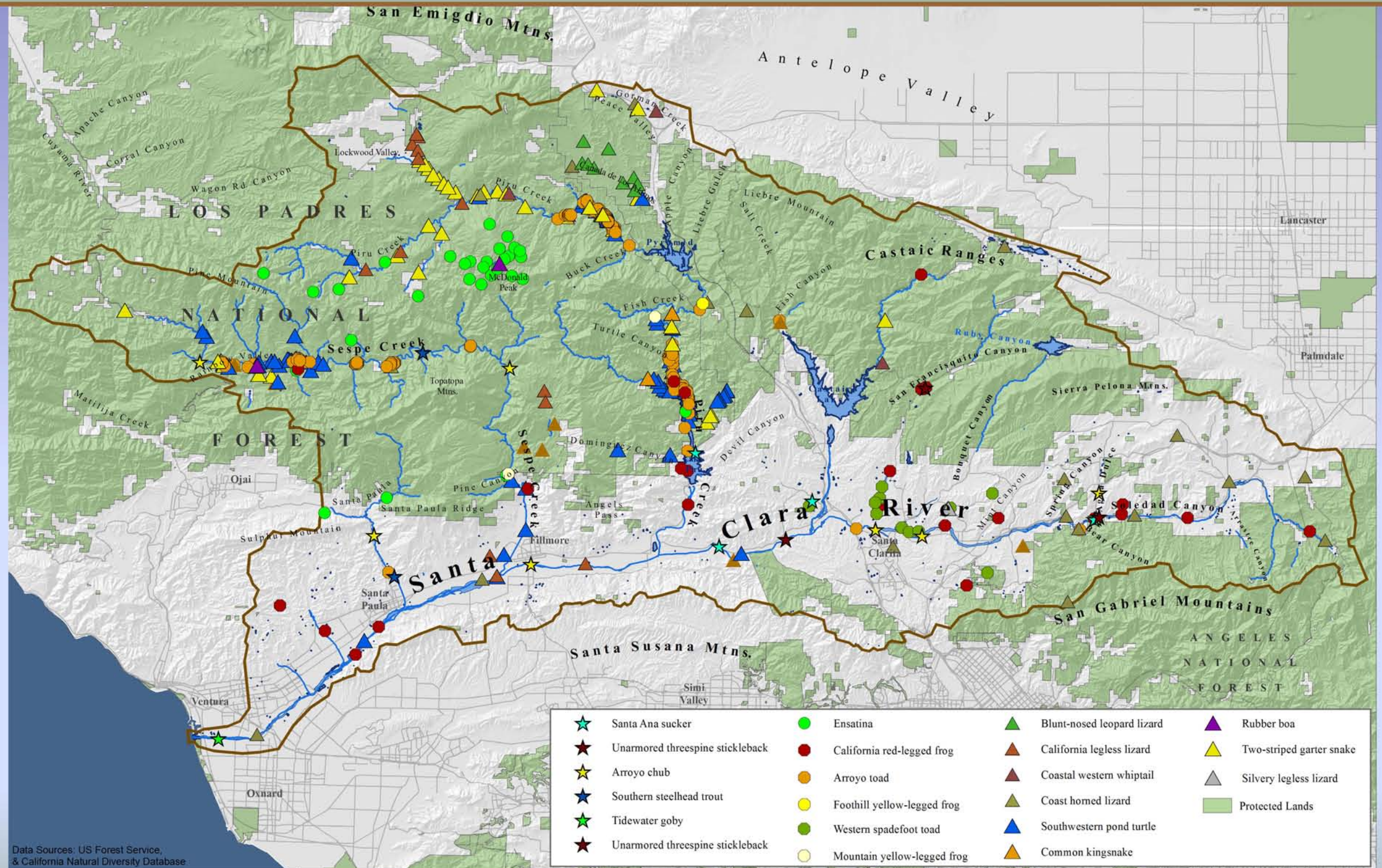


Two-striped garter snake (*Thamnophis hammondi*) is federally and state listed as a species of special concern. This species has been recorded throughout the watershed, with most occurrences documented on Los Padres National Forest.



Santa Ana sucker (*Catostomus santaanae*) is considered a species of special concern in the watershed. The sucker has been recorded in the River and in Piru Creek above the dam.

Recorded Occurrences of Listed & Sensitive Amphibians, Reptiles & Fish



Data Sources: US Forest Service, & California Natural Diversity Database

Habitat for Listed & Sensitive Birds and Mammals



Southwestern willow flycatcher (*Empidonax traillii extimus*) is federally listed as endangered. This species has been recorded along the Santa Clara River and on upper Piru Creek on Los Padres National Forest.



Hermit warbler (*Dendroica occidentalis*) is a state species of concern and on the Audubon and Partners in Flight watch lists. This colorful warbler has been on Forest Service lands in the watershed.



Lodgepole chipmunk (*Tamias speciosus*) Two subspecies of Lodgepole chipmunk occur in the watershed, both are federal species of special concern and considered sensitive by the Forest Service. The Lodgepole chipmunk (pictured) has been recorded near Elizabeth Lake in the upper watershed, while the Mount Pinos chipmunk is restricted to the forests around Mount Pinos and Mount Abel.



Least Bell's vireo (*Vireo bellii pusillus*) is federally and state listed as endangered. The vireo has been recorded all along the Santa Clara River and in San Francisquito Canyon in the upper watershed.



Rufous hummingbird (*Selasphorus rufus*) is a federal species of concern and on the Audubon and Partners in Flight watch lists. This hummingbird has been recorded in San Francisquito Canyon on the Angeles National Forest.



Yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is state listed as endangered and is proposed for listing as federally endangered. The cuckoo has been recorded along the Santa Clara River in the lower watershed.



Rufous-crowned sparrow (*Aimophila ruficeps canescens*) is a federal species of special concern. The sparrow has been recorded in San Francisquito, Ruby, and Piru Canyons on both Los Padres and the Angeles National Forests.



American badger (*Taxidea taxus*) is listed as a state species of special concern. The distribution of this wide-ranging mammal has not been well documented but it has been recorded in the Liebre Mountains and near Angels Pass in the lower part of the watershed.

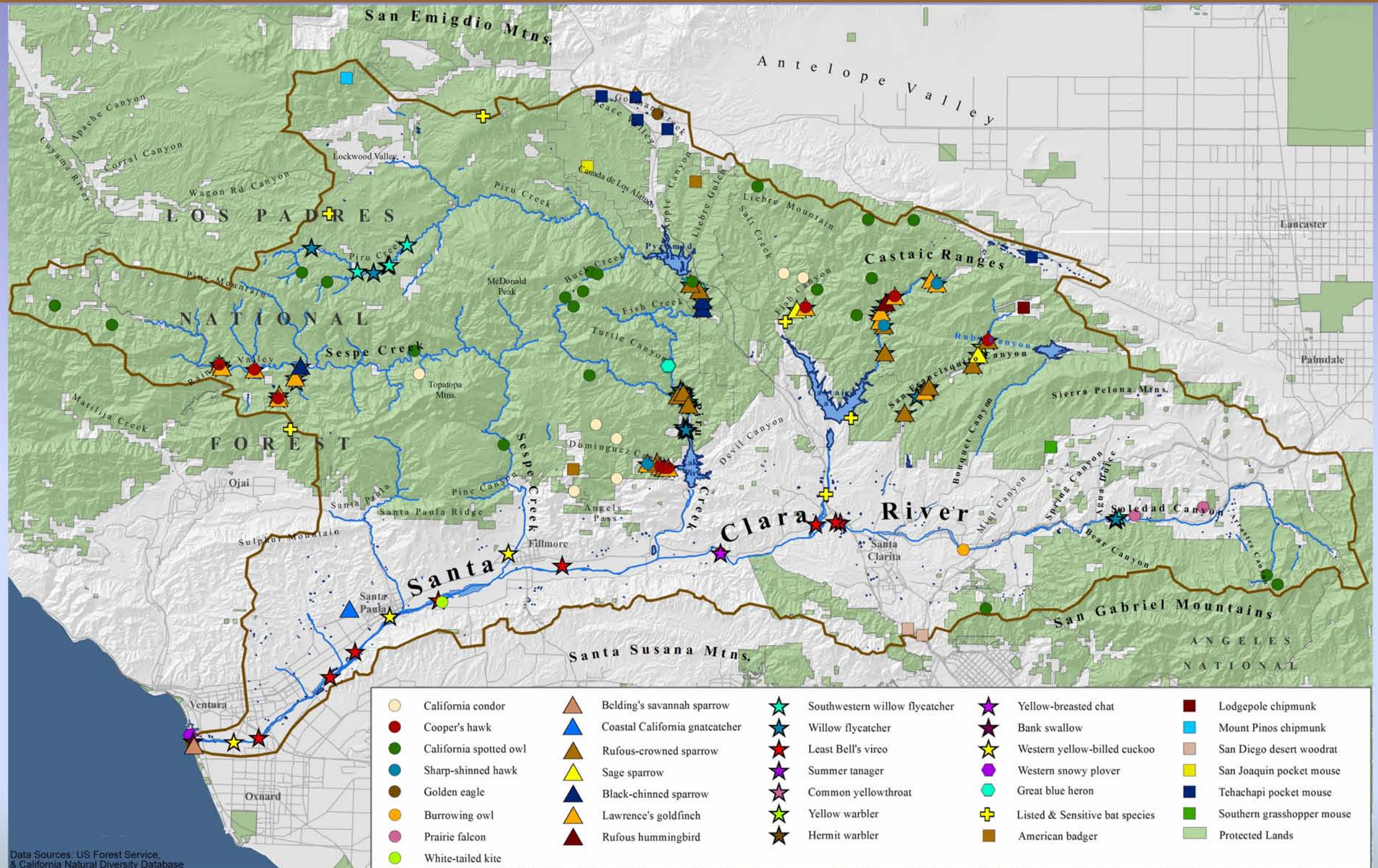


Bank swallow (*Riparia riparia*) is state listed as threatened. This swallow nests colonially in sand banks making it particularly vulnerable to disturbance. It has been recorded in the watershed near the coast.



Lawrence's goldfinch (*Carduelis lawrencei*) is a federal species of concern and on the Audubon and Partners in Flight watch lists due to its restricted range in California. This species has been recorded on National Forest lands in the watershed.

Recorded Occurrences of Listed & Sensitive Birds and Mammals



Data Sources: US Forest Service, & California Natural Diversity Database

Recovery of Endangered Species Depends on Habitat Protection & Restoration



Least Bell's vireo
(*Vireo bellii pusillus*)



Coastal California gnatcatcher
(*Polioptila californica californica*)



Arroyo toad
(*Bufo californicus*)



Red-legged frog
(*Rana aurora draytonii*)



Riverside fairy shrimp
(*Streptocephalus woottoni*)



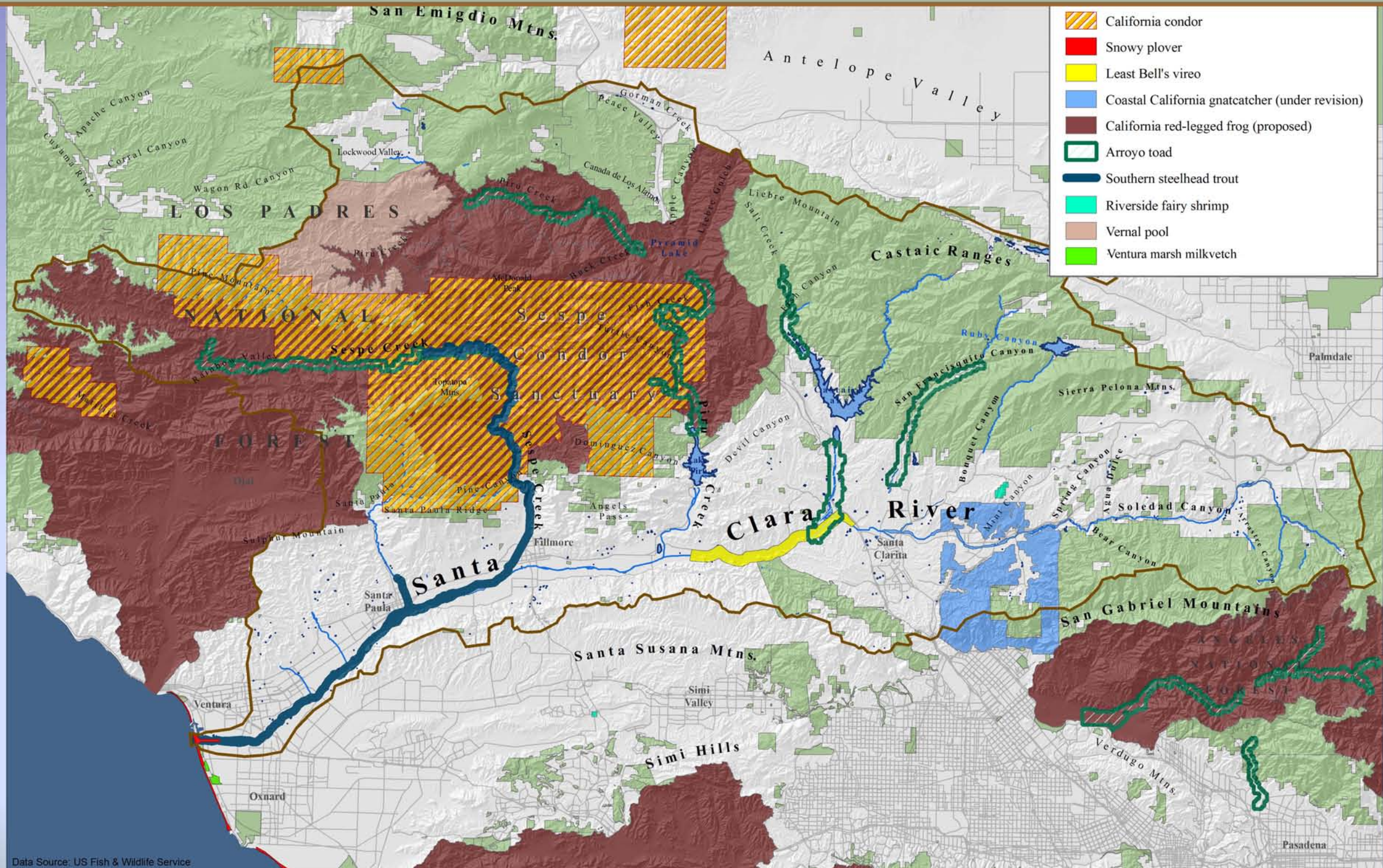
Southern steelhead trout
(*Oncorhynchus mykiss mykiss*)

The map to the right depicts areas of the watershed that have been designated as critical habitat for the 7 federally endangered species pictured here. The U.S. Fish and Wildlife Service defines critical habitat as specific geographic areas, whether occupied or not, that are essential to the conservation of a federally listed species. The most thoroughly documented of these species is the majestic California condor, which was brought in for captive breeding in 1987 when only 9 individuals remained in the wild. Since 1992 condors have been repatriated to the wild at the Sespe Condor Sanctuary where historical wild populations had last retreated. As of 2002, a total of 88 condors have been released in California and 38 remain free-flying. In April of 2002, the first wild-laid condor chick hatched in the Sesp-Piru area. The goal of the Condor Recovery Program is to establish a free-flying population of at least 150 birds in California. Biologists continue to track and monitor the recovery of this and other listed species whose recovery and survival depend on maintaining their habitat in our watershed. Although critical habitat has not been designated for all federally listed species that occur within our watershed, the wildlands of the Santa Clara River Watershed provide for the physical and biological needs of numerous resident and migratory species. Protecting and restoring natural habitats is essential to maintaining biodiversity in our watershed.



California condor (*Gymnogyps californianus*)

Critical Habitat for Endangered Species in Our Watershed



Data Source: US Fish & Wildlife Service

Riparian Habitats for Sensitive Migratory Songbirds



Summer tanager (*Piranga rubra*)



Lazuli bunting (*Passerina amoena*)

Populations of many birds that depend on riparian habitats in our watershed for breeding and nesting are declining. These declines are largely due to loss and degradation of riparian and upland habitats along stream and river corridors, caused by urban and industrial development, flood control projects, cattle grazing and agriculture. These activities have also caused an increase in non-native invasive plant and animal species, such as the Brown-headed cowbird (*Molothrus ater*), which parasitizes several sensitive riparian bird species. Free-roaming cats have also contributed to the decline of songbird populations. Over 97% of the wetland and riparian habitats once present in Los Angeles County are gone and what remains is severely threatened. Conservation and restoration of riparian habitats in the Santa Clara River Watershed is critical to the survival of many riparian dependent songbirds. Many plant and wildlife species in our watershed are regionally imperiled and will only persist if we protect the habitats they depend upon for survival.



Wilson's warbler (*Wilsonia pusilla*)



Black-headed grosbeak (*Pheucticus melanocephalus*)



Yellow warbler (*Dendroica petechia*)



Bullock's oriole (*Icterus bullockii*)



Orange-crowned warbler (*Vermivora celata*)



Vermilion flycatcher (*Pyrocephalus rubinus*)



Yellow-breasted chat (*Icteria virens*)



MacGillivray's warbler (*Oporornis tolmiei*)



*Santa Clara River, Soledad Canyon
© Andrew M. Harvey VisualJourneys.net*

Prime Habitat for Numerous Birds of Prey



Burrowing owl (*Athene cunicularia*)



Great horned owl (*Bubo virginianus*)

Natural habitats in the Santa Clara River Watershed also support numerous birds of prey. Many raptor species are experiencing population declines due to changes in land use that have eliminated or degraded habitats and movement corridors required by a number of raptors for survival. The rich mosaic of natural habitats in our watershed provide nesting and roosting sites, as well as prime hunting grounds for several birds of prey, from species that prefer to nest in riparian habitats such as the Cooper's hawk, to those that hunt in open grassland habitats such as the prairie falcon, to ground dwelling species such as the burrowing owl. Birds of prey are crucial to maintaining ecosystem balance in our watershed. They also consume many pest species, such as mice, rats, and destructive species of insects. As top predators, they are also indicator species of the overall health of our watershed.



Barn owl (*Tyto alba*)



Merlin (*Falco columbarius*)



Prairie falcon (*Falco mexicanus*)



Swainson's hawk (*Buteo swainsoni*)



California spotted owl (*Strix occidentalis*)



Red-tailed hawk (*Buteo jamaicensis*)



Cooper's hawk (*Accipiter cooperii*)



Long-eared owl (*Asio otus*)



Vasquez Rocks & the San Gabriel Mountains
© Andrew M. Harvey VisualJourneys.net

Optimal Roosting & Foraging Habitat for Sensitive Bat Species



Spotted bat (*Euderma maculatum*) is a federal and state species of special concern. They forage in a variety of habitats but roost only in cliffs. There are a few records for this species in the watershed but more distribution information is needed.

Bats are amongst the world's most valuable, yet misunderstood and endangered animals. Bat populations have declined worldwide in recent decades, with nearly 40% of bat species in North America endangered or candidates for such status. Bats face multiple threats such as pesticide poisoning, roost destruction and closure, habitat loss, over-exploitation, and extermination as pests. Bats often range widely in their foraging activities and habitat modifications such as urbanization, agriculture, and other land use practices may affect local plant and insect populations and thus the food resources of bats.

Bats play an essential role in keeping ecosystems healthy and in balance. Bats are important pollinators that help plants to produce fruits and seeds. And as fruit-eaters they help carry seeds to places where they can grow. They also ensure the survival of plants required by many other animals and as such can be used to illustrate the delicate balance of nature and the interdependence of life on earth. Just as pollinating activities of bats are important to plant ecology, the insectivorous food habits of bats play an important role in maintaining a balance among insect populations. Most species appear to be specialized to pursue and capture selected kinds of night-flying insects. Without bats by night and birds by day, we could be overwhelmed by insects that eat our crops and destroy our forests.

~ Bat Conservation International



Pallid bat (*Antrozous pallidus*) is as a state species of special concern. They prefer desert, chaparral, and scrub habitats and roost and nest in caves and other rocky habitats. This bat has been recorded on Forest Service lands and vast habitat exists for this species in the upper watershed.



Western mastiff bat (*Eumops perotis californicus*) is listed as a federal and state species of special concern. This bat prefers arid desert habitats but may also utilize open scrub and deciduous woodlands. This species has also been recorded on Forest Service lands in the watershed.



Yuma myotis bat (*Myotis yumanensis*) is listed as a federal and state species of special concern. They prefer riparian, arid scrub, and forest habitats near water for foraging. It roosts in caves, cliffs, trees, mines, and under bridges. Potential habitat for this species is also widespread in the watershed.



Fringed myotis (*Myotis thysanodes*) is a federal species of special concern. This species prefers caves and crevices in rocks in arid habitats. Extensive habitat occurs for this species in the upper watershed and it's been documented on Forest Service lands.



Rock Outcrop, Vasquez Rocks
© Andrew M. Harvey VisualJourneys.net

Essential Linkages for a Viable Wildlands Network in Southern California

Nature Needs Room to Roam

The native plant and wildlife species in our watershed need room to roam. Movement is essential to wildlife survival, whether it be the day-to-day movements of individuals seeking food, shelter, or mates, dispersal of offspring (e.g., seeds, pollen, fledglings) to new home areas, or migration of organisms to avoid seasonally unfavorable conditions. Movements can lead to recolonization of unoccupied habitat after environmental disturbances, the healthy mixing of genes among populations, and the ability of organisms to respond or adapt to environmental stressors. Maintaining connections among natural lands in the Santa Clara River Watershed is important for sustaining natural ecological processes and biological diversity.

Habitat loss and fragmentation are the leading threats to biodiversity, both globally and in southern California. Efforts to combat these threats must focus on conserving well-connected networks of large wildland areas. The three habitat linkages associated with the Santa Clara River Watershed are critically important landscape level connections that must be conserved if ecological and evolutionary processes are to continue operating in the South Coast Ecoregion, as they have for millennia. The biological integrity of the several thousand square miles of the very best southern California wildlands would be jeopardized if these linkages were lost.

Threats to natural habitats in our watershed have been recognized by federal, state, and local agencies, and non-governmental organizations that have launched a variety of successful planning efforts to conserve habitat in our watershed. The value of already protected land in the region for biodiversity conservation, watershed protection, environmental education, outdoor recreation, and scenic beauty is immense, but it can be irrevocably degraded if these remaining wildlands become disconnected.



The South Coast Missing Linkages Project has identified fifteen landscape linkages in southern California that are crucial to maintaining the ecological integrity of our existing conservation investments in the region. These fifteen linkages are biologically irreplaceable and imminently threatened, and three of these regionally important linkages (highlighted in the above map) are within the Santa Clara River Watershed.

Benefits of Protecting Habitat Connectivity in Our Watershed

- ◆ Provides both live-in and move-through habitat for countless native species, including many listed and sensitive species.
- ◆ Allows natural processes to operate in a semblance of their natural rhythms.
- ◆ Supports metapopulations (e.g., a network of semi-isolated populations with some level of migration among them, in which individual populations may go extinct but can then be recolonized by other populations).
- ◆ Ensures the availability of key resources for numerous native plants and animals, including food, shelter, host plants (e.g., for butterflies), pollinators, and other essential elements.
- ◆ Provides for semi-aquatic species that depend on upland habitats during some portion of their cycle, (e.g., western pond turtle that live most of their lives in water but lay their eggs in sandy upland habitats).
- ◆ Helps to reduce negative interactions between animals, their habitats and human activities, such as artificial night lighting, noise, pesticides & pollutants, and removal of natural vegetation.
- ◆ Protects upland habitats adjacent to riparian vegetation or other wetlands to prevent aquatic habitat degradation.



Regionally important habitat linkages in the Santa Clara River Watershed.

- ◆ Allows for natural processes of disturbance and subsequent recruitment to operate with minimal constraints from adjacent urban areas. The Linkage is wide enough such that the temporary devastation caused by fires, floods and other natural processes would not affect all habitats in the linkage simultaneously.
- ◆ Accommodates wholesale movements in natural communities due to climate change. Plant and animal distributions are predicted to shift (generally northwards or upwards in elevation in California) due to global warming. The linkage must therefore accommodate at least elevational shifts by being broad enough to cover an elevational range as well as a diversity of microhabitats that allow species to colonize new areas.

A Focal Species Approach to Linkage Conservation Planning

Focal species are organisms whose requirements for survival represent factors important to maintaining ecologically healthy conditions. As such, focal species are helpful in planning and managing networks of natural areas. The focal species approach recognizes that species move through and utilize habitat in a wide variety of ways. Some species may require multiple generations to move among natural lands in our watershed, while others may traverse a fair distance in a single night. Agency, academic and professional scientists specializing in a wide variety of disciplines participated in a series of workshops to identify focal species that represent the complexity of ecological interactions that can be sustained by successful linkage design. These focal species cover a broad range of habitat and movement requirements: some are widespread but require huge tracts of land to support viable populations (e.g., mountain lion, badger, mule deer, and California spotted owl); others are habitat specialists (e.g., acorn woodpecker in oak woodlands, California thrasher in dense chaparral) and others require specific configurations of habitat (e.g. western pond turtles that live most of their lives in water but lay their eggs in sandy upland habitats). Together, these focal species cover a wide array of habitats and movement needs in the region, so that planning adequate linkages for them is expected to cover connectivity needs for the ecosystems they represent. If we can maintain populations of these focal species, we can protect numerous other wildlife species and the habitats they need to survive.

Work being done in the Santa Clara River Watershed is being replicated across southern California in 15 critical linkages addressed by the South Coast Missing Linkages Project. This work is essential to protect our wildlife and to maintain ecological and evolutionary processes that promote genetic diversity, species diversity, habitat diversity, and landscape diversity in the South Coast Ecoregion. Southern California's archipelago of conserved Wildlands is fundamentally one interconnected system and the goal of the South Coast Missing Linkages Project is to keep it so.



Mountain lion



American badger



Mule deer



Pacific kangaroo rat



California spotted owl



Burrowing owl



Acorn woodpecker



California thrasher



Mountain kingsnake



Two-striped garter snake



Western pond turtle



Bear sphinx moth



California juniper



Scalebroom



Monterey salamander

Things We Can Do to Protect Wildlife in Our Watershed

Reduce traffic speed. Be an alert driver and reduce speed when traveling through wildlands to minimize wildlife mortality and vehicle collisions.

Don't feed wildlife. Don't give food to wildlife directly and don't leave pet food outside. Both can attract predators by attracting their prey.

Keep children safe. Don't let small children wander in wildlands unattended or play near dense vegetation.

Keep pets safe. Do not allow pets to roam in or near wildlands. Free roaming cats have decimated songbird populations, and they can also become easy prey for coyotes and other predators. Keep dogs leashed to protect your pet and wildlife. Feed pets indoors and lock pet doors at night.

Don't abandon unwanted pets. Releasing pets such as cats, turtles, frogs, or fish in or near wildlands can seriously alter natural community dynamics. For example, some frogs sold in pet stores (e.g., bullfrogs, African clawed frogs) have devastated populations of many aquatic and semi-aquatic species (e.g., arroyo toad, red-legged frog, western pond turtle).

Keep livestock secure. Install predator-safe enclosures for livestock and outdoor pets to avoid conflicts with wildlife. The Mountain Lion Foundation works with several ranchers and farmers to keep livestock safe with the ultimate goal of reducing the number of depredation permits issued for mountain lions.

Keep trash secure. Dispose of garbage in wildlife-proof containers.

Limit nighttime lighting. Homes abutting wildlands should have minimal outdoor lighting, always restricted to and directed toward the home and yard and not into wild areas.

Support ecological infrastructure. Encourage transportation agencies to use road improvement projects as opportunities to restore functional habitat connectivity across transportation barriers.

Limit noise. Loud noises can deter wildlife movement; alter habitat use patterns; and cause wildlife to flee into precarious situations.

Limit fencing. Large properties should minimize fencing to allow wildlife movement through wildlands.

Don't use pesticides. They can cause secondary poisoning in predators and scavengers, such as coyotes, hawks, and owls. Brodifacoum, an active ingredient in d-Con, is a commonly used rodent poison. Two mountain lions that died in the Simi Hills in 2005 ingested this poison by eating coyotes that had themselves eaten poisoned rats or mice.

Landscape for safety. Don't landscape with plant species that unnaturally feed wildlife. Enclose and protect garden areas from animals such as deer with fences, since attracting deer to our yards will also attract their predators.

Minimize use of irrigation. Excessive irrigation can create habitat for non-native invasive species such as Argentine ants and bullfrogs. Use native plants for landscaping. If using ornamental plants, use non-invasive drought tolerant species.

Keep barbeque clean. Brush or burn off all greasy buildup regularly to avoid attracting wildlife to our yards.

Advocate for the protection of watershed and linkage values. Encourage county and city planners to establish buffers along riparian zones.

Participate in your local community planning. Discourage major residential or urban development in the upper watershed, and along the river and its tributaries. Encourage well-planned communities that incorporate designs to slow flows, clean contaminants from runoff, and maintain wildlife movement corridors.

Become an active steward of the land. Learn more about our watershed and the wildlife that inhabits it to protect our critical natural resources.



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