The Nature Conservancy

SAVING THE LAST GREAT PLACES ON EARTH

Santa Clara River

Upper Watershed Conservation Plan

Fall 2006

A project funded in part by the
Santa Clara River Trustee Council ARCO Oil Spill Settlement

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This plan is dedicated to the memory of Dr. Frank Hovore –
whose presence we will dearly miss
and whose knowledge and devotion will continue to inspire.

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Executive Summary

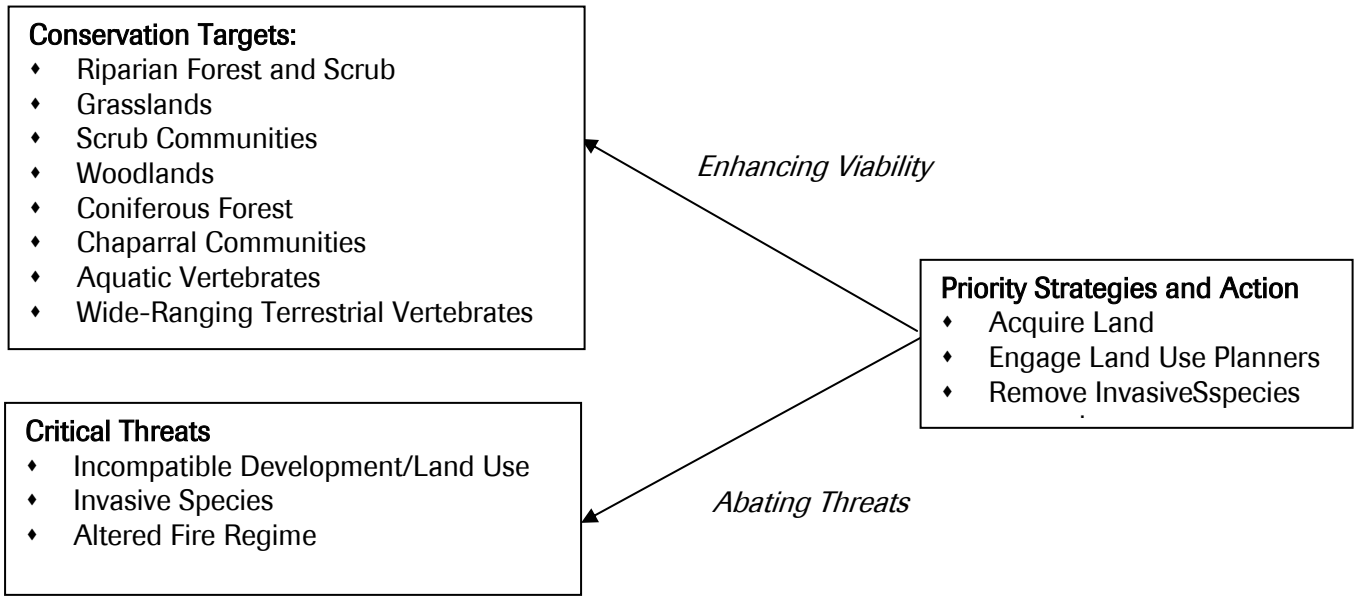
The upper watershed of the Santa Clara River encompasses an area of great biological richness. Those values, however, are increasingly threatened by the conversion of habitat to human land uses that are incompatible with biodiversity conservation, as well as by invasive species and altered fire regimes. The intent of this conservation plan is to focus collaborative, strategic conservation action to abate the main threats to — and enhance the viability of — the watershed's unique natural heritage.

Guided by The Nature Conservancy's conservation planning framework and the collective expertise of numerous stakeholders, this conservation plan highlights the ecological assets, or conservation targets, of the upper watershed (Figure 1). It analyzes land uses, conditions and activities that threaten the viability of the targets. Based on the analysis of targets and threats, the plan identifies strategies that can be undertaken by partners and stakeholders of the watershed to enhance the viability of the conservation targets as well as to abate the threats to them. Success in achieving the goals of this plan will be measured against short- and long-term benchmarks.

The goal of this plan, like the mission of The Nature Conservancy,[1] is

> ***To preserve the plants, animals and natural communities that represent the diversity of life in the upper Santa Clara River watershed, by protecting the land and waters they need to survive.***

Figure 1: Conservation Plan Summary — Conservation Targets, Threats, and Strategic Actions.



[1] The Nature Conservancy's mission statement uses "on Earth" where ours says "in the upper Santa Clara River watershed."

Introduction

Featuring one of coastal southern California's last naturally flowing major river systems, the Santa Clara River watershed is rich in biodiversity and severely threatened by conversion of habitat to human land uses. After five years of successful conservation in the lower portion of the watershed (located mostly in Ventura County), The Nature Conservancy brought together dozens of experts and partners from the public and private sectors to address the conservation needs of the upper portion of the watershed (located mostly in Los Angeles County). The goal was to create, through a participatory process, the foundations for a conservation plan to preserve the natural communities and natural processes of the upper watershed and to abate the threats to their continued viability. This plan builds upon that foundation and identifies priorities for conservation action that will lead to tangible conservation returns.

Project History

Since 1999 The Nature Conservancy (the Conservancy) has been working to safeguard and enhance the native biodiversity of the lower Santa Clara River watershed. The importance of the work has been described, and the work itself has been guided, by a number of the Conservancy's analyses, including these:

- *California Southwest Bioregional Conservation Analysis* (1993)
- *California South Coast Ecoregional Assessment* (draft 2004)
- *California 2010 Goal* (2004) prioritization analysis
- *LA-Ventura Project Initial Assessment* (1999)
- *Lower Santa Clara River Focus Plan* (2001)

As of summer 2006, working with partners, the Conservancy has acquired 16 properties on the main stem of the Santa Clara. These properties span 10.5 river miles or nearly one-third of the river's entire length in Ventura County.

Yet working only in the lower watershed is clearly not enough. To conserve the ecological integrity of the Santa Clara River system, conservation efforts must focus on the entirety of the river's watershed. It was for that reason that the Conservancy initiated this planning process to guide conservation actions in the upper watershed.

Key Stakeholders and Partners

Accomplishing ambitious conservation goals in the upper watershed in the face of immediate and pervasive threats requires the cooperation and commitment of many stakeholders and partners. Fortunately, many of these partners are already engaged in conservation efforts in the watershed.

An important nucleus for this collaborative effort is the network focused on the planning and protecting the wildlife corridor known as the San Gabriel-Castaic Linkage. It is one of 15 landscape linkages in the ecoregion identified by the South Coast Missing Linkages Project as irreplaceable and imminently threatened.[2] To help plan the corridor, representatives from many groups met informally over several years. These groups included South Coast Wildlands, the U.S. Fish and Wildlife Service, the Santa Monica Mountains Conservancy, the River and Mountains Conservancy, the Wetlands Recovery Project, the City of Santa Clarita, the U.S. Forest Service, and the Conservancy. Planning for

[2] The South Coast Missing Linkages Project is a highly collaborative effort among federal and state agencies and non-governmental organizations to identify and conserve landscape-level habitat linkages to protect essential biological and ecological processes in the South Coast ecoregion.

this linkage was completed in March 2004, and the group is continuing its work by protecting specific parcels within the linkage.

This Santa Clara River upper watershed conservation planning process built upon the partnership that coalesced around the need to protect the San Gabriel-Castaic Linkage. The planning process included the agencies and organizations listed above as well as many others such as the California Department of Fish and Game, the Conservation Biology Institute, the Friends of the Santa Clara River, the California Native Plant Society, U.C. Santa Barbara, U.C. Cooperative Extension, and many private consultants. For a complete listing of partners involved in this planning process, see The Planning Team at the front of this document.

This planning process was supported in part by The Santa Clara River Trustee Council, whose trustees include representatives from the U.S. Fish and Wildlife Service and the California Department of Fish and Game. The Trustee Council administers funds derived from the ARCO Oil Spill Settlement.

The South Coast Ecoregion

The Santa Clara River watershed lies within the California South Coast ecoregion (South Coast), which stretches from the coastal area of southern Santa Barbara County to El Rosario in Baja California.[3] The ecoregion is one of only five areas in the world that feature mediterranean-type ecosystems. Mediterranean ecosystems are characterized by wet winters, dry summers and year-round moderate temperatures. Occupying only 2 percent of the world's land area, mediterranean regions are extremely biologically diverse; in spite of their limited size, they harbor 16 percent of the Earth's plant species.[4] Because of the rich biodiversity and high rate at which natural areas are being destroyed, Conservation International has designated coastal California as one of the world's 25 "Hot Spots" for biodiversity.[5]

In addition to containing a globally significant habitat type, the South Coast is one of the most biologically diverse ecoregions in North America. The South Coast contains at least 138 endemic plant and animal species and more imperiled species than any other ecoregion in the continental United States (CBI 2005). In addition, four of California's twelve ecoregions, as identified by the Conservancy, converge in the Santa Clara watershed — the Central Coast, Great Central Valley, Mojave, and South Coast (Groves 2000). This confluence makes the upper Santa Clara River watershed a unique ecological crossroads.

Its well-known pleasant climate also makes the South Coast one of the most coveted places to live in the world, and it has a large and growing population. Human land uses, most notably urbanization, have altered or destroyed up to 95 percent of southern California's historical wetlands. With few places left to nest and forage, many wetland-dependent species are now threatened or endangered. The Santa Clara River watershed provides a refuge for many of those species.

The Santa Clara River

The Santa Clara River flows roughly 86 miles from the San Gabriel Mountains to the Pacific Ocean. With a 1,600-square-mile watershed, the system is the second largest in the South Coast and the last to remain in a relatively natural state — in stark contrast to other southern California rivers, such as the Los Angeles, San Gabriel, and Santa Ana, which are heavily dammed and lined by concrete channels.

In the Santa Clara's upper watershed, the 650,000-acre Angeles National Forest lies north and south of the main stem, divided by a rapidly urbanizing corridor along the river's banks. The nearly two-million-acre Los Padres National Forest, including the Sespe Wilderness, covers much of the northwest portion of the watershed.

Elevations in the watershed range from nearly 9,000-foot Mt. Pinos down to sea level. The Santa Clara River drains portions of the San Gabriel, Sierra Pelona, Los Padres, and Santa Susana Mountains.

As a South Coast river, the Santa Clara is an extremely dynamic and flashy system, prone to drought and flood events, as well as fire, landslides and seismic activity. During periods of drought, much of the riverbed can be dry and dusty. As evidenced by the infamous Day Fire, wildfires sweep entire mountain ranges and river segments, leaving denuded lands vulnerable to mudslides and erosion. Seismic events can disrupt the Santa Clara by causing oil or wastewater pipelines to rupture, sending contaminants into the river. Heavy rains can cause massive flooding and swell the river to flows more

[3] An ecoregion is a large area of land and water that contains a geographically distinct assemblage of natural communities. Ecoregions are defined primarily by similar landforms, climate, ecological processes, and vegetation.
[4] See: ***http://conserveonline.org/workspaces/global.med.assessment***
[5] See: ***http://www.biodiversityhotspots.org/xp/Hotspots/california_floristic/***.

than three times the normal, dam-controlled high flows of the Colorado River as it runs through the Grand Canyon. These floods can damage or destroy personal property and infrastructure along the river's banks and scour the riverbed bare of vegetation.

An estimated 17 species listed by the state and/or federal government as threatened or endangered can be found in the Santa Clara River watershed. Many of them are present in the upper watershed (see Appendix A, *Threatened, Endangered and Rare Species in the Upper Santa Clara River Watershed*). The watershed includes critical habitat for the California red-legged frog, arroyo toad, and least Bell's vireo (CBI 2005). In addition, the upper watershed contains populations of the southwestern pond turtle, Santa Ana sucker, and slender-horned spineflower. Many of these species were considered in the development of this plan.

The Upper Watershed

We define the Santa Clara River upper watershed to include the sub-watersheds of the tributaries that join the main stem upstream from (east of) Piru Creek, and including the Piru Creek watershed. The lower Santa Clara watershed encompasses the remaining watershed, which lies mostly within Ventura County. (See Map 1, *Upper Watershed of the Santa Clara River*).

The upper watershed features five major tributaries: Piru Creek, Castaic Creek, San Francisquito Creek, Bouquet Canyon, and Mint Canyon. With the exception of the Vern Freeman diversion, all of the regulated flows in the system occur in the upper watershed. Two reservoirs are located on Piru Creek. Pyramid Lake, which receives State Water Project (SWP) water, provides artificially perennial flows to Lake Piru, held by Santa Felicia dam (1955). Castaic Lake, which also receives SWP flows, is maintained by Castaic Lake Water Agency. And finally, Bouquet Reservoir sits behind Bouquet Canyon Dam and is operated by the Los Angeles Department of Water and Power.

While portions of the upper Santa Clara River have perennial flows, most of the upper watershed is dry in the absence of storms. Perennial flows occur west of the Bouquet Creek confluence, largely due to discharges from the Valencia and Saugus wastewater reclamation plants. The dry segment near the confluence of Bouquet Canyon is essential to the genetic isolation of the unarmored three-spine stickleback in the upper watershed, keeping it from interbreeding with its close relative, the armored three-spine stickleback, found downstream.

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The Upper Watershed of the Santa Clara River

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Situational Analysis: Land Use Patterns and Trends

Infrastructure

Major infrastructure and associated development in the entire watershed follow both the river channel and several major regional transportation corridors. The Santa Clara River watershed is traversed by Interstate 5, which runs north-south in Los Angeles County and separates the Los Padres and Angeles National Forests; US 101, running north-south through coastal Ventura County; Highway 126, running east-west and connecting I-5 to US 101; and Highway 14, running east-west through Los Angeles County to the east of I-5.

Land Ownership

Approximately 467,000 acres, or 66 percent, of the upper watershed is in public ownership, mostly within the Los Padres and Angeles National Forests. The national forests are mainly made up of higher-elevation lands featuring chaparral shrub and coniferous forests, with some riparian and woodland habitats along the waterways. The Angeles is bisected by private lands, the Santa Clara River and Highway 14. The San Gabriel-Castaic Linkage, a major wildlife corridor, connects the two sections of the forest (Penrod 2004). This corridor has been identified as one of the 15 highest-priority wildlife linkages in the ecoregion.

The lower-elevation lands that directly surround the Santa Clara River are predominantly in private ownership. Private landholdings are mostly small, ranging from city lots (15 percent of the upper watershed) to ranchettes of 5 to 40 acres (15 percent) to agricultural lands, mostly in Ventura County, commonly held in plots of 40 to 300 acres (4 percent). In addition to urban and agriculture, other common land uses include oil drilling sites, aggregate mining operations, privately owned campground facilities, and livestock grazing.

Urbanization and Sprawl

The most significant trends in the upper watershed are increasing urbanization and suburban sprawl. Encompassing 45 square miles, the City of Santa Clarita is one of the fastest-growing cities in Los Angeles County. Surrounding Santa Clarita are the unincorporated communities of Acton, Aqua Dulce, Castaic, Canyon Country, Newhall, and Valencia. The Conservation Biology Institute cites reports of up to 60,000 planned homes in the Santa Clarita Valley alone (2005).

More than 40 percent of the watershed's population is found within the City of Santa Clarita (CBI 2005). Between 1990 and 2000, the population living in the upper watershed grew 32 percent, from 172,395 to 228,190. Acres of developed land increased from 21,760 in 1990 to 28,180 in 2004, according to the California Department of Conservation's Farmland Mapping and Monitoring Program (2004). Over half of this increase, 5,166 acres, was due to the conversion of natural lands to developed lands. Another third of the increase, 3,500 acres, came from the conversion of grazing lands.

Water Supply and Quality

In addition to sustaining natural habitat, the Santa Clara River watershed provides public drinking water and irrigation water for agriculture,. In the upper watershed, 60 percent of the water supply comes from the State Water Project, with the remaining 40 percent coming from local groundwater (CBI 2005). Castaic Lake Water Agency conveys the State Water Project supplies to four retailers in the Santa Clarita Valley: Los Angeles County Water Works District No. 36, Newhall County Water District, Santa Clarita Water Company, and Valencia Water Company (Birosek 2006).

Five municipal wastewater reclamation and/or treatment plants release effluent into the Santa Clara River. The facilities are located in Valencia, Saugus, Fillmore, Santa Paula, and Ventura. Valencia has a design flow of 21.6 million gallons per day; Saugus, 6.5 million gallons per day (Birosek 2006).

Although water quality in the Santa Clara River is generally regarded as good (CBI 2005), issues with nitrate and chloride have been noted in the upper watershed. Concentrations of nitrates have been detected in wells in Mint Canyon and they are thought to be derived from the reliance on septic waste disposal systems (Birosek 2006). Elevated chloride concentrations that have been detected coming from Valencia and Saugus wastewater reclamation plants are due to domestic use of water softeners (Birosek 2006).

Other Land Uses

In addition to high-density residential development, the upper watershed contains low-density residential and industrial uses. Resource extraction also occurs in the area, including oil production, tree harvesting and gravel mining, as well as agriculture and grazing. The Santa Clara River watershed provides a variety of recreational opportunities, including fishing in reservoirs and in tributaries, campgrounds along the riverbed and in the public lands, off-road vehicle trails, and hunting grounds.

Conservation Assessment

Our Approach

As a science-based conservation organization, The Nature Conservancy has, over the past 20 years, developed and refined a planning approach known as the *Five-S Framework for Site Conservation* (2000). This framework has been successfully used to develop hundreds of conservation plans throughout the world, including the *Lower Santa Clara River Focus Plan*. For a summary of the framework, see Appendix B, Five-S Framework.

The Conservancy convened a series of workshops to engage partners and stakeholders in completing the Five-S Framework for the upper watershed. The collaborative process involved more than two dozen partners and three workshops between July and November 2005. In these workshops participants identified the natural communities and species to be conserved, the threats to their viability and the opportunities for their protection, enhancement or restoration. Conservancy science, planning and program staff then built upon these foundations to set strategic priorities and identify actions to be taken. The results of the planning process are presented here.

The collaborative development of this plan was an integral part of creating a shared conservation vision and work plan for partners and stakeholders in the upper watershed.

Conservation Targets

Landscape-scale conservation begins with understanding the priority conservation targets in an area. A conservation target is an element of biodiversity that serves as the focus of planning efforts. These targets may include ecological systems, ecological communities, plant or animal species, or other important resources. Conservationists can then develop strategies to protect and enhance the viability of those targets.

The upper Santa Clara watershed contains a wide array of natural communities and habitats, ranging from high-elevation coniferous forests to the creeks and streams that flow to the Santa Clara. We have identified several major vegetation community types and species assemblages as conservation targets. The selected targets are broad enough to encompass characteristic plant and animal species that represent the biodiversity of the upper watershed. Nested within each focal conservation target are sub-targets — threatened or endangered species, special plant assemblages, and animal species that utilize the habitat-based targets. Generally, the targets and nested targets co-occur within the landscape, share ecological processes and face similar threats.

Floral Targets

To capture the main habitat features of the upper watershed, six of our eight conservation targets are broad vegetation communities. Within those broad target categories is a great diversity of plant and animal assemblages that collectively are characteristic of the region. For example, within the broad target of *scrub communities* are areas dominated by coastal scrub species, areas dominated by desert scrub species, and a unique transition zone where both coastal and desert influences co-occur. Priority conservation areas will seek to protect the best representations of these communities.

Faunal Targets

While the floral targets can perhaps be conceived of as discrete landscape elements, the two faunal targets (aquatic vertebrates and wide-ranging terrestrial vertebrates) were selected because they rely on the interconnections among the various vegetation communities. For example, maintaining a population of mountain lions — with each individual requiring a very large home range — requires a network of conservation lands that traverse many of the target communities.

The aquatic vertebrates target captures the watershed's need for a functional hydrologic network. A viable regional population of native fish or amphibians, for example, may be thought of as a metapopulation — a population that is spread out over the river and its tributaries, but in discrete areas that are separated from one another. In a functional metapopulation, a network of suitable habitat exists — but at any one time, not all of those suitable patches of habitat are necessarily occupied. Subpopulations may establish themselves in a given area and may later go extinct there, only to be reestablished by colonization from a more or less discrete subpopulation occupying a neighboring stretch of river. The viability of the wider population relies on the dynamic among a dispersed array of habitat patches that are connected by occasional dispersal events such as floods.

The metapopulation model may provide an especially helpful framework for conservation planning in this dynamic river system. The Santa Clara River is a flashy river that experiences episodic cycles of flooding and drought. The spatial and temporal pattern of watered and dewatered reaches is an important attribute of the habitat the river provides for native species. Fire, earthquake, scouring, drought, and even human-caused events (e.g., oil spills) can render regions of this hydrologic network temporarily unsuitable as habitat for some native species. It is therefore important to protect multiple habitable and potentially habitable patches in the watershed so that species can find refuges when such events occur. It is important that connectivity and dispersal potential be maintained so that recolonization of unoccupied habitat can eventually occur when conditions are favorable.

Conservation of faunal species, therefore, requires that we create a functional conservation network across the various floral targets.

The following table summarizes the conservation targets, indicators of target health and sub-targets. For a detailed discussion of each conservation target, see Appendix C, *Conservation Targets and Sub-Targets.*

Table 1: Conservation Targets – A summary of the conservation targets, their viability and sub-targets.

Conservation Target	% of upper watershed	% private lands	Viability Indicators	Sub-targets
Riparian Forest and Scrub Communities	3%	60%	• Functional protected patches • % native cover • Presence and breeding success of sub-targets • Natural hydrologic regime • Connectivity – up and downstream, to uplands	• Cottonwood-willow riparian forest • Alluvial fan scrub • Southern coast live oak riparian forest • Southern sycamore alder riparian woodland • Riparian-dependent bird species (least Bell's vireo, southwestern willow flycatcher)
Grasslands	5%	76%	• Functional protected patches • % relative native species cover • % adjacent to other natural communities • Natural fire regime	• Vernal pools • Wildflower fields • California Orcutt grass • Spreading navarretia • Grassland-dependent bird species
Scrub Communities	25%	64%	• Functional protected patches • % relative native species cover • % adjacent to other natural communities • Representations of transitional scrub from Mojave and Great Central Valley	• Mojave scrub (desert buckwheat, California juniper, mixed desert scrub) • Basin sagebrush • Slender-horned spineflower • Scrub-dependent bird species • Coast horned lizard • Coastal western whiptail
Woodlands	3%	20%	• Functional protected patches • Recruitment • Natural fire regime • Representations of transitional woodlands	• Oak woodlands (canyon live, valley, California black, blue), many indicative of the transition zone • Black walnut woodlands • Pinyon-juniper woodlands • Woodland-dependent bird species
Coniferous Forest	15%	8%	• Functional protected patches • % adjacent to other natural communities • Natural fire regime	• Pines (Single-leaf Pinyon Pine, Jeffrey Pine) • Mixed conifer – pine and bigcone Douglas-fir • Forest-dependent bird species (CA condor, spotted owl, SW willow flycatcher) • Bighorn sheep • Arroyo toad
Chaparral Communities	42%	13%	• Functional protected patches • % relative native species cover • % adjacent to other natural communities • Natural fire regime	• Chaparral (northern mixed, semi desert, foothill mixed, montane mixed) • Chamise • Scrub oak • Chaparral-dependent bird species
Aquatic Vertebrates			• Presence and breeding success of sub-targets • Connectivity – to up- and downstream populations, to uplands • Natural hydrologic regime • Water quality	• Unarmored three-spine stickleback (UTS) • Southwestern pond turtle • Arroyo toad • Santa Ana sucker • Arroyo chub • Two-striped garter snake
Wide-ranging Terrestrial Vertebrates			• Functional protected wildlife linkages	• San Gabriel-Castaic Wildlife Linkage • Santa Monica-Sierra Madre Wildlife Linkage

Target Viability

Viability indicators provide a means to assess the current and future health, or viability, of the conservation targets. For the first seven targets[6] we identified key ecological attributes critical to the long-term viability of each target. These attributes fell into three categories: 1) size — measuring area or abundance of the target's occurrence; 2) condition — measuring the composition, structure and biotic interaction that characterize the occurrence; and 3) landscape context, which examines ecological processes that allow the target to function and connectivity to resources that help the target to sustain environmental change through dispersal or migration. The table below summarizes the viability ranking for each conservation target.

Table 2: Target Viability Summary – Viability rankings of each conservation target's key attributes.

Conservation Targets		Ecological Attributes			Viability Rank
		Landscape Context	Condition	Size	
1	Riparian Forest and Scrub Communities	Fair	Good	Fair	Fair
2	Grasslands	Fair	Fair	Poor	Fair
3	Scrub Communities	Poor	Good	Fair	Fair
4	Woodlands	Good	Fair	Fair	Fair
5	Coniferous Forest	Poor	-	Very Good	Fair
6	Chaparral Communities	Poor	Good	Very Good	Fair
7	Aquatic Vertebrates	Fair	Good	Fair	Fair
Site Biodiversity Health Rank					Fair

While individual indicators ranged from "very good" to "poor," the overall current condition of all the targets is "fair." Definitions of the ranking are as follows:

- Very Good — the factor or target is naturally functioning and requires little human intervention.
- Good — the factor or target is functioning within its range of acceptable variation; it may require some human intervention.
- Fair — the factor or target lies outside its range of acceptable variation and requires human intervention. If unchecked, the target will be vulnerable to serious degradation.
- Poor — Allowing the factor or target to remain in this condition for an extended period will make restoration or preventing extirpation practically impossible (Low 2003).

Thus the conservation assessment determined that conservation targets in the upper Santa Clara River watershed are generally functional but require active conservation to prevent further decline.

[6] Because indicators for wide-ranging vertebrates are not practically available, we omitted this target during the viability portion of the analysis.

Threats

Threats destroy, degrade or impair conservation targets by detrimentally affecting some aspect of a target's viability (Low 2003). Using the Five-S Framework, we analyzed threats in two steps. The first identified the stresses on the targets, and the second focused on the sources or causes of those stresses.

Stresses are unnatural disturbances that negatively affect the viability or heath of conservation targets. Examples include altered stream hydrology and habitat destruction. Once identified, we ranked each stress based on the severity of damage anticipated under current conditions in the next ten years and on and the expected geographic scope of that damage.

Each stress has one or more causes or sources. Continuing the example from above, altered stream hydrology is caused by bank stabilization or channelization, dams and diversions, and the release into the river of effluent from sewer treatment plants. Habitat destruction is caused by incompatible urban development and invasive plants. We ranked these sources based on the degree that they contribute to the existing stress and on the irreversibility of the stress's impacts. The scale ranged from low to very high, with the following definitions:

- Low — the source is a low contributor of the stress and/or produces a stress that is easily reversible at relatively low cost.
- Medium — the source is a moderate contributor of the stress and /or produces a stress that is reasonably reversible.
- High — the source is a large contributor of the stress and/or produces a stress that is reversible, but not practically affordable.
- Very High — the source is a very large contributor of the stress and/or produces an irreversible stress (Low 2003).

The table below summarizes the sources of threats and their impacts on the targets in the upper watershed.

Table 3: Threat Summary – List of threats to each conservation target and the threat's ranking.

Threats Across Systems		Riparian Forest and Scrub Communities	Grasslands	Scrub Communities	Woodlands	Coniferous Forest	Chaparral Communities	Aquatic Vertebrates	Overall Threat Rank
1	Incompatible development	Medium	High	Very High	Medium	Low	High	Medium	High
2	Altered fire regime	High	High	High	High	Low	High	High	High
3	Invasive plants	Medium	High	Medium	High	Low	Medium	- [7]	High
4	Gravel mining	Low	-	High	-	-	Medium	Medium	Medium
5	Incompatible road construction	-	-	High	-	-	Medium	Medium	Medium
6	Bank stabilization / Channelization	Medium	-	-	-	-	-	High	Medium
7	Dams and diversions	-	-	-	-	-	-	High	Medium
8	Cow bird parasitism	Medium	-	Medium	Low	-	Low	-	Medium
9	Incompatible livestock grazing	-	Medium	-	Medium	-	-	-	Medium
10	Oil & gas drilling	Low	-	-	-	Low	-	Medium	Low
11	Sewer treatment plant effluent	-	-	-	-	-	-	Medium	Low
12	Invasive herps	-	-	-	-	-	-	Medium	Low
13	Incompatible recreational use	Low	-	-	-	Low	-	-	Low
14	Unsustainable groundwater pumping	Low	-	-	-	-	-	-	Low
Threat Status for Targets and Site		Medium	High	Very High	High	Low	High	High	High

[7] The threat of invasive plants to aquatic systems is taken into account in the Riparian Forest ranking.

The threats analysis ranked three threats to the upper watershed as critical: incompatible urban development, altered fire regimes, and invasive plants. In addition, there are four other high-ranking threats to a particular conservation target: gravel mining, incompatible road development, bank stabilization or channelization, and dams and diversions. The following discussion explores the stresses and sources of the critical and high-ranking threats.

Incompatible Development

Development includes residential, industrial and commercial development, along with supporting infrastructure. When it is "incompatible," it adversely affects the functionality of a conservation target (see Map 2, *Ecological Integrity*). In the upper watershed, incompatible development negatively affects all of the conservation targets by causing one or more of the following stresses:

- *Habitat destruction* — Converts native habitat to human land uses, reducing the total area of available habitat, perhaps below the amount necessary to sustain survivorship or reproduction of some species.
- *Habitat fragmentation* — Divides historically contiguous natural communities, creating smaller patches of habitat that could cease to be functional as a result of the diminished size or due to lack of connection to other natural communities. The intervening human land uses may be hostile to native species and preclude their movement from one patch of habitat to the next. Impermeable developed lands also disrupt important ecological processes like migration, fire and hydrological regimes.
- *Habitat degradation* Human activity or proximity to human land uses often alters, and can degrade, native species. Negative effects range from the invasion of non-native pest plants or animals, to the reduction of breeding success due to chemical or even light pollution, to the alteration of the natural fire regime.

The threat of incompatible development is most acute in the portions of the watershed with lesser slopes. These areas also tend to be close to the riparian corridor and almost entirely on private lands. Thus there is little current protection of the lands most susceptible to development.

Altered Fire Regime

Fire is a natural and essential process in this semi-arid region (see Map 3, *Fire Regime*). Much of the native diversity is fire adapted, even fire dependent — that is, it needs fire to regenerate. Yet fire regimes have been altered in most of the upper watershed, negatively affecting essentially all of the natural communities (see Map 4, *Fire Condition*).

Changes in fire regime differ by vegetation community as well as by proximity to human land use (e.g., proximity to homes and roads). In many of the higher-elevation areas, suppression of fire has resulted in an accumulation of forest fuels such that when fires now begin, the likelihood of a large, catastrophic, essentially unmanageable fire is greatly increased. Suppression may also have the effect of increasing the intensity of fires when they do occur. The ability of native biota, even fire-adapted biota, to survive fire declines as burn intensity increases. Overly frequent fire can also pose a threat to native diversity by favoring regeneration of non-native habitat types. For example, recurring human-caused fire in scrublands may preclude post-fire recovery of shrubs and trigger a grass-fire cycle that perpetuates itself. Disruption of the natural fire regime can therefore reduce habitat quality and contribute to the spread and establishment of non-native plant communities.

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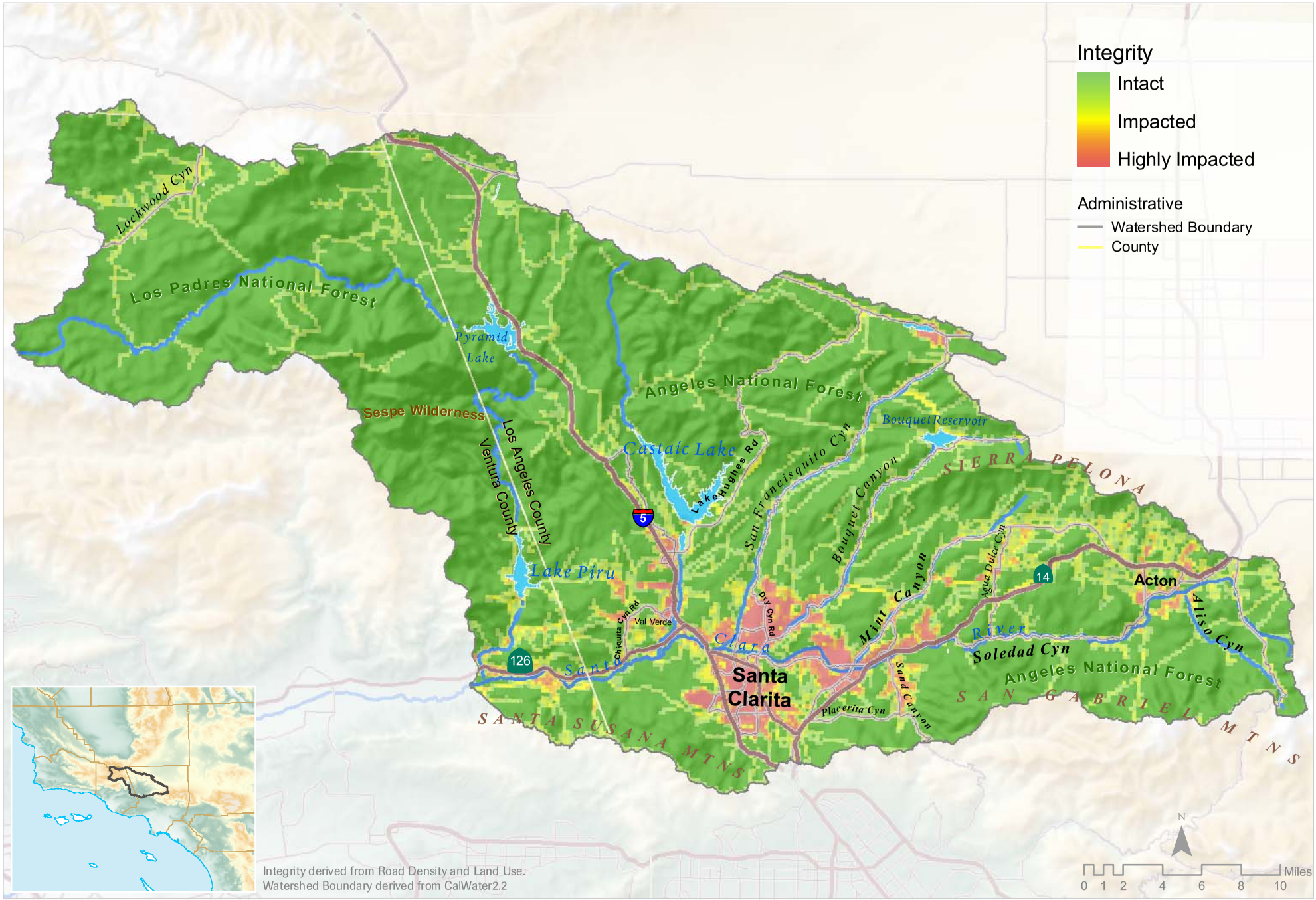
Santa Clara River, Upper Watershed

Map 2: Ecological Integrity



Integrity derived from Road Density and Land Use.
Watershed Boundary derived from CalWater2.2

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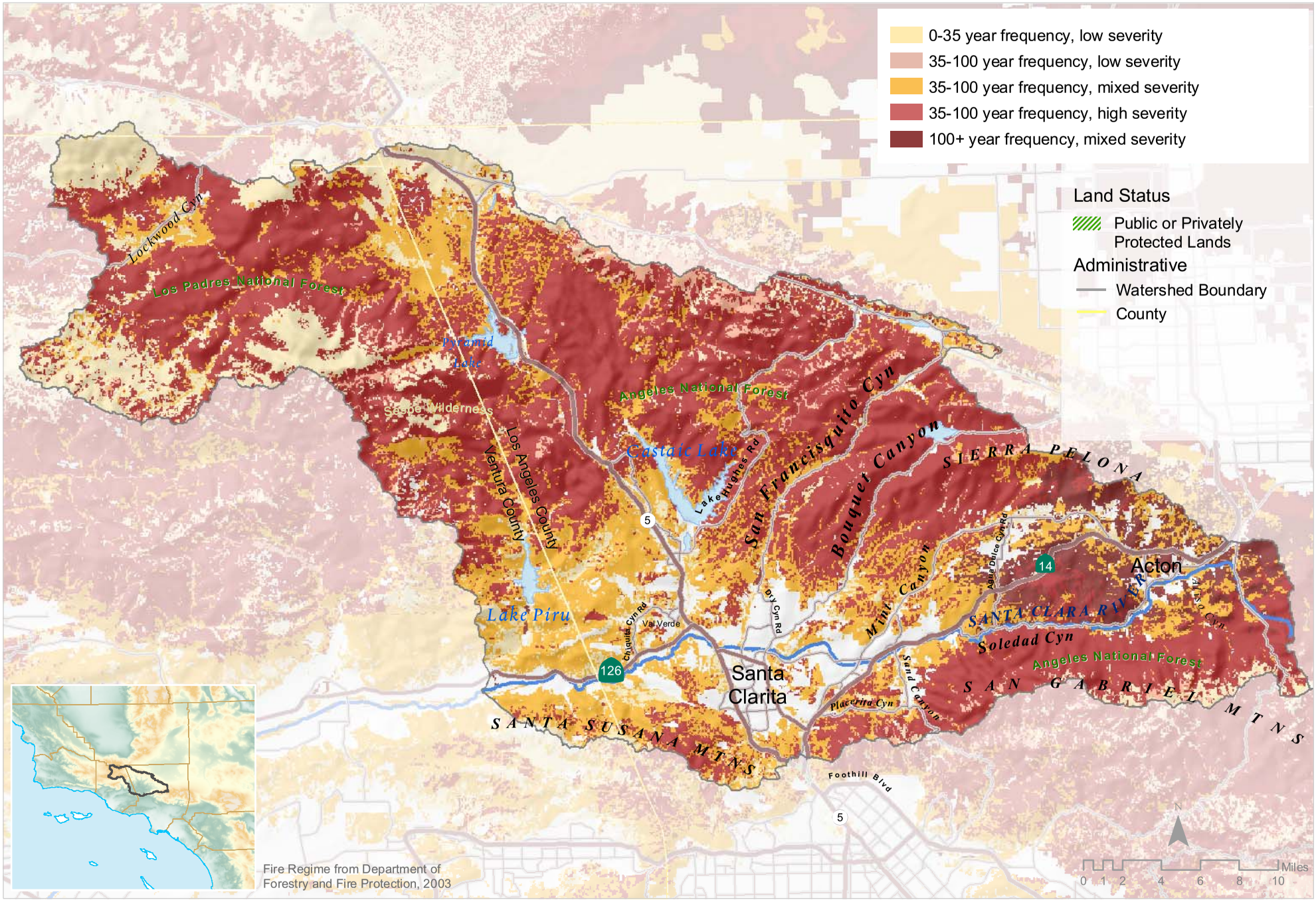
Santa Clara River, Upper Watershed

Map 3: Fire Regime



Fire Regime from Department of Forestry and Fire Protection, 2003

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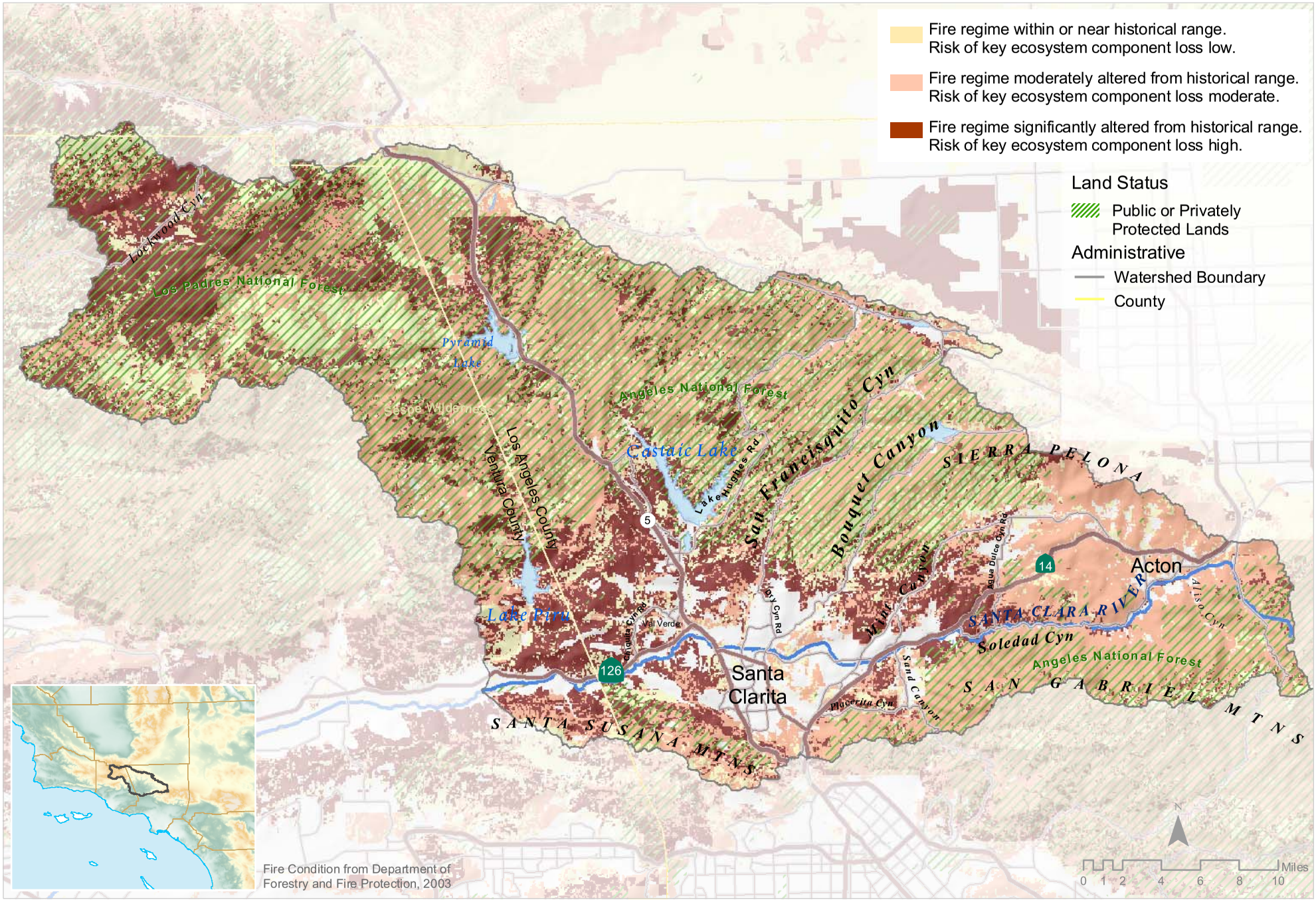
Santa Clara River, Upper Watershed

Map 4: Fire Condition



Fire Condition from Department of Forestry and Fire Protection, 2003

Invasive Plants

Invasive plants threaten the viability of all conservation targets. The types of invasive plants vary throughout the watershed, but their impacts are generally similar. Invasive plants can

- *Decrease quality or quantity of habitat* — Invasive plants can outcompete and replace native vegetation, resulting in the loss of food resources or other habitat attributes for native wildlife.
- *Decrease water quantity* — Invasive plant species, such as arundo, eucalyptus, and tamarisk, can consume more water than native plants, reducing water in the riverbed as well as groundwater (VCRCD 2006).
- *Decrease water quality* — Major invasive plant infestations that replace native plant canopy can reduce shade in the riparian zones. The resulting increased water temperatures lead to decreased dissolved oxygen, to the detriment of native aquatic vertebrates (VCRCD 2006).
- *Alter fire regimes* — Invasive plants interrupt natural fire regimes by altering the extent and vertical density of fuels. Along the riparian corridor, arundo can cause fires to spread quickly, burn more intensely, and carry ground-level burns to the mature overstory canopies. In the uplands, eucalyptus also tends to burn more intensely, making fires more difficult to extinguish.
- *Alter geomorphology* — Large stands of invasive plants in channels may trap sediment and narrow the stream channels, potentially causing downstream erosion and increasing flooding (VCRCD 2006).

Invasive plants also pose threats and costs to humans. For example, some riparian pest plants can exacerbate hazards of flooding and bank erosion. It is common for the riverbed to be scoured during big storm flows. Large masses of scoured arundo (which has shallow roots compared to native riparian vegetation) have been known to accumulate under bridges and in culverts, backing up stream flows and potentially flooding adjacent properties (VCRCD 2006).

Conservation Vision

The cooperating organizations' long-term conservation vision for the upper Santa Clara River watershed is to

- Protect and enhance quality representations of each natural community conservation target and of the characteristic variation within those communities.
- Protect and enhance populations of aquatic vertebrate and wide-ranging terrestrial vertebrate conservation targets.
- Connect protected natural communities and populations.
- Eliminate unnatural disturbances to ecological processes, including altered fire regimes and disruptions to the natural hydrologic function of the Santa Clara River.
- Abate threats to the viability of conservation targets.

The following sections provide conservation strategies to accomplish, on different time scales and over diverse geographies, this conservation vision for the Santa Clara River's upper watershed.

Conservation Focus Areas

The pattern of land ownership in the upper watershed divides the study area into general categories. Higher elevations tend to support relatively intact landscapes that fall within public ownership, primarily U.S. Forest Service lands. The main stem of the Santa Clara is where more intensive human land uses concentrate, such as transportation corridors, urbanization, extractive industry, and irrigated agriculture. Between the river corridor and the public lands lies a matrix of private lands that are subject to varying intensities and types of land use. It is useful to consider threats and strategies in three broad categories — public, private, and urban. The plan takes these categories into account in identifying cross-watershed strategies. We also examine issues with a finer resolution in subregions within the watershed. Those subregions, or "conservation focus areas," are composed of broad ecological units — for example, the watershed of a major tributary to the river.

The conservation focus areas include Acton, Santa Clarita, Mint Canyon, Bouquet Canyon, San Francisquito Canyon, Castaic Canyon, and Piru Creek (See Map 5, *Conservation Focus Areas*). The map delineates the focus areas and Table 4 summarizes the conservation targets, land uses, and threats in each focus area. For a detailed discussion of the conservation focus areas, including targets, land uses and threats, see Appendix D, *Conservation Focus Areas*.

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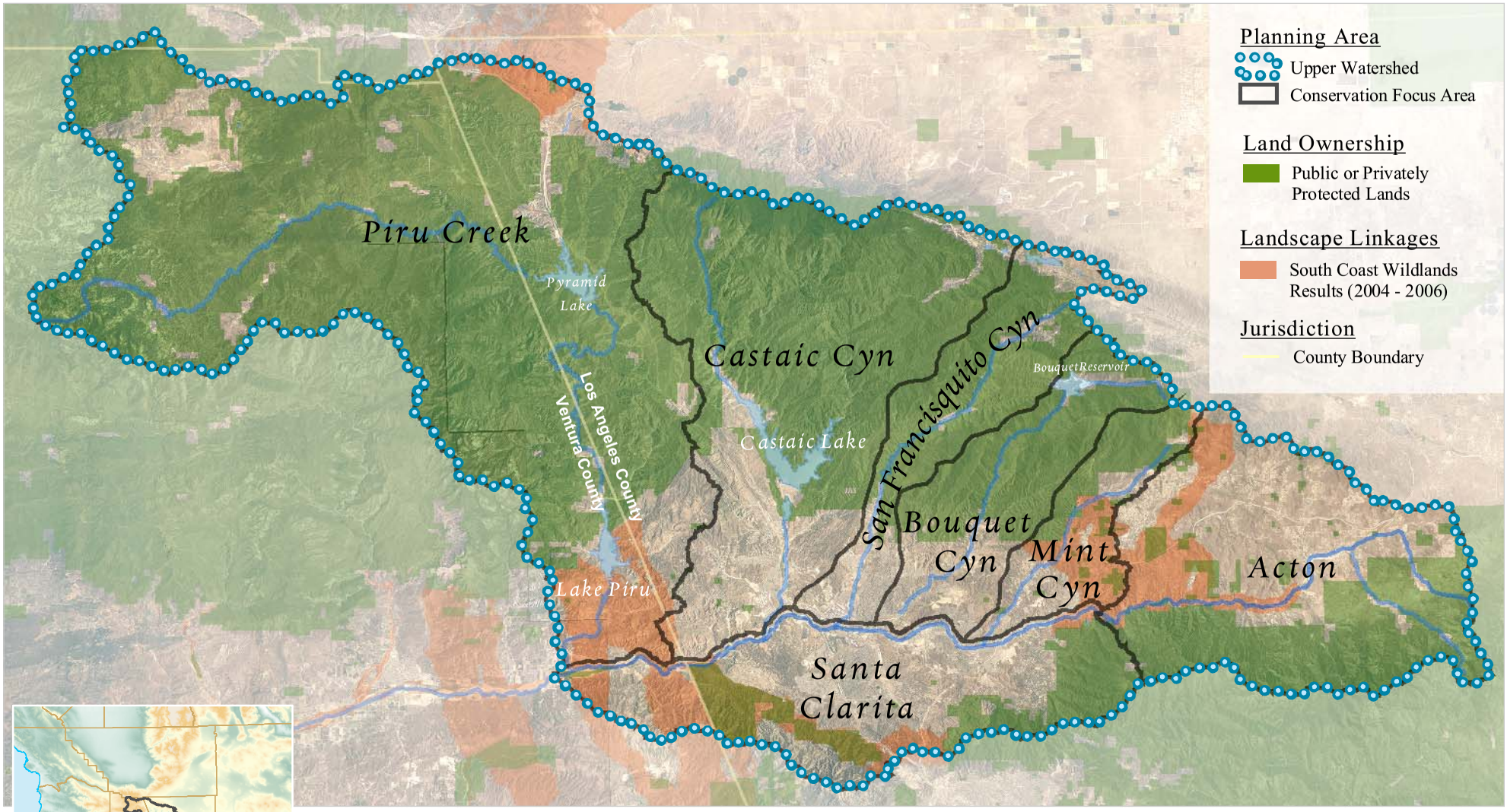
SAVING THE LAST GREAT PLACES ON EARTH

Santa Clara River, Upper Watershed

Map 5: Conservation Focus Areas



Land Ownership from GreenInfo Network, 2005
Wilderness Areas and Roadless Areas from USFS Region 5, 2003.
Land Use from California Department of Forestry and Fire Protection, 2003
Watershed Boundary and Conservation Focus Areas derived from CalWater2.2
Linkages from South Coast Wildlands, 2006

N

0 1 2 4 6 8 10 Miles

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August 9, 2006

Table 4: Conservation Focus Areas – Targets, land uses and threats by focus area

Focus Area	% privately owned	Conservation targets (% coverage in focus area)	Land Uses	Threats
Acton *Aliso, Soledad, Arrastre and Agua Dulce Canyons*	55%	• Transitional desert flora, including desert buckwheat and CA juniper (30%) • Riparian forest & scrub, including 25% of the alluvial fan scrub in the upper watershed • Large patches of chaparral (40%), adjacent to other intact habitat • Aquatic vertebrates (unarmored three-spine stickleback (UTS), red-legged frog, arroyo toad, arroyo chub, southwestern pond turtle, Santa Ana sucker) • Southwestern willow flycatcher, least Bell's vireo	• Suburban areas of Acton and Aqua Dulce • Low-density residential & agriculture • 45% of the focus area is privately owned and undeveloped • Privately owned campgrounds and recreational vehicle parks • Gravel mining in Soledad Canyon	• Altered fire regime • Gravel mining • Conversion of transitional desert habitat • Encroachment along the riparian corridor • Incompatible road development • Degraded water quality • Bank stabilization/channelization • Incompatible recreational use • Invasive plants (tamarisk)
Santa Clarita *Pole, Placerita and Potrero Canyons*	72%	• High-quality sage scrub (25%) • Large, functional patches of grasslands. 10% of grasslands in upper watershed • Chaparral (34%) • 20% of CA walnut and 50% of valley oak woodlands in upper watershed • Riparian forest & scrub • Aquatic vertebrates (UTS, arroyo toad, arroyo chub, Santa Ana sucker southwestern pond turtle) • Least Bell's vireo	• Urban area of Santa Clarita • Low-density residential communities • 48% of the focus area is privately owned and undeveloped, though many areas have plans for development. • Gravel mining east of the City limits	• Incompatible development • Altered fire regime, esp. on urban edge • Bank stabilization/channelization • Invasive plants & herptofauna • Gravel mining • Degraded water quality • Incompatible recreational use
Mint Canyon *Bee, Spring, Tapie, Tick, and Sand Canyons*	60%	• Sage scrub (40%) • Large patches of chaparral (40%), adjacent to other intact habitat • Riparian forest & scrub, including 50% of the alluvial fan sage scrub in the upper watershed. Slender-horned spineflower may be present	• Low-density residential communities of Pine Tree and Canyon Country • 25% of the focus area is privately owned and undeveloped • Gravel mining in Sand Canyon	• Incompatible development • Altered fire regime, esp. on private lands • Invasive plants (tamarisk, arundo) • Gravel mining • Water quality (nitrates)
Bouquet Canyon *Plum, Texas, Vasquez, Mystic, Dry and Haskell Canyons*	33%	• Large, intact patches of chaparral (65%) • Sage scrub (20%) • Cruzen Mesa vernal pools along the eastern boundary of the focus area • High-quality riparian habitat in Bouquet Creek • Aquatic vertebrates (UTS)	• High-density residential • Low-density residential & agriculture • 8% of the focus area is privately owned and undeveloped • Oil and gas drilling • Bouquet Reservoir	• Incompatible development (high-density on private lands, lower-density along Bouquet Creek in Angeles NF) • Bank stabilization/channelization • Altered fire regime • Invasive plants • Degraded water quality • Incompatible livestock grazing • Incompatible road development

Focus Area	% privately owned	Conservation targets (% coverage in focus area)	Land Uses	Threats
San Francisquito Canyon	33%	• Chaparral (60%) • Aquatic vertebrates (UTS, Santa Ana sucker, California red-legged frog) • High-quality riparian forest and scrub • Southwestern willow flycatcher, least Bell's vireo	• Urban sprawl of Santa Clarita	• Incompatible development • Altered fire regime
Castaic Canyon *Fish, Elizabeth Lake, San Martinez and Hasley Canyons*	28%	• Chaparral (57%) • CA sage scrub (23%) • Aquatic vertebrates (arroyo toad) • Riparian forest and scrub • Southwestern willow flycatcher, spotted owl	• Urban areas of Castaic, Wayside and Val Verde • Low-density residential and agriculture • 28% of focus area is privately owned and undeveloped • Castaic Lake (water storage)	• Incompatible development • Altered fire regime, esp. on private lands and along I-5 • Incompatible recreational use • Incompatible road development
Piru Creek	20%	• 56% of grasslands in upper watershed, including wildflower fields • 80% of CA walnut and 50% of valley oak woodlands in upper watershed • Coniferous forest • Chaparral • CA sage scrub (20%) • Aquatic vertebrates (Santa Ana sucker, arroyo toad, southwestern pond turtle) • Riparian forest and scrub • Southwestern willow flycatcher, spotted owl	• Pyramid Lake and Lake Piru (water storage) • 18% of focus area is privately owned and undeveloped	• Incompatible development • Altered fire regime • Incompatible recreational use

Conservation Strategies

Conservation strategies are the tools to abate threats to the conservation targets and/or enhance target viability. The most effective strategies tend to be those that are highly leveraged and accomplish multiple goals. The strategies for the upper Santa Clara River watershed include

- *Land Acquisition* — Protect target-rich, rare, and highly threatened sites, as well as important wildlife linkages, through fee acquisition, conservation easements, and flood inundation easements.
    - Benefits — Achieves protection in perpetuity; enables restoration; builds on acquisition work in the lower watershed; provides opportunities for compatible uses such as conservation, recreation, agriculture, grazing.
    - Challenges — Expensive to acquire and manage properties; requires a willing seller.
- *Invasive Species Control* — Control invasive plant infestations; reduce adverse effects of cowbird parasitism and other non-native species.
    - Benefits — Enhanced habitat quality for native species; potential benefits to water supply and quality and potential reduction of flood and/or fire hazards; may help to restore natural processes.
    - Challenges — Expensive and labor intensive; requires large-scale implementation beginning at the headwaters to be effective; total eradication may not be feasible and must be accomplished without detrimentally affecting native species; requires cooperative landowner or control over the property.
- *Restoration* — Restore converted and degraded natural communities.
    - Benefits — Increases quantity and quality of native habitat; can help to restore natural processes.
    - Challenges — Expensive and labor intensive; generally must be preceded by land protection; requires successful invasive plant removal prior to implementation.
- *Land Use Planning* — Work with planners and government officials in the City of Santa Clarita and County of Los Angeles to encourage land use planning that supports conservation goals, such as compatible use zoning, habitat-sensitive setbacks, and buffering policies.
    - Benefits — Widespread impact; achieves long-term threat abatement; has potential to improve multiple, if not all, conservation targets.
    - Challenges — Difficult; protections not permanent *per se*; time-consuming; subject to election cycle; requires support by conservation-minded stakeholders.
- *Land Use Policy* — Work with other agencies with land use or management authority, including L.A. County Public Works Agency, California Department of Fish and Game, Army Corps of Engineers, U.S. Forest Service and U.S. Fish and Wildlife Service.
    - Benefits — Affects large-scale areas under that agency's jurisdiction; potential to achieve multiple-benefit projects; increases funding sources for conservation activities; potential to improve multiple conservation targets; achieves long-term threat abatement.

    - Challenges — Difficult; time-consuming; requires support by conservation-minded stakeholders.

- *Stakeholder Building* — Create a locally based citizen watershed stakeholder group to promote river stewardship, provide labor and funds for conservation activities, and educate the public and officials about the importance of the watershed.
    - Benefits — Complements above strategies to engage planners and agencies; provides volunteers to assist with invasive species removal and restoration; creates education and community-building opportunities; necessary to achieve long-term watershed protection; promotes compatible uses.
    - Challenges — Time-consuming; stakeholders are geographically dispersed and socially and economically diverse; difficult to ensure their involvement in absence of an urgent cause.

- *Scientific Investigation* — Fill data gaps, explore more effective conservation strategies, monitor target viability, and provide recommendations on ways to further the conservation vision. Research should be prioritized so that it addresses questions most relevant to management and coordinated so that it uses available funds most efficiently. Findings should be made publicly available on ***www.santaclarariverparkway.org*** or a similar site.
    - Benefits — Guides and refines conservation strategies; measures outcomes and successes; engages academia; provides data to support activities.
    - Challenges — Funding; some investigations may require threatened or endangered species "take" permits.

The following *Conservation Strategies Matrix* (Table 5) shows which threats the above strategies address. Strategies were ranked based on their potential to abate multiple threats as well as high-ranking threats. The potentially most effective strategies are shown in red followed by yellow, light green, and dark green. The ranking reveals three top strategies: 1) engage L.A County planning, 2) invest in invasive species control, and 3) acquire properties.

Table 5: Conservation Strategies Matrix – Conservation strategies by threat.

	Threats													
	Altered fire regime	Incompatible development	Invasive plants	Bank stabilization channelization	Dams and diversions	Gravel mining	Incompatible road construction	Cow bird parasitism	Incompatible livestock grazing	Oil and gas drilling	Sewer treatment plant effluent	Invasive herps	Incompatible recreational use	Unsustainable groundwater pumping
Threat Rank>	High	High	High	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low	Low	Low	Low
Strategies														
Land Acquisition														
Invasive Species Control														
Restoration														
Land Use Planning														
L.A. County														
City of Santa Clarita														
Land Use Policy														
LACO Public Works														
DFG/ACOE														
BLM														
USFS														
Caltrans														
RWQB														
Water Districts														
Watershed Adovcacy														
Scientific Investigation														

Conservation Success Measures

Conservation actions implement the aforementioned strategies to achieve the conservation vision. Success, the final step of the Five-S Framework, will be measured based upon the progress made in accomplishing the following short-term and long-term actions.

Short-Term Success

The Conservancy and its partners will concentrate on accomplishing the following objectives during the next five years:

- *Land Protection*
  - Acquire five parcels in the San Gabriel-Castaic Linkage. These parcels will be part of those identified as the primary corridor by the upper watershed working group.
  - Acquire 20 percent of the currently unprotected target riparian habitat that supports populations of targeted species (e.g., aquatic vertebrates, southwestern willow flycatcher, least Bell's vireo).
- *Invasive Control*
  - Prioritize and participate in implementing the invasive removal work of the Resource Conservation District's *Upper Santa Clara River Watershed Arundo and Tamarisk Removal Plan* (VCRCD 2006).
  - Establish a cow-bird trapping program modeled after the one currently operating in the lower watershed.
  - Assess the need for control of African clawed frogs.
  - Respond to the recent discovery of New Zealand mud snails in middle Piru Creek.
  - Respond to newly discovered invasive species.
- *Land Use Planning*
  - Engage L.A. County and City of Santa Clarita planning departments with the goal of halting the loss of key habitat areas identified in this plan.
  - Identify and increase the protection opportunities presented by the county's Significant Ecological Areas.
  - Gain planning department recognition of the San Gabriel-Castaic and Santa Monica-Sierra Madre Linkages to ensure they are accommodated in future subdivisions and land use policies.
- *Land Use Policy*
  - Promote and participate in Ventura County Watershed Protection District, Los Angeles County Public Works Agency, and U.S. Army Corps of Engineers efforts to model the hydrology, hydraulics, and sediment transport of the Santa Clara River. Ensure that land use policies consider conservation issues of the upper watershed.
  - Promote the use of non-structural flood and erosion control methods on the river and its main tributaries with the two county watershed protection districts. Focus on setbacks and inundation easements.
  - Engage appropriate agencies in river aggregate mining policies, with the goal of eliminating mining where it may negatively impact conservation targets.

    - Evaluate the potential of purchasing mineral rights to abate threats to conservation targets.
- *Stakeholder Building*
    - Participate in preparation of the upper watershed stakeholder outreach plan, currently under way.
- *Scientific Investigation*
    - Identify and map high-quality, functional patches of each targeted natural community and appropriate sub-targets.
    - Identify and map parcel-specific protection priorities in the Santa Monica-Sierra Madre Linkage.
    - Prioritize potential land protection areas identified in the investigation listed above, including viable connections between isolated patches. Integrate protection priorities with this conservation plan.

Long-Term Success

Over the next 10 years the Conservancy and its partners will concentrate on reaching the following objectives:

- *Land Protection*
    - Complete protection of the basic San Gabriel-Castaic Linkage (i.e., establish a functioning but not necessarily completed corridor).
    - Protect a majority of parcels identified in the Santa Monica-Sierra Madre Linkage.
    - Acquire or otherwise protect 70 percent of the currently unprotected target riparian habitat that supports populations of targeted species.
    - Acquire or otherwise protect 20 percent of the currently unprotected target plant communities (e.g., sage scrub, chaparral).
- *Invasives Control*
    - Obtain removal of arundo and tamarisk in 60 percent of key riparian target areas by collaborating with USFS, the Santa Clara River Arundo and Tamarisk Removal Plan project, and other invasive control efforts.
    - Establish an invasive herptofauna eradication program for the upper watershed.
- *Restoration*
    - Identify, plan, prioritize, and implement restoration of one key conservation site.
- *Land Use Planning*
    - Incorporate conservation goals into the *One Valley One Vision* valley-wide general plan for the Santa Clarita Valley.
- *Land Use Policy*
    - In cooperation with local agencies, establish a best-practices fire management plan that will promote protection of conservation targets.
- *Stakeholder Building*
    - Establish a watershed-wide citizen-based stakeholder group to promote education, volunteer opportunities and consensus-oriented watershed management.
    - Identify a long-term management entity for conservation lands.

- *Scientific Investigation*
    - Create and implement monitoring plans for targeted species.
    - Support efforts to identify, study and approve suitable biological controls for invasive plant species, especially arundo and tamarisk.
    - Investigate and enhance fire management plans for the different natural communities within the different landscape contexts they occur.

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APPENDIX A: THREATENED, ENDANGERED, AND RARE SPECIES IN THE SANTA CLARA WATERSHED

Table A.1. Federally and State-Listed Endangered and Threatened Plant and Animal Species in the Santa Clara Watershed

Type	Common Name	Scientific Name	Global Rank	Fed Rank	State Rank	Location*
Plant	Nevin's barberry	*Berberis nevinii*	G2	FE	SE	U and L
Plant	San Fernando Valley spineflower	*Chorizanthe parryi* var. *fernandina*	G2T1	C	SE	U and L
Plant	Slender-horned spineflower	*Dodecahema leptoceras*	G1	FE	SE	U
Plant	Spreading navarretia	*Navarretia fossalis*	G2	FT		U
Plant	California Orcutt grass	*Orcuttia californica*	G2	FE	SE	U
Arthropod	Vernal pool fairy shrimp	*Branchinecta lynchi*	G2G3S2S3	FT		U
Arthropod	Quino checkerspot butterfly	*Euphydryas editha quino*	G5T1S1	FE		U
Fish	Santa Ana sucker	*Catostomus santaanae*	G1	FT		U and L
Fish	Tidewater goby	*Eucuclogobius newberrryi*	G3S2S3	FT	SOC	L
Fish	Unarmored threespine stickleback	*Gasterosteus aculeatus williamsoni*	G5T1	FE	SE	U
Fish	Southern steelhead trout	*Oncorhynchus mykiss*	G5S2	FE	SOC	L
Herp	Arroyo toad	*Bufo californicus*	G2G3	FE	SOC	U and L
Herp	California red-legged frog	*Rana aurora draytonii*	G4T2T3S2S3	FT	SOC	U
Bird	Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	G5T2S1	C	SE	U
Bird	Southwestern willow flycatcher	*Empidonax traillii extimus*	G5T1T2	FE	SE	U and L
Bird	California condor	*Gymnogyps californianus*	G1S1	FE	SE	U
Bird	Least Bell's vireo	*Vireo bellii pusillus*	G5T2	FE	SE	U and L
Mammal	California bighorn sheep (a.k.a. Sierra Nevada bighorn sheep)	*Ovis canadensis californiana*	G4T1S1	FE	SE	U and L

Global Rank: G1 = Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. G2 = Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors. G3 = Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. G4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors. G5 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
Two "G" or "T" ranks indicate a range. T# = Infraspecific Taxon (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks.
Fed Rank: FE = Endangered, FT = Threatened, C = Candidate for listing.
State Rank: SE = Endangered, SOC = Species of Special Concern
Location: Upper watershed (U) corresponds roughly to Los Angeles County. Lower watershed (L) refers to portion in Ventura County. List does not include species restricted to estuary or coastal areas at mouth of river.

Table A.2. Rare Vegetation Types in the Upper Santa Clara River Watershed

Common Name	Global Rank	State Rank
California Walnut Woodland	G2	S2.1
Riversidian Alluvial Fan Sage Scrub	G1	S1.1
Southern Willow Scrub	G3	S2.1
Valley Needlegrass Grassland	G1	S3.1
Valley Oak Woodland	G3	S2.1
Wildflower Field	G2	S2.2

Global Rank: G1 = Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. G2 = Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors. G3 = Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. G4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors. G5 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
Two "G" or "T" ranks indicate a range. T# = Infraspecific Taxon (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks.
State Rank: S1.1 = Very Threatened—Less than 6 element occurences OR less than 1000 individuals OR less than 2000 acres. S2.1 = Very Threatened—6-20 element occurences OR 1000-3000 individuals OR 2000-10,000 acres. S2.2 = Threatened—6-20 element occurences OR 1000-3000 individuals OR 2000-10,000 acres. S3.1 = Very Threatened—21-100 element occurences OR 3000-10,000 individuals OR 10,000-50,000 acres.

Table A.3. Rare Plant and Animal Species of Concern in the Upper Santa Clara River Watershed Not Listed as Endangered or Threatened by Federal or State Governments.

Note: This is not a complete list; it includes neither species of the lower watershed nor species of concern listed by California Native Plant Society, US Forest Service or other agencies and non-profits.

Type	Common Name	Scientific Name	Global Rank
Plant	Kusche's sandwort	*Arenaria macradenia* var. *kuschei*	G5T2
Plant	Slender mariposa lily	*Calochortus clavatus* var. *gracilis*	G4T1
Plant	Mt. Gleason Indian paintbrush	*Castilleja gleasonii*	G2Q
Plant	Short-joint beavertail	*Opuntia basilaris* var. *brachyclada*	G5T1
Plant	Mason's neststraw	*Stylocline masonii*	G1
Fish	Arroyo chub	*Gila orcutti*	G2
Herp	Coastal western whiptail	*Aspidoscelis tigris stejnegeri*	G5T3T4
Herp	Southwestern pond turtle	*Emys (=Clemmys) marmorata pallida*	G3G4T2T3Q
Herp	Coast (San Diego) horned lizard	*Phrynosoma coronatum (blainvillei)*	G4T3T4
Herp	Two-striped garter snake	*Thamnophis hammondii*	G3
Mammal	San Joaquin pocket mouse	*Perognathus inornatus inornatus*	G4T2T3

Global Rank: G1 = Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. G2 = Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors. G3 = Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors. G4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors. G5 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
Two "G" or "T" ranks indicate a range. T# = Infraspecific Taxon (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks.

APPENDIX B: FIVE-S FRAMEWORK

The Nature Conservancy's *Five-S Framework* for conservation planning analyzes these factors:

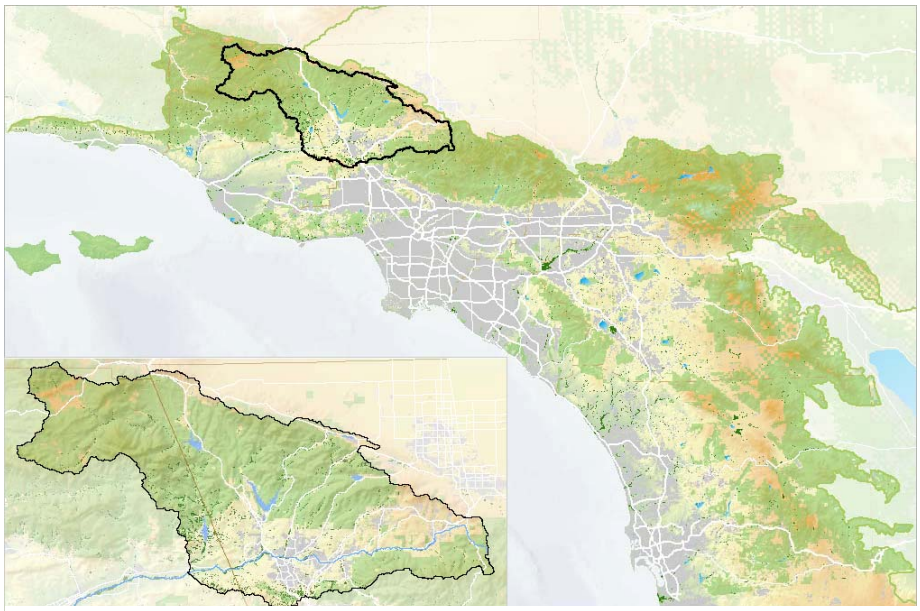
1. **S**ystems: the conservation targets occurring in the upper Santa Clara River watershed and the key ecological attributes that maintain their viability.
2. **S**tresses: the most serious types of destruction or degradation affecting the conservation targets.
3. **S**ources: the cause or agents of the destruction or degradation.
4. **S**trategies: the full array of actions necessary to abate the threats or enhance the viability of the conservation targets.
5. **S**uccess measures: the monitoring process for assessing progress in abating threats and improving the health of biodiversity in the upper watershed.

The conservation goal is to maintain healthy, viable occurrences of the conservation targets. By definition, healthy occurrences are not significantly stressed. Abating the sources of stress should alleviate the stresses to the systems and result in greater viability of the conservation targets. In those cases where viability has been reduced due to a historical source, direct restoration of a conservation target may be necessary (Low 2003).

APPENDIX C: CONSERVATION TARGETS AND SUB-TARGETS

Riparian Forest and Scrub Communities

This focal conservation target is characterized by riparian vegetation and riparian-dependent avian species found along the Santa Clara River (see Map 6, *Riparian Forest and Scrub Communities*). The riparian zone around the river ranges from narrow to several hundred yards wide. Nested within this target are cottonwood-willow riparian forest, alluvial fan scrub, and riparian-dependent bird species, including the southwestern willow flycatcher and least Bell's vireo, which nest along the Santa Clara. Other key species include the yellow warbler, blue grosbeak, green heron, great blue heron, and Cooper's hawk. The yellow-billed cuckoo has also been sighted in the upper watershed, though there are currently no known breeding grounds.



Map 6: Riparian Forest and Scrub Communities – Ecoregional and local extents.

Approximately 3 percent of the upper watershed features this natural community, a proportion similar to the 2 percent representation that occurs in the ecoregion. Fremont cottonwood can be found along the upper reaches the Santa Clara's main stem, while California sycamores are more dominant in the main stem through the city of Santa Clarita and toward the county line. Oak assemblages also exist in the river's floodplain. Most of the main stem Santa Clara, Agua Dulce Canyon, Sand Canyon, and Placerita Creek are in private ownership, with individuals owning the actual riverbed and any associated riparian habitat. The upper portions of Castaic Creek, San Francisquito Canyon, and Bouquet Canyon fall within Angeles National Forest; their confluences with the main stem are in the urban area of Santa Clarita.

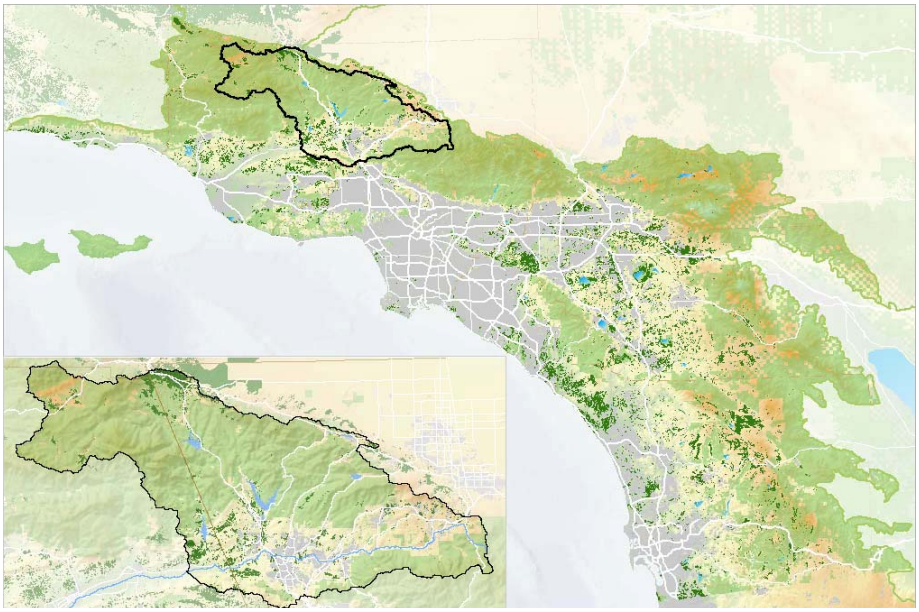
Grasslands

Grasslands are characterized by native herbaceous vegetation and associated grassland features (see Map 7, *Grasslands*). Nested sub-targets include vernal pools, flower fields, the Kennedy mariposa lily, and a suite of wildlife, including the western spadefoot toad.

Grasslands cover approximately 8 percent of the ecoregion, with roughly 20 percent of these lands in public or conservation NGO ownership.

Grasslands comprise approximately 5 percent of the upper watershed. They occur in scattered patches, mostly 10 to 40 acres in size, throughout the watershed. The largest patches are found in the northwestern part of the watershed near Interstate 5 and State Highway 138 (roughly 8,200 acres), east of Lake Piru (approximately 2,000 acres), and around Potrero Canyon Creek (approximately

2,100 acres) near the Ventura County border. These three large patches of grassland are in private ownership. Cruzen Mesa vernal pools are found east of the City of Santa Clarita.



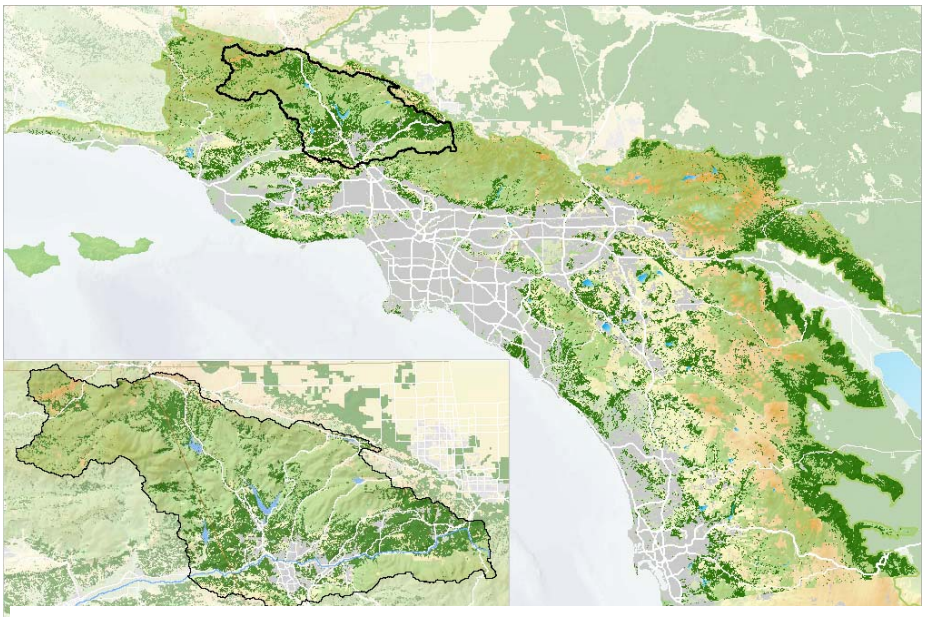
Map 7: Grasslands – Ecoregional and local extents.

Scrub Communities

Coastal sage scrub and associated animal species characterize the scrub communities conservation target (see Map 8, *Scrub Communities*). Nested within the target are focal bird species, mixed scrub from the ecoregional transition zone, the horned lizard, the coastal western whiptail, and the slender horned spineflower.

Almost 25 percent of the upper watershed features scrub communities (California Department of Forestry and Fire Protection, 2003). The eastern portion of the upper watershed is dominated by desert buckwheat, California juniper, and mixed desert shrub, reflecting the influence of the Mojave ecoregion. This mixing or transition zone is a special occurrence in the South Coast ecoregion, representing a unique blend of desert and coastal species and communities.

The upper watershed of the Santa Clara accounts for 12 percent of the California sagebrush that exists in the ecoregion. The northwest portion contains buckwheat and basin sagebrush. This basin sagebrush reflects the transition zone between the South Coast and Great Central Valley ecoregions. Representations of each scrub type are found in both public and private ownership.

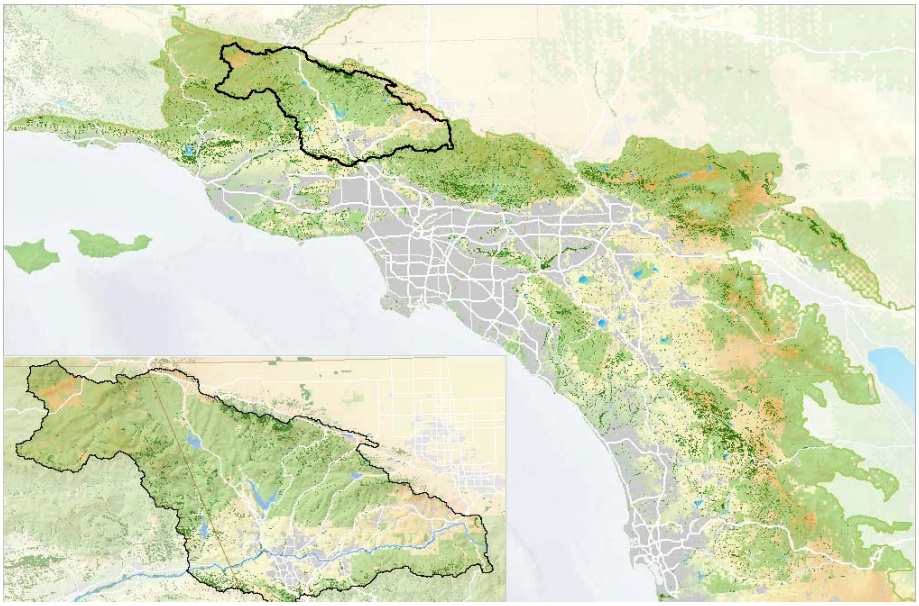


Map 8: Scrub Communities – Ecoregional and local extents.

Woodlands

Woodlands encompass a variety of woodland types and associated animal species (see Map 9, *Woodlands*). Oak, walnut, and pinyon-juniper woodlands are nested targets, along with woodland-dependent bird species and mixed-woodland communities from the ecoregional transition zone.

Approximately 2 percent of the upper watershed features woodlands, which is similar to the historic extent. Six types of oaks are present, reflecting the ecoregional junction between the South Coast, Great Central Valley, and Central Coast ecoregions. The predominant woodland community is canyon



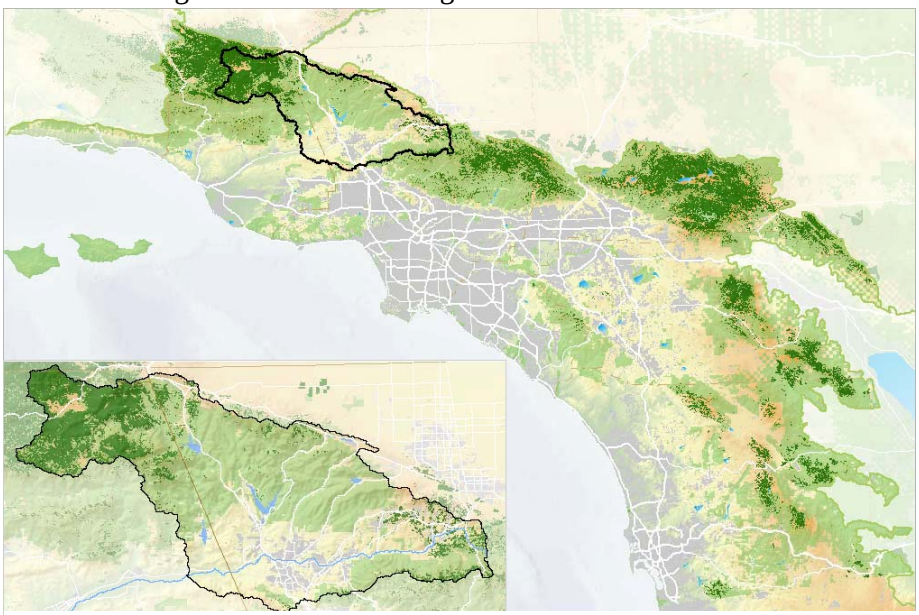
Map 9: Woodlands – Ecoregional and local extents.

live oak, found in the mid-elevation ranges in the Angeles and Los Padres National Forests. Most of the canyon live oak in the ecoregion occurs in public or privately protected lands. The upper watershed accounts for almost 20 percent of both the black walnut and valley oak occurrences in the ecoregion, while the small patches of California black oak and blue oak represent only a small portion of their ecoregional occurrences. The California black oak is fairly well protected in the ecoregion, while the black walnut, valley oak, and blue oak occurrences are mainly on private lands.

Coniferous Forest

Coniferous forest is made up of of coniferous forest vegetation and associated animal and reptile species (see Map 10, *Coniferous Forest*). Nested targets include a suite of coniferous forest-dependent bird species and endangered reptiles. The coniferous forest is home to a variety of critical species, including the California condor, bighorn sheep, spotted owl, southwestern willow flycatcher, steelhead trout, arroyo toad, and a host of threatened plants.

Coniferous forests cover nearly 114,000 acres and make up approximately one-sixth of the area of the upper watershed. Most of this conservation target is found in the higher elevations of the northwest portion of the upper watershed. Single-leaf pinyon pine is the dominant species, covering nearly 57,000 acres. This community represents the part of the westernmost extent of this species in California and is the link between its extensive presence in the Great Basin and its southern extent in the southern California Transverse Range and into Baja California. The loss of this junction would isolate the southern extent, severing the genetic flow between populations. Single-leaf pinyon pine germination requires the presence of jays and other birds that bury its seed.

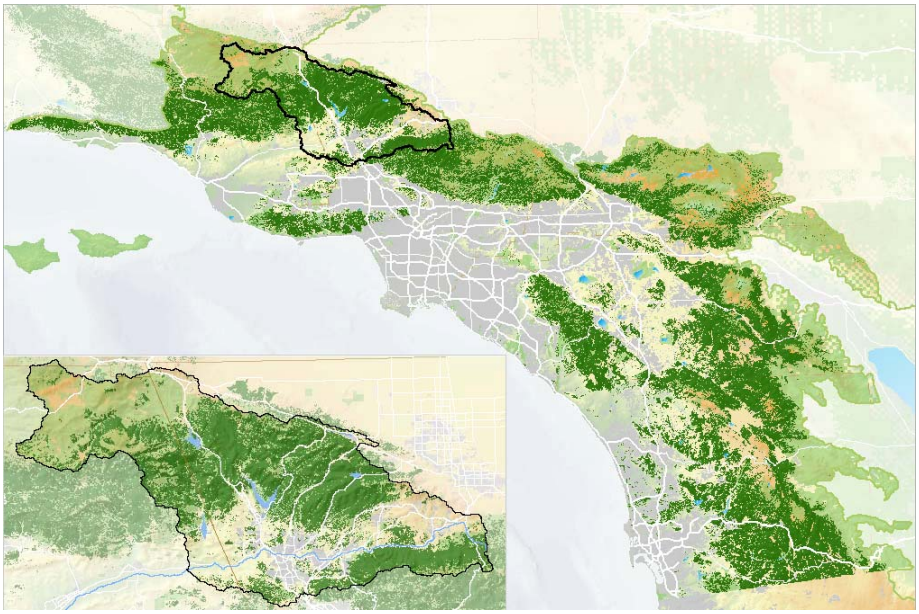


Jeffrey pine covers roughly 20,000 acres, followed by mixed conifer — pine and bigcone Douglas-fir, each covering over 5,000 acres. Most of the coniferous forest is in public ownership, with only 15

percent of its area not in either national forest or state park lands. The Los Padres National Forest contains the largest portion.

Chaparral Communities

Chaparral communities contain chaparral vegetation and associated animal species (see Map 11, *Chaparral Communities*). Chaparral-dependent bird species and mixed chaparral communities from the ecoregional transition zone are nested targets.



Map 11: Chaparral Communities – Ecoregional and local extents.

Chaparral is the predominant community type. It covers more than 40 percent of the upper watershed. There are four main chaparral types, including (in order of abundance) northern mixed, semi-desert, foothill mixed, and montane mixed chaparral. The central portion of the upper watershed is characterized by large, unbroken patches of northern mixed chaparral and chamise. The north-draining slopes of the southern portion of Angeles National Forest contain a unique mixing of foothill mixed, semi-desert, red shanks, and northern mixed chaparral along with scrub oak and chamise. The higher elevations in the northern and western portions of the upper watershed are characterized by scrub oak and montane mixed chaparral, mainly in the Los Padres National Forest. All of the chaparral communites are well protected throughout the ecoregion and within the upper watershed itself.

Aquatic Vertebrates

Aquatic vertebrates include fish, amphibian, and reptiles that depend upon the Santa Clara River's freshwater aquatic habitat for all or part of their life cycles (see Maps 13, 15, 17, 19, 21, 23, and 25, *Nested Target Maps)*. Nested species include the southwestern pond turtle, two-striped garter snake, red-legged frog, arroyo toad, unarmored three-spine stickleback, Santa Ana sucker, and arroyo chub. To fulfill their life cycles, the aquatic vertebrates have different habitat needs, including sandy ponded water, riparian forest cover, dry riverbed, and uplands. They are also affected by river flow rates and water quality.

The arroyo toad is a federally listed endangered amphibian and a California species of special concern. Healthy populations of arroyo toad can be found in the main stem of the Santa Clara River near the confluences of Aqua Dulce and San Francisquito, in upper Castaic Creek above the Castaic Lake, and in upper Piru Creek above Lake Piru Dam. Historically, populations also existed near Aliso Canyon at the eastern end of the watershed and in upper San Francisquito Canyon.

The unarmored three-spine stickleback is a freshwater fish listed as endangered by both the federal and state governments. The unarmored three-spine stickleback is genetically distinct from its non-listed cousin, the armored three-spine stickleback, which is found in the lower Santa Clara River watershed. The genetically distinct populations are separated by a dry stretch of the Santa Clara River east of Piru Creek. This introgression zone is a critical barrier to maintaining the genetic distinction

between these fish. Generally, when there are flows in this normally dewatered reach, the flows are so high that migration upstream from the lower watershed is precluded. Unarmored three-spine sticklebacks (UTS) inhabit the main stem of the Santa Clara in Soledad Canyon and between San Francisquito Canyon and Piru Creek, as well as Bouquet Canyon. Historically, UTS populations also resided in Agua Dulce Canyon and San Francisquito Canyon. UTS rely for spawning grounds on ponded gravel streambeds with low flows.

Southwestern pond turtle, a California species of special concern; two-striped garter snake, a California species of special concern; and California red-legged frog, a federally listed threatened amphibian and a California species of special concern, all have similar habitat requirements.

Wide-Ranging Terrestrial Vertebrates

This target incorporates into this plan two other studies: *A Linkage Design for the San Gabriel-Castaic Connection* (Penrod 2004) and *A Linkage Design for the Santa Monica-Sierra Madre Connection* (Penrod 2006). (For both, see Map 1, *Upper Watershed of the Santa Clara River*.) These linkages are among 15 priority wildlife linkages in the South Coast whose high rankings are based upon their biological irreplaceability and vulnerability. Put simply, to design each linkage, scientists and planners took into account the habitat and movement needs of numerous focal species, including the mountain lion, American badger, mule deer, and Pacific kangaroo rat.

The San Gabriel-Castaic Linkage emerged across Highway 14, connecting the northern and southern portions of the Angeles National Forest in the vicinity of Vasquez Rocks. A planning group identified specific parcels to acquire and submitted the linkage design to the Wildlife Conservation Board as a Conservation Area Protection Plan (CAPP). Funding through the CAPP was approved, and efforts to acquire the targeted properties are under way.

The Santa Monica-Sierra Madre Linkage is more extensive, and only a portion of this connection falls within the boundaries of the upper watershed. That portion crosses Highway 126 from Lake Piru down to the Santa Susana Mountains and eventually reaches the Santa Monica Mountains. The remainder of the linkage falls within the lower Santa Clara watershed, just east of the City of Fillmore.

These linkages serve as the sub-targets for wide-ranging terrestrial vertebrates.

Table C.1. Representation of Targets in Upper Watershed.

	Upper Watershed Focal Targets Representation (Acres)						
	Chaparral	Conifer	Grasslands	Riparian	Shrublands	Woodlands	Totals
Ownership - Private	38,616	7,918	27,856	12,303	114,610	4,164	205,467
Ownership - Protected	254,540	95,734	8,559	8,364	63,992	16,160	447,350
Total Acres	293,156	103,653	36,415	20,667	178,603	20,323	652,817
% Private	13%	8%	76%	60%	64%	20%	31%
% Protected	87%	92%	24%	40%	36%	80%	69%
% of Watershed	42%	15%	5%	3%	25%	3%	93%

	Upper Watershed Focal Targets in Ecoregion (Acres)						
	Chaparral	Conifer	Grasslands	Riparian	Shrublands	Woodlands	Totals
Ownership - Private	743,128	116,813	547,974	171,536	918,194	42,697	2,540,342
Ownership - Protected	1,815,051	692,287	134,875	96,234	929,524	133,357	3,801,328
Total Acres	2,558,179	809,100	682,849	267,770	1,847,718	176,054	6,341,670
% Private	29%	14%	80%	64%	50%	24%	40%
% Protected	71%	86%	20%	36%	50%	76%	60%
% of Ecoregion	23%	7%	6%	2%	16%	2%	56%

APPENDIX D: CONSERVATION FOCUS AREAS

Acton

Land Use Patterns

The Acton conservation focus area is the eastern portion of the upper watershed. It begins upstream from the Agua Dulce Canyon and Bear Canyon watersheds and includes Soledad, Arrastre, and Aliso Canyons. Approximately 45 percent of the conservation focus area is under public ownership, with the Angeles National Forest covering almost the entire southern half. The remaining 55 percent is under private ownership in low-density residential, small-scale agricultural, and urbanized areas (about 10 percent of the total) and undeveloped areas (about 45 percent). Development is concentrated in the communities of Acton and Agua Dulce.

Floral Targets

Chaparral, the primary upland vegetation type in the focus area, covers about 40 percent of the area. Roughly 80 percent of the chaparral occurs on public lands (see Maps 12, *Acton Focal Targets*, and 13, *Acton Nested Targets*). The chaparral occurs in large contiguous patches that are adjacent to other intact habitats. The threats to chaparral in the focus area appear to be low due to a high level of public ownership and relatively low density of roads and urbanized development.

A mosaic of desert communities, dominated by desert buckwheat and California juniper, covers roughly 30 percent of the focus area. The desert communities are located in the northern portion in an area with little public ownership. Primary threats are incompatible development, increased fire frequency, and fragmentation. Protection of the transition zone between the desert, coastal, and montane communities is critical for maintaining large-scale ecological processes.

Riparian forest and scrub communities that lie within the conservation focus area include southern cottonwood willow riparian forest, southern riparian scrub, southern willow scrub, and southern sycamore alder riparian woodland. These riparian communities support a variety of conservation targets and are important movement and migration corridors for wildlife in the focus area. The southwestern willow flycatcher and least Bell's vireo have been observed along the Santa Clara River in the western portion of the focus area. Additionally, the focus area contains roughly 15 percent of the alluvial fan scrub found in the upper watershed, with less than half occurring on public lands.

Faunal Targets

The unarmored three-spine stickleback (UTS) are currently found in the Santa Clara River in the western portion of the focus area and in a small reach of Agua Dulce Canyon. Historically, UTS occurred along the Santa Clara River in the central portion of the focus area southeast of Acton. Habitat and water quality degradation associated with the growth of Acton may have contributed to the loss of UTS along this reach.

California red-legged frog (CRLF) have been documented in the western and eastern portions of the focus area. To the west, CRLF have been found along the Santa Clara River and canyons to the north, including Aqua Dulce Canyon. A large majority of this area is under private ownership. CRLF have also been documented in Aliso Canyon on public land in the eastern part of the focus area.

Four additional species dependent on aquatic habitat have been documented in the focus area since 1990. The southwestern pond turtle was observed in Escondido and Tapo Canyons. The arroyo chub has been observed in the Santa Clara River and Agua Dulce Canyon. The Santa Ana sucker and arroyo toad have been documented along the Santa Clara River in the western portion of the focus area.

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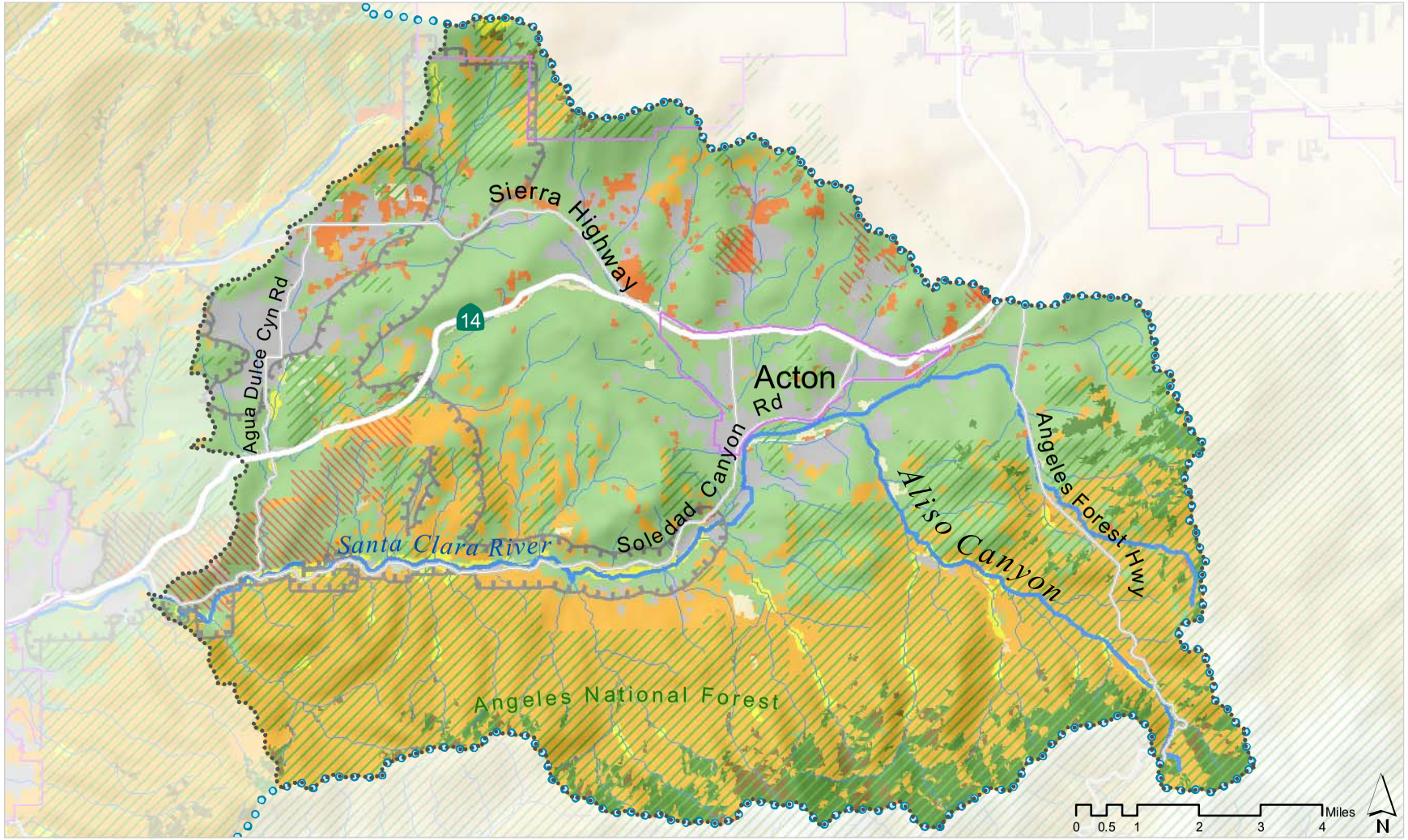
Santa Clara River, Upper Watershed

Map 12: Acton Focal Targets



Focal Targets
- Riparian
- Grasslands
- Scrub
- Chaparral
- Woodlands
- Conifers

Administrative
- Upper Watershed
- Acton Conservation Focus Area
- Landscape Linkage

Land Status
- Public or Privately Protected Lands
- Proposed Projects

Urban
- Developed
- City Boundary

Targets from California Department of Forestry, 2003
Linkage from South Coast Wildlands, 2003 - 2006

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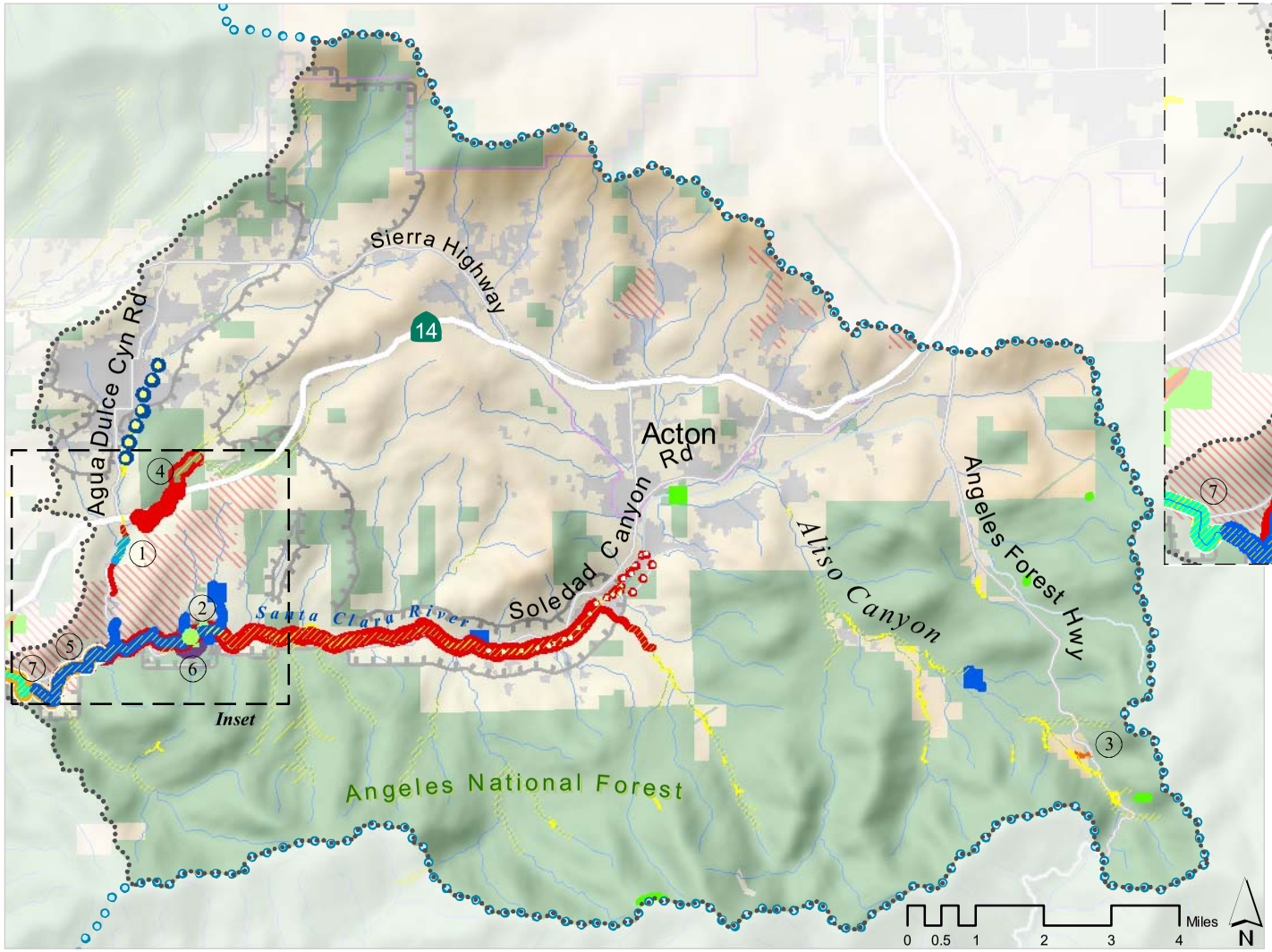
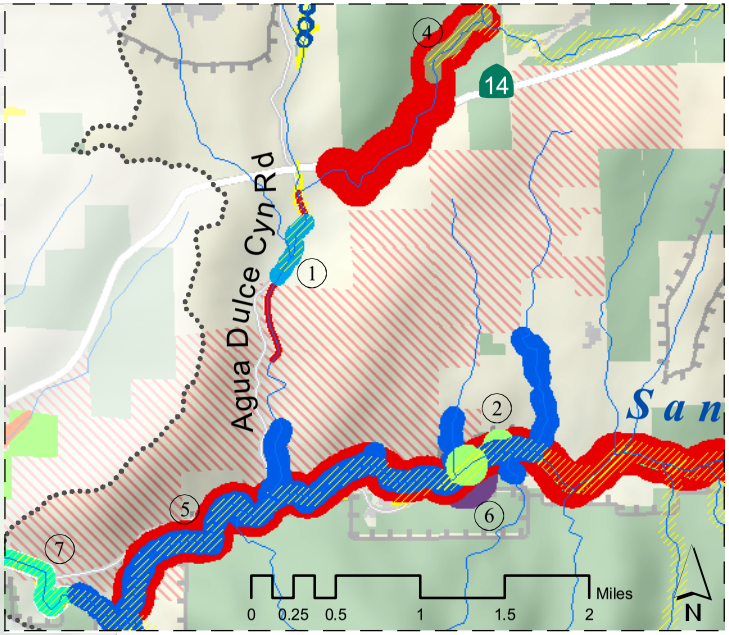
Santa Clara River, Upper Watershed

Map 13: Acton Nested Targets





Inset

Targets Note: Not all Targets listed in the Plan are well represented in spatial datasets, and may / do occur in areas that are not shown on this map.

- California Red Legged Frog
- (7) Santa Ana Sucker
- (1) Arroyo Chub
- (5) Arroyo Toad
- (6) Least Bell's Vireo
- (4) Southwestern Pond Turtle
- (2) Southwestern Willow Flycatcher
- Unarmored Threespine Stickleback
- (3) Riversidian Alluvial Fan Sage Scrub
- Plants**
- Riparian***
- UTS, Formely Occupied
- UTS, Habitat

**Kusche's sandwort; Mason's neststraw; Mt. Gleason Indian paintbrush; Nevin's barberry; short-joint beavertail; slender mariposa lily; slender-horned spineflower

*** Southern Coast Live Oak Riparian Forest; Southern Cottonwood Willow Riparian Forest; Southern Mixed Riparian Forest; Southern Riparian Scrub; Southern Sycamore Alder Riparian Woodland; Southern Willow Scrub

Administrative

- Upper Watershed
- Acton Conservation Focus Area

Land Status

- Public or Privately Protected Lands
- Proposed Development

Urban

- Developed
- City Boundary

California Department of Fish & Game, 2004
USFS, Los Padres National Forest, 2004
Personal Communication, summer 2005 workshops
Proposed Projects - CBI, via LA County, 2005
Linkage from South Coast Wildlands, 2003 - 2006

August 9, 2006

Conservation Strategies

In areas to the north of public lands, land acquisition should be considered to protect the desert transition zone. A significant portion of the aquatic and riparian habitats that support conservation targets is currently under private ownership, thus special attention should be given to these areas and adjacent areas that buffer these lands from degradation. Invasive species removal and restoration are necessary to ensure the long-term viability of conservation targets and potentially to reestablish UTS along a stretch of the Santa Clara River they once occupied. Influencing land use policy and planning is a necessary strategy to address the threats of incompatible development and land management. The formation of a watershed stakeholder group to implement these conservation strategies and promote the river and its tributaries as valuable assets is a key component to the long-term success of the plan.

Santa Clarita

Land Use Patterns

The Santa Clarita conservation focus area is defined as the Santa Clara River west of the Acton Focus Area with a one-kilometer buffer and the area to the south of the river between the Potrero Canyon and Pole Canyon watersheds. Roughly 28 percent of the focus area is under public ownership. Public lands are located south and east of the City of Santa Clarita. The remaining 72 percent is under private ownership, with most of the private lands currently undeveloped (about 48 percent of the focus area). However, there are numerous large developments at various stages of planning and implementation. Development is currently scattered throughout the focus area from just west of I-5 to the western boundary of the Angeles National Forest, but it is concentrated in Santa Clarita between I-5 and State Route 14. Gravel mining currently occurs along reaches of the Santa Clara River (Soledad Canyon).

Floral Targets

Chaparral, the primary upland vegetation type, covers roughly 34 percent of the area (see Maps 14, *Santa Clarita Focal Targets*, and 15, *Santa Clarita Nested Targets*). Roughly 65 percent of the chaparral is on public lands. In the focus area the threats to chaparral are high. Incompatible development has fragmented stands and reduced patch size, resulting in greater potential for human-ignited fires. An increase in fire frequency will lead to habitat degradation and the potential for type conversion to non-native grassland. Management of the urban-wildland interface will be increasingly important in providing safety for people and maintaining healthy chaparral communities.

Sage scrub covers roughly 25 percent of the focus area, and only 13 percent of the sage scrub is in public ownership. A large majority of high-quality California sage scrub is located on private lands in areas adjacent to the two main transportation corridors, I-5 and SR 14. As a result, the greatest threats to sage scrub are direct habitat loss and degradation resulting from fragmentation and frequent disturbance.

Riparian forest and scrub communities that lie within the focus area include southern coast live oak riparian forest, southern cottonwood willow riparian forest, southern willow scrub, southern riparian scrub, and southern sycamore alder riparian woodland.

Roughly 10 percent of the grasslands in the upper watershed are within the focus area, primarily on private lands. The grasslands occur primarily in large contiguous blocks, creating the potential for protecting entire functional systems with buffer areas.

There are two rare woodland types— California walnut and valley oak woodlands. Roughly 50 percent of all the valley oak woodlands in the upper watershed are located in the focus area, with 27 percent of them on public lands. Roughly 20 percent of all California walnut woodlands in the upper watershed occur in the focus area, with 22 percent of them on public lands. The importance of these woodlands is

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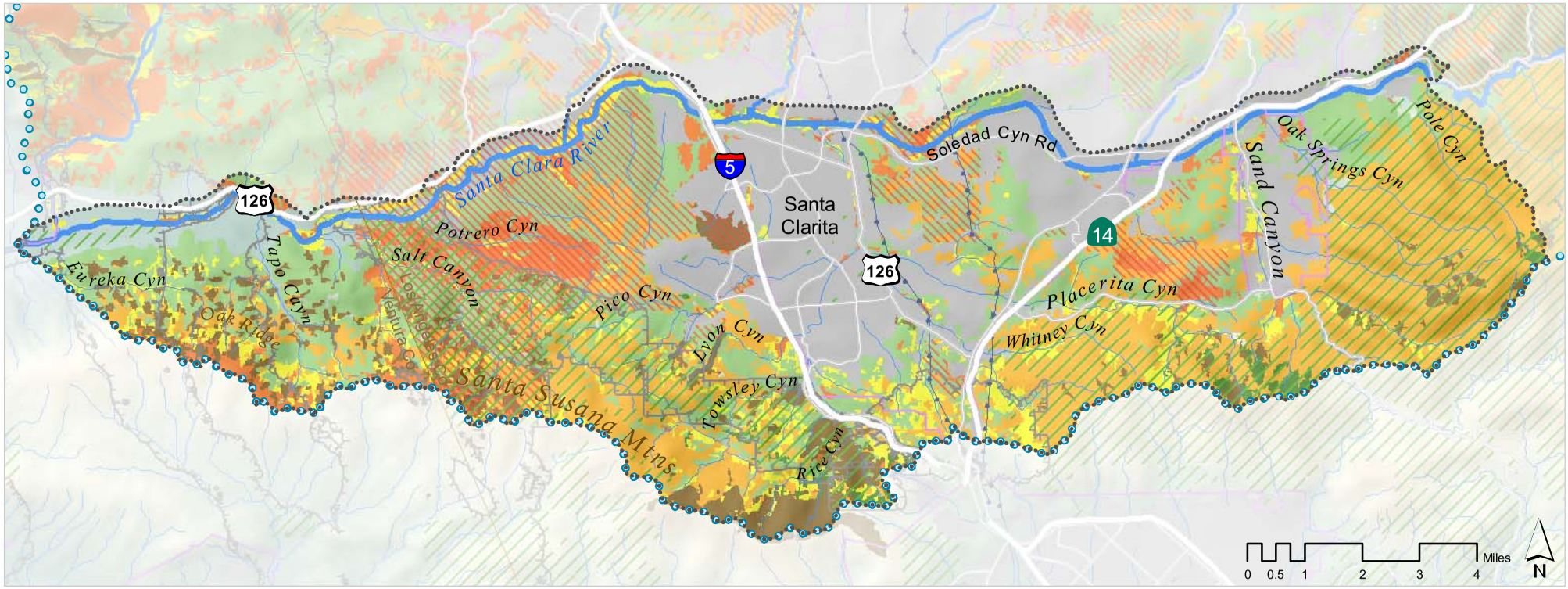
Map 14: Santa Clarita Focal Targets



Focal Targets
- Riparian
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- Scrub
- Chaparral
- Woodlands
- Conifers

Administrative
- Upper Watershed
- Santa Clarita Conservation Focus Area
- Landscape Linkage

Land Status
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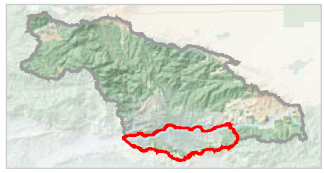
- Proposed Projects

Urban
- Developed
- City Boundary

Targets from California Department of Forestry, 2003
Linkage from South Coast Wildlands, 2006



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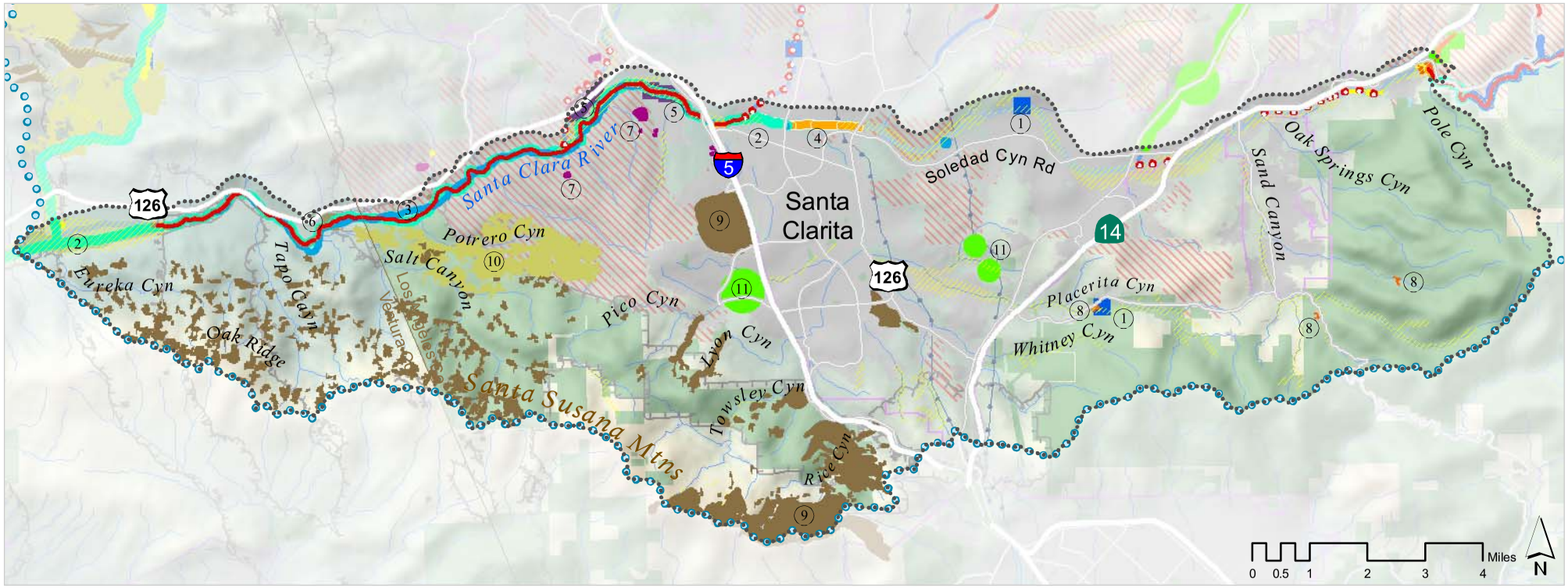
Santa Clara River, Upper Watershed

Map 15: Santa Clarita Nested Targets



Targets Note: Not all Targets listed in the Plan are well represented in spatial datasets, and may / do occur in areas that are not shown on this map.

- (1) California Red Legged Frog
- (2) Santa Ana Sucker
- (3) Arroyo Chub
- (4) Arroyo Toad
- (5) Least Bell's Vireo
- (6) Southwestern Pond Turtle
- Unarmored Threespine Stickleback
- (7) San Fernando Valley spineflower
- (8) Alluvial Fan Sage Scrub
- (9) Rare Woodlands
- (10) Rare Grassland & Wildflower Field
- (11) Plants**
- Riparian***
- UTS, Formely Occupied

California Department of Fish & Game, 2004
USFS, Los Padres National Forest, 2004
Personal Communication, summer 2005 workshops
Proposed Projects - CBI, via LA County, 2005
Linkage from South Coast Wildlands, 2006

Administrative
- Upper Watershed
- Santa Clarita Conservation Focus Area
- Landscape Linkage

Land Status
- Public or Privately Protected Lands
- Proposed Development

Urban
- Developed
- City Boundary

**Kusche's sandwort; Mason's neststraw; Mt. Gleason Indian paintbrush; Nevin's barberry; short-joint beavertail; slender mariposa lily; slender-horned spineflower

*** Southern Coast Live Oak Riparian Forest; Southern Cottonwood Willow Riparian Forest; Southern Mixed Riparian Forest; Southern Riparian Scrub; Southern Sycamore Alder Riparian Woodland; Southern Willow Scrub

August 9, 2006

enhanced by their location along the southern transition zone — a critical area for maintaining regional connectivity and large-scale ecological processes.

Most of the known occurrences of San Fernando Valley spineflower are in the northern portion of the focus area. Of these, most are located within the boundary of a planned development.

Faunal Targets

The Santa Ana sucker, UTS, and arroyo chub occur along the Santa Clara River, primarily west of the confluence with San Francisquito Creek. Here, the river runs exclusively through private lands, resulting in multiple potential threats to the long-term viability of these species, including direct loss of habitat, water quality degradation, and altered flow regime.

Arroyo toads occur at two locations along the Santa Clara River within the focus area: near the confluence of the river and Aqua Dulce Creek, and along the Santa Clara between Vasquez Canyon Creek and San Francisquito Creek.

The southwestern pond turtle has recently been documented at multiple locations along the Santa Clara River west of the confluence with San Francisquito Creek.

Least Bell's vireo breeding grounds have been documented along the main stem of the Santa Clara River between I-5 and the Castaic Creek confluence (Labinger and Greaves 2001).

Conservation Strategies

Along the Santa Clara River, acquisition should focus on protection of the river, significant tributaries, and buffer lands. Protecting at least one large grassland area and safeguarding most of the California walnut and valley oak woodlands should be priorities. Influencing land use policy and planning is a necessary strategy to address the threats of incompatible development and land management. The formation of a watershed stakeholder group to implement these conservation strategies and promote the river and its tributaries as valuable assets is essential to the long-term success of the plan.

Mint Canyon

Land Use Patterns

The Mint Canyon conservation focus area is roughly defined as the watershed of Mint Canyon and small adjacent canyons to the east that flow directly into the Santa Clara River. The small canyons include Bee, Spring, Tapie, Tick, and Sand Canyons. Approximately 40 percent of the focus area is under public ownership, which is concentrated in the northern and western potions. The remaining 60 percent is under private ownership; it includes developed areas (about 15 percent) and undeveloped areas (about 25 percent). Development is concentrated in the south in Santa Clarita but continues north into many of the canyon bottoms. Gravel mining occurs within Sand Canyon.

Floral Targets

Chaparral and sage scrub are the primary upland vegetation types, each covering roughly 40 percent of the area (see Maps 16, *Mint Canyon Focal Targets*, and 17, *Mint Canyon Nested Targets*). Roughly 70 percent of the chaparral is on public lands. As with under way of the chaparral in the upper watershed, it occurs in large contiguous patches that are adjacent to other intact habitats. In the focus area the threats to chaparral itself are low due to large areas under public ownership and few roads to act as fire ignition corridors. In contrast to the amount of chaparral under public ownership, less than one-third of the sage scrub is on public lands. As a result, the primary threats to sage scrub are habitat conversion, degradation, and fragmentation.

Riparian forest and scrub communities that lie within the focus area include southern coast live oak riparian forest, southern riparian scrub and southern sycamore alder riparian woodland. These

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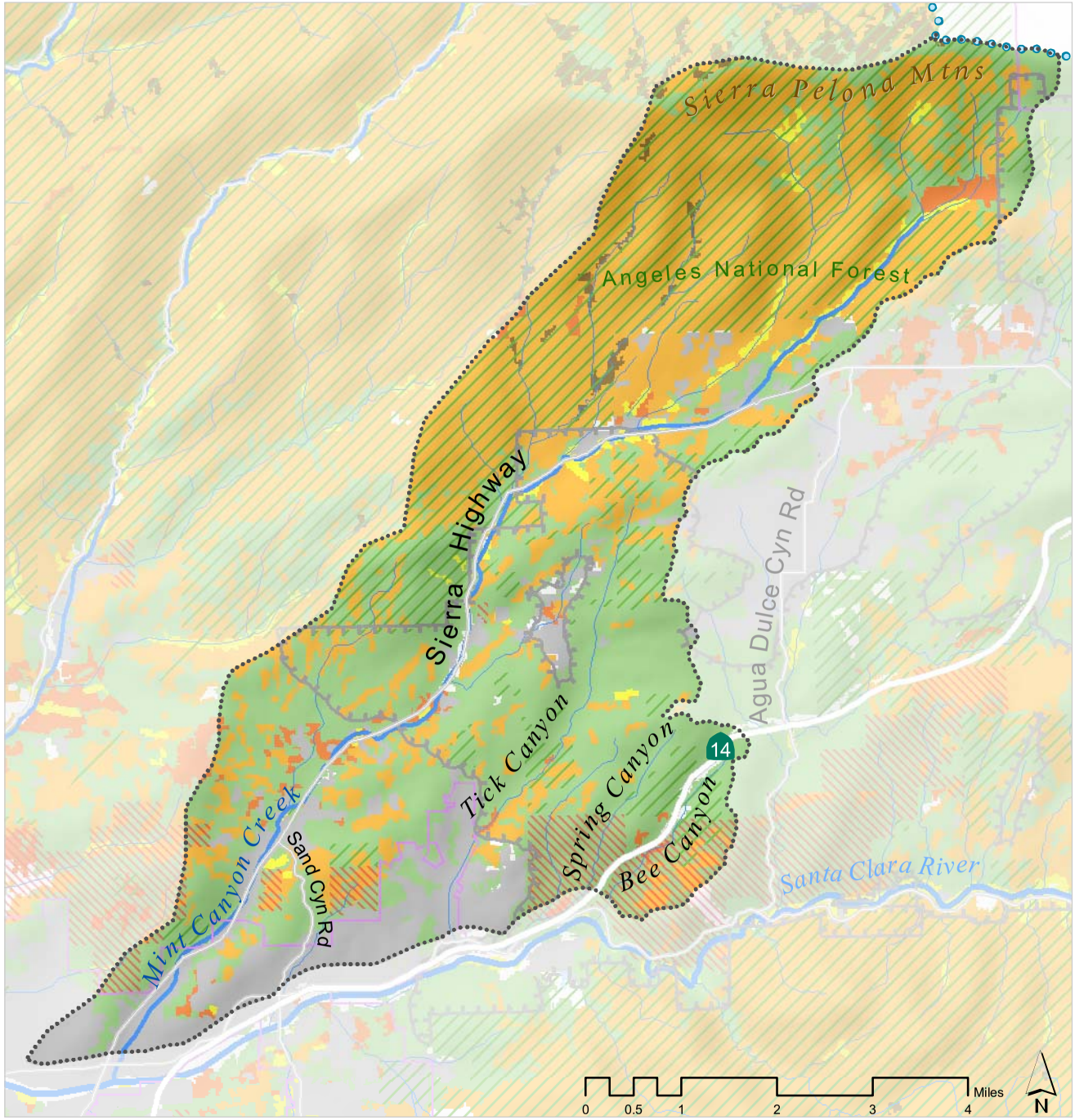
Santa Clara River, Upper Watershed

Map 16: Mint Canyon Focal Targets



Focal Targets

- Riparian
- Grasslands
- Scrub
- Chaparral
- Woodlands
- Conifers

Administrative

- Upper Watershed
- Mint Canyon Conservation Focus Area
- Landscape Linkage

Land Status

- Public or Privately Protected Lands
- Proposed Projects

Urban

- Developed
- City Boundary

Focal Targets from California Department of Forestry, 2003
Linkage from South Coast Wildlands, 2006

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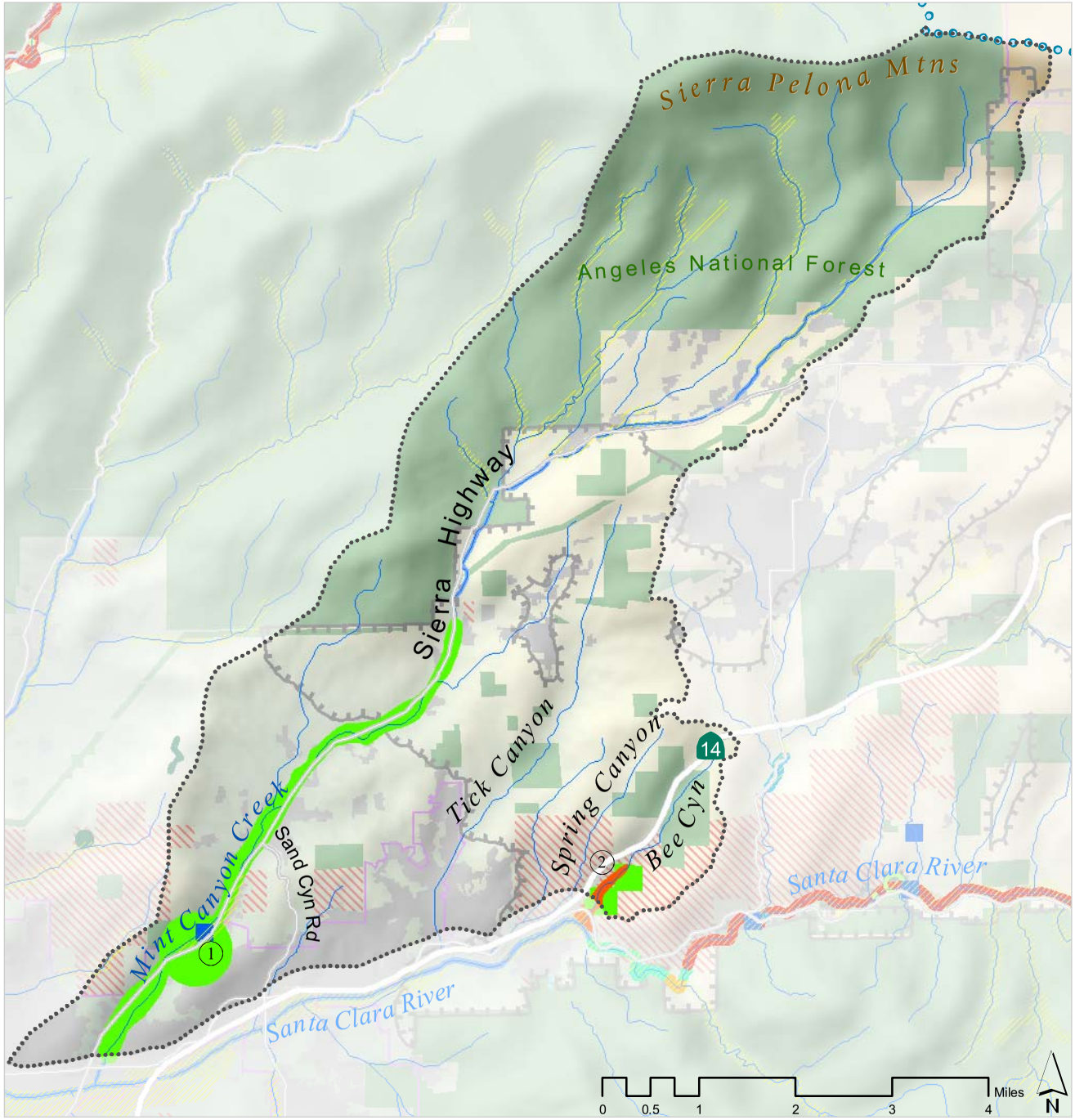
Santa Clara River, Upper Watershed

Map 17: Mint Canyon Nested Targets



Targets Note: Not all Targets listed in the Plan are well represented in spatial datasets, and may / do occur in areas that are not shown on this map.

- (1) California Red Legged Frog
- (2) Riversidian Alluvial Fan Sage Scrub
- Plants**
- Riparian***

Administrative

- Upper Watershed
- Mint Canyon Conservation Focus Area
- Landscape Linkage

Land Status

- Public or Privately Protected Lands
- Proposed Development

Urban

- Developed
- City Boundary

* Vernal Pool includes California Orcutt Grass, Spreading Navarretia, and Vernal Pool Fairy Shrimp

**Kusche's sandwort; Mason's neststraw; Mt. Gleason Indian paintbrush; Nevin's barberry; short-joint beavertail; slender mariposa lily; slender-horned spineflower

*** Southern Coast Live Oak Riparian Forest; Southern Cottonwood Willow Riparian Forest; Southern Mixed Riparian Forest; Southern Riparian Scrub; Southern Sycamore Alder Riparian Woodland; Southern Willow Scrub

California Department of Fish & Game, 2004
USFS, Los Padres National Forest, 2004
Personal Communication, summer 2005 workshops
Proposed Projects - CBI, via LA County, 2005
Linkage from South Coast Wildlands, 2006

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riparian communities are important movement and migration corridors for wildlife. Additionally, an area along Bee Canyon in the southeast contains alluvial fan sage scrub. As mapped in 1990, this patch would account for 15 percent of all the alluvial fan sage scrub in the upper watershed. Within this intact community the endangered slender-horned spineflower has been documented, increasing the area's value. The area is currently privately owned and is thus threatened by potential development.

Conservation Strategies

In areas to the south and east of public lands, land acquisition should be considered as a means of protecting large patches of sage scrub and alluvial fan scrub. Invasive species removal and restoration are necessary to ensure long-term viability of conservation targets and potentially reestablish UTS along a stretch of the Santa Clara River they once occupied. Influencing land use policy and planning is a necessary strategy to address the threats of incompatible development and land management. The formation of a watershed stakeholder group to implement these conservation strategies and promote the river and its tributaries as valuable assets is essential to the long-term success of the plan.

Bouquet Canyon

Land Use Patterns

The Bouquet Canyon conservation focus area is roughly defined as the watershed of Bouquet Canyon. The area contains Texas, Vasquez, Mystic, Dry, and Haskell Canyons. Approximately two-thirds is under public ownership. The remaining one-third is under private ownership, containing developed areas (about 12 percent in urbanized, low-density residential, and small-scale agriculture) and undeveloped areas (about 21 percent). Bouquet Canyon contains high-quality aquatic and riparian habitats that support a variety of conversation targets identified for the upper watershed. The hydrology of the creek is relatively intact due to limited impacts in the upper two-thirds of the watershed on either the creek or the uplands.

Floral Targets

Chaparral is the primary upland vegetation type in the focus area. It covers 65 percent of the area (see Maps 18, *Bouquet Canyon Focal Targets*, and 19, *Bouquet Canyon Nested Targets*). Roughly 85 percent of the chaparral in the focus area is on public lands. The chaparral occurs in large contiguous patches that are adjacent to other intact communities. The current threats to chaparral in the focus area appear moderate. However, the potential for human-cause fires will increase as development continues north toward public lands and as traffic increases on Bouquet Canyon Road, which runs through the middle of the focus area. Management of the urban-wildland interface will be increasingly important in providing safety for people and maintaining healthy chaparral communities. Because a large population of UTS occurs in the focus area, it is important to minimize the potential for a single large fire event. The structure of creeks can be significantly altered by sediment deposition and increased peak flows following large fires.

Riparian forest and scrub communities along Bouquet Canyon and its tributaries include southern coast live oak riparian forest, southern willow scrub, southern cottonwood willow riparian forest, southern riparian scrub, and southern sycamore alder riparian woodland. Additionally, the focus area contains roughly 25 percent of the alluvial fan scrub found in the upper watershed, with all occurring on private lands.

Cruzan Mesa lies along the western boundary of the focus area and contains a vernal pool known to support California Orcutt grass, spreading navarretia, and vernal pool fairy shrimp. A second area below Cruzan Mesa just north of Plum Canyon also has documented occurrences of both vernal pool associated plant species. Both areas are currently privately owned and are thus threatened by potential development.

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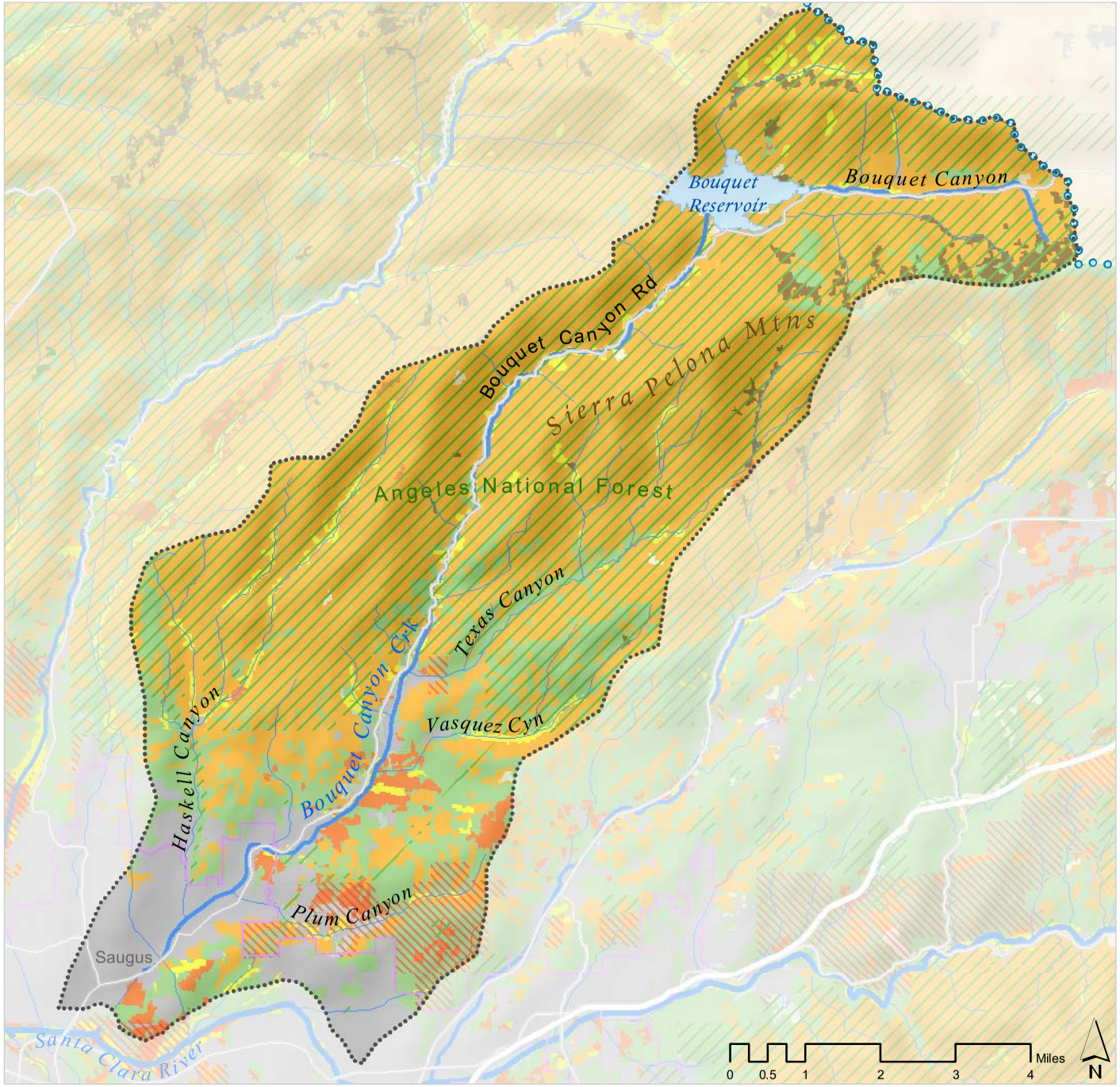
Santa Clara River, Upper Watershed

Map 18: Bouquet Canyon Focal Targets



Focal Targets

- Riparian
- Grasslands
- Scrub
- Chaparral
- Woodlands
- Conifers

Administrative

- Upper Watershed
- Bouquet Canyon Conservation Focus Area

Land Status

- Public or Privately Protected Lands
- Proposed Projects

Urban

- Developed
- City Boundary

Focal Targets from California Department of Forestry, 2003

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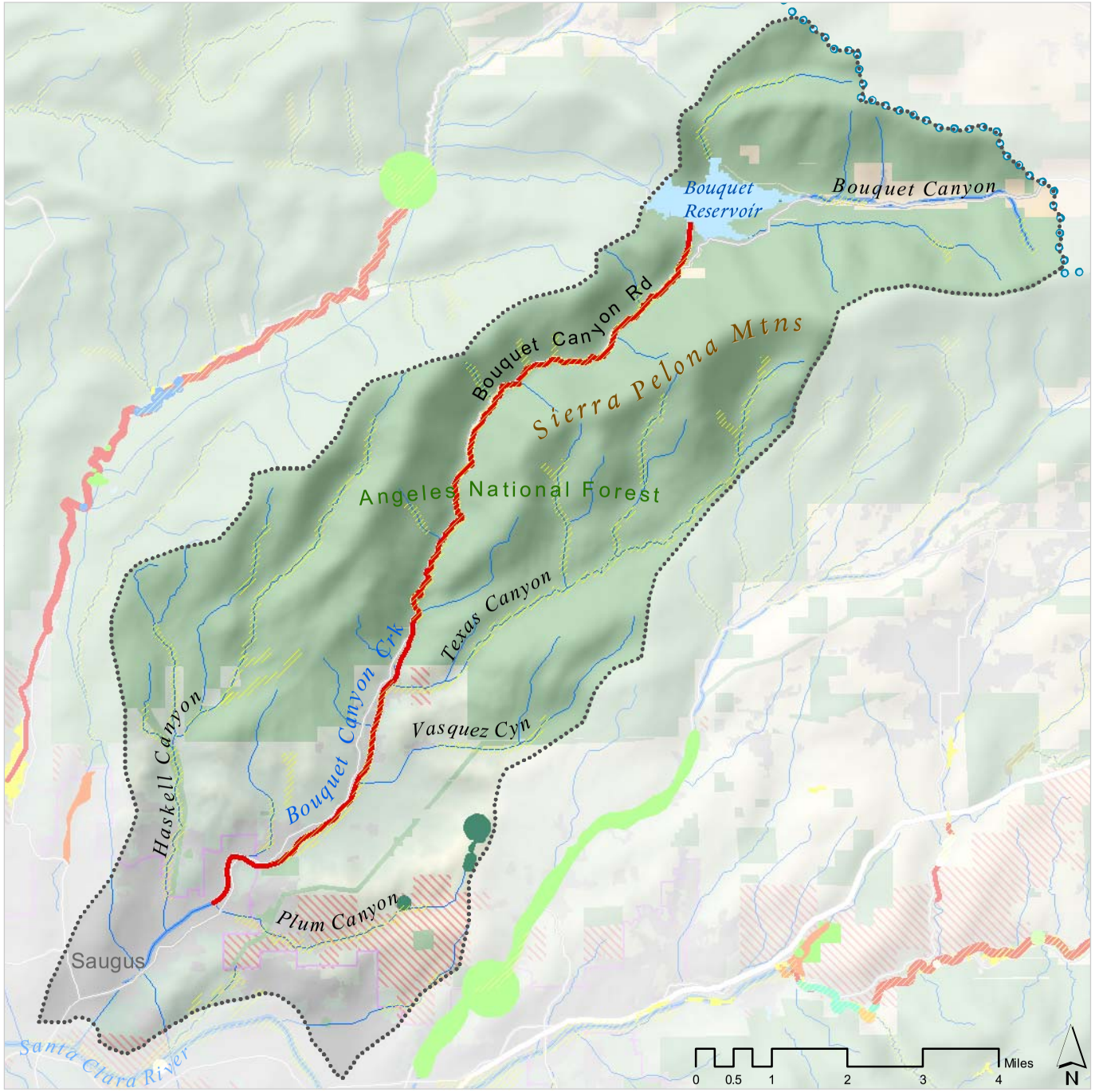
Santa Clara River, Upper Watershed

Map 19: Bouquet Canyon Nested Targets



Targets Note: Not all Targets listed in the Plan are well represented in spatial datasets, and may / do occur in areas that are not shown on this map.

- Unarmored Threespine Stickleback
- Vernal Pool*
- Riparian***

Administrative

- Upper Watershed
- Bouquet Canyon Conservation Focus Area

Land Status

- Public or Privately Protected Lands
- Proposed Development

Urban

- Developed
- City Boundary

* Vernal Pool includes California Orcutt Grass, Spreading Navarretia, and Vernal Pool Fairy Shrimp

**Kusche's sandwort; Mason's neststraw; Mt. Gleason Indian paintbrush; Nevin's barberry; short-joint beavertail; slender mariposa lily; slender-horned spineflower

*** Southern Coast Live Oak Riparian Forest; Southern Cottonwood Willow Riparian Forest; Southern Mixed Riparian Forest; Southern Riparian Scrub; Southern Sycamore Alder Riparian Woodland; Southern Willow Scrub

California Department of Fish & Game, 2004
USFS, Los Padres National Forest, 2004
Personal Communication, summer 2005 workshops
Proposed Projects - CBI, via LA County, 2005

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Sage scrub covers roughly 20 percent of the focus area; however, less than one-third is under public ownership. As a result of limited acres on public lands, the primary threats to sage scrub are habitat conversion, degradation, and fragmentation.

Faunal Targets

Unarmored three-spined stickleback (UTS) have a well-established population within Bouquet Canyon. UTS occur in most of the central portion of Bouquet Canyon, from just below Bouquet Reservoir to the developed area within Santa Clarita. The upper two-thirds of the UTS-occupied reach is located on publicly owned lands, resulting in some level of protection for the habitat and adjacent uplands. The lower one-third of the occupied reach is on privately owned lands, resulting in the potential for direct habitat loss (streambed alteration) and loss of adjacent uplands. Water quality degradation as a result of incompatible development could also reduce target viability in the lower occupied reach.

Conservation Strategies

In areas to the south of public lands, land acquisition along and adjacent to Bouquet, Plum, and Haskell Canyons should be considered to protect the riparian corridor of the Santa Clara River and one of the last reaches supporting UTS. Invasive species removal and restoration are likely necessary to ensure long-term viability of conservation targets within the canyons. Influencing land use policy and planning is a necessary strategy to address the threats of incompatible development and land management. The formation of a watershed stakeholder group to implement these conservation strategies and promote the river and its tributaries as valuable assets is essential to the long-term success of the plan.

San Francisquito

Land Use Patterns

The San Francisquito conservation focus area is roughly defined as the watershed of San Francisquito Creek. Approximately two-thirds is under public ownership. The remaining one-third is under private ownership, including highly urbanized areas (about 12 percent), undeveloped areas (about 15 percent), and a combination of low-density residential communities and small-scale agriculture (about 7 percent). San Francisquito Creek contains high-quality aquatic and riparian habitats that support a variety of conversation targets identified for the upper watershed. The hydrology of the creek is relatively intact due to limited impacts in the upper two-thirds of the watershed on either the creek or uplands.

Floral Targets

Chaparral is the primary upland vegetation type, covering roughly 60 percent of the area (see Maps 20, *San Francisquito Focal Targets*, and 21, *San Francisquito Nested Targets*). Approximately 90 percent of the chaparral is on public lands. As with most of the chaparral in the upper watershed, it occurs in large contiguous patches that are adjacent to other intact habitats. The threats to chaparral in the focus area are high. The potential for human-ignited fire is high, as development proceeds on the edge of public lands to the north. Management of the urban-wildland interface is extremely important in providing safety for people and maintaining healthy chaparral communities. As a number of key populations of aquatic targets occur along San Francisquito Creek and immediately downstream from its confluence with the Santa Clara River, it is important to minimize the potential for a single large fire event. The structure of creeks can be significantly altered by sediment deposition and increased peak flows following large fires.

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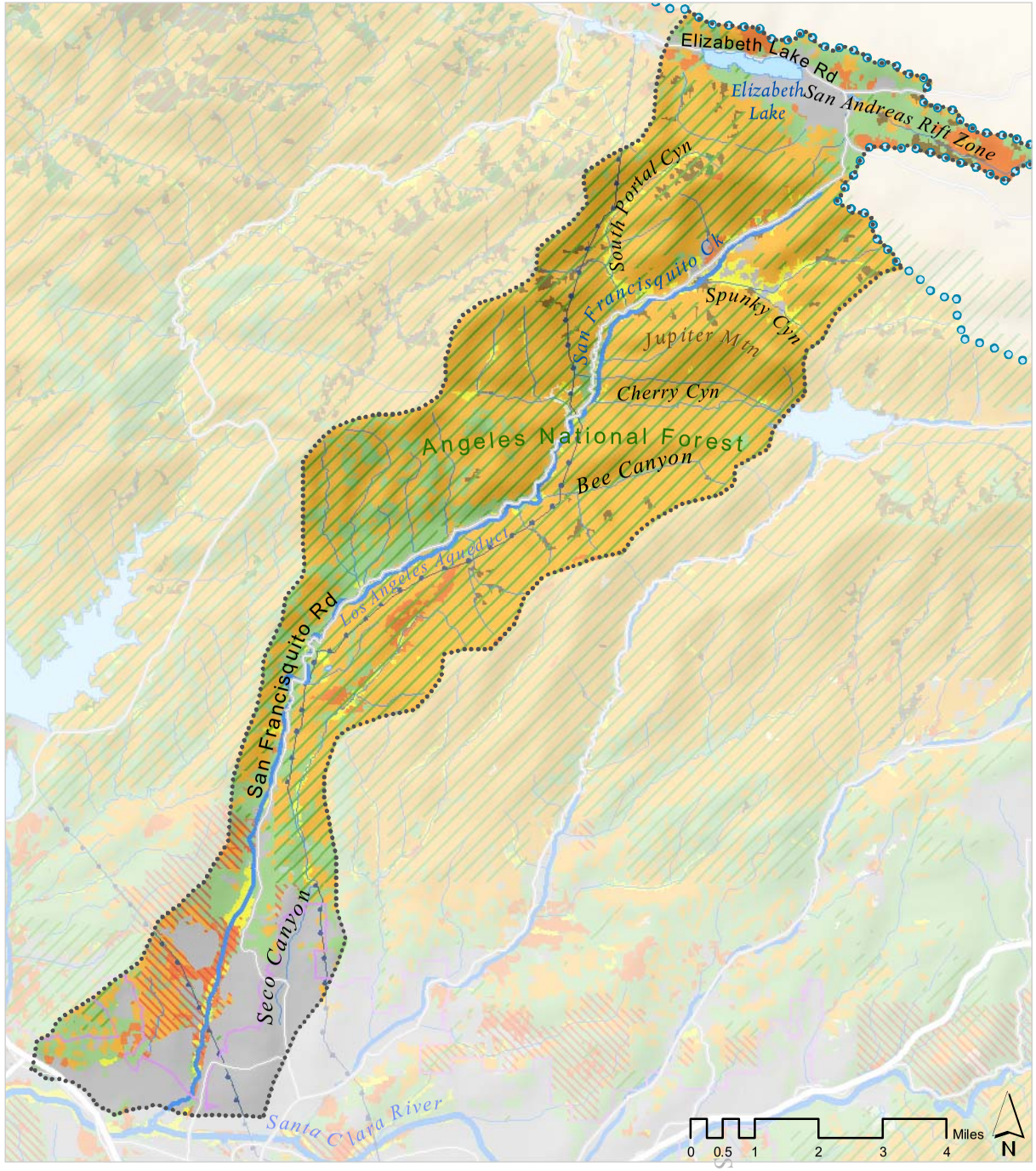
Santa Clara River, Upper Watershed

Map 20: San Francisquito Canyon Focal Targets



Focal Targets

- Riparian
- Grasslands
- Scrub
- Chaparral
- Woodlands
- Conifers

Administrative

- Upper Watershed
- San Francisquito Canyon Conservation Focus Area

Land Status

- Public or Privately Protected Lands
- Proposed Projects

Urban

- Developed
- City Boundary

Focal Targets from California Department of Forestry, 2003

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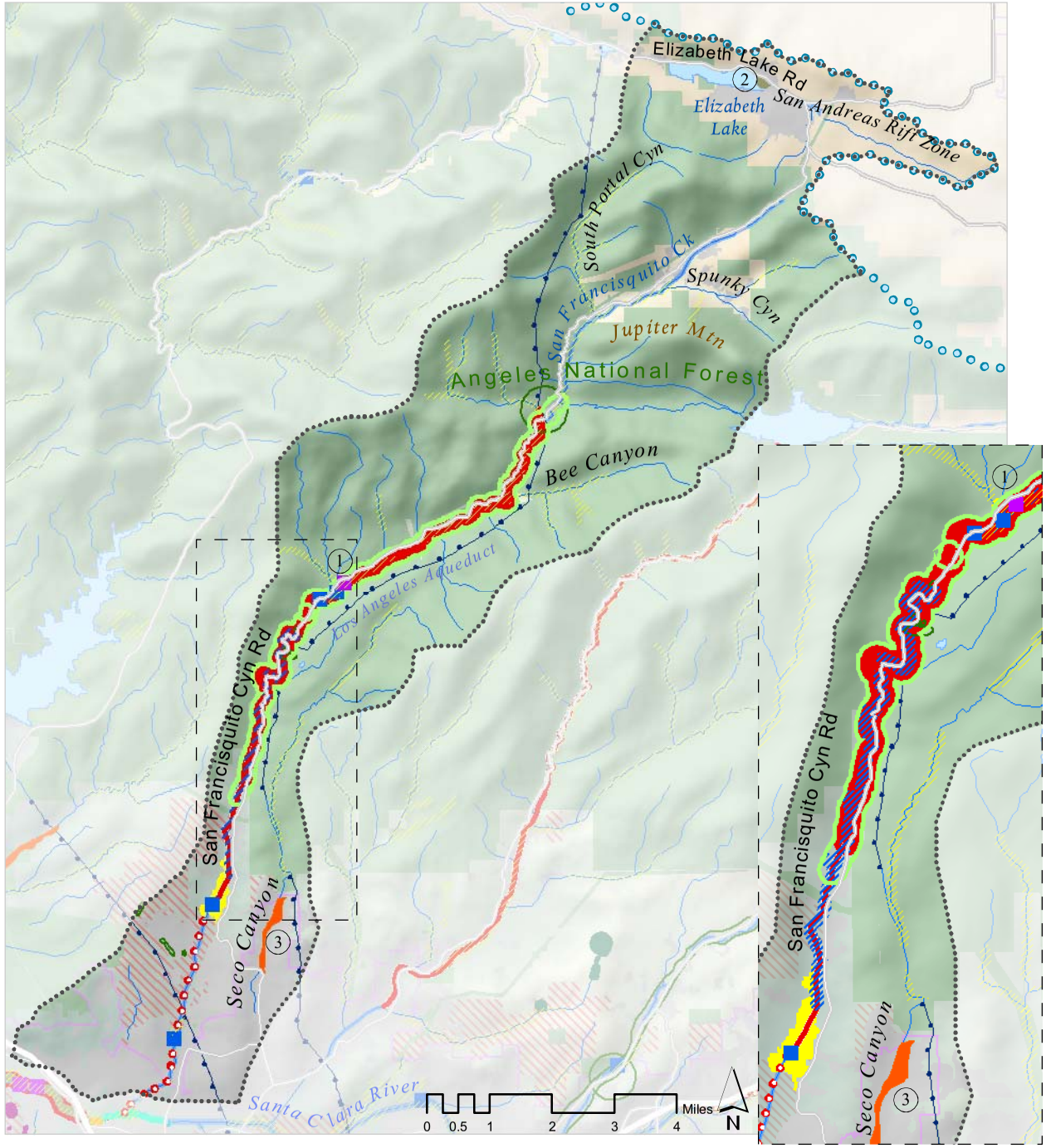
Santa Clara River, Upper Watershed

Map 21: San Francisquito Canyon Nested Targets



Targets Note: Not all Targets listed in the Plan are well represented in spatial datasets, and may / do occur in areas that are not shown on this map.

- California Red Legged Frog
- (1) Least Bell's Vireo
- (2) Southwestern Pond Turtle
- Southwestern Willow Flycatcher
- Unarmored Threespine Stickleback
- (3) Riversidian Alluvial Fan Sage Scrub
- Plants**
- Riparian***
- UTS, Formely Occupied

Administrative

- Upper Watershed
- San Francisquito Canyon Conservation Focus Area

Land Status

- Public or Privately Protected Lands
- Proposed Development

Urban

- Developed
- City Boundary

* Vernal Pool includes California Orcutt Grass, Spreading Navarretia, and Vernal Pool Fairy Shrimp

**Kusche's sandwort; Mason's neststraw; Mt. Gleason Indian paintbrush; Nevin's barberry; short-joint beavertail; slender mariposa lily; slender-horned spineflower

*** Southern Coast Live Oak Riparian Forest; Southern Cottonwood Willow Riparian Forest; Southern Mixed Riparian Forest; Southern Riparian Scrub; Southern Sycamore Alder Riparian Woodland; Southern Willow Scrub

California Department of Fish & Game, 2004
USFS, Los Padres National Forest, 2004
Personal Communication, summer 2005 workshops
Proposed Projects - CBI, via LA County, 2005

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Riparian forest and scrub communities along San Francisquito Creek and its tributaries include southern coast live oak riparian forest, southern cottonwood willow riparian forest, southern riparian scrub, and southern sycamore alder riparian woodland.

Faunal Targets

Well-established populations of aquatic targets include California red-legged frogs and UTS. Red-legged frogs currently occur in the central section of San Francisquito Creek on public land. UTS occur in the lower third of the creek and immediately downstream from its confluence with the Santa Clara River. All of the UTS-occupied reaches are located on privately owned lands, resulting in the potential for direct habitat loss (streambed alteration) and loss of adjacent uplands. Further loss and fragmentation of UTS habitat could result in a significant reduction in the viability of the remaining populations within and adjacent to the conservation focus area. Water quality degradation as a result of incompatible development could also reduce target viability.

Within the riparian communities, many rare birds have been documented, including the southwest willow flycatcher, least Bell's vireo, and yellow warbler.

Conservation Strategies

In areas to the south of public lands, land acquisition along and adjacent to San Francisquito Creek should be considered to protect the riparian corridor to the Santa Clara River and one of the last reaches supporting UTS. Invasive species removal and restoration are likely necessary to ensure long-term viability of conservation targets along San Francisquito Creek, its tributaries, and adjacent uplands. Influencing land use policy and planning is a necessary strategy to address the threats of incompatible development and land management. The formation of a watershed stakeholder group to implement these conservation strategies and promote the river and its tributaries as valuable assets is essential to the long-term success of the plan.

Castaic Canyon

Land Use Patterns

The Castaic Canyon conservation focus area is roughly defined as the watersheds of Castaic Creek, San Martinez Grande Canyon, San Martinez Chiquito Canyon, and Hasley Canyon. Approximately 72 percent is under public ownership. Public lands are located north and east of Castaic Lake. The remaining 28 percent is under private ownership with most of the lands currently undeveloped (about 23 percent of the focus area). Development is currently clustered around the communities of Castaic, Wayside, and Val Verde. Interstate 5 runs northwest-southeast through the southern portion of the focus area. State Route 126 runs along the Santa Clara River adjacent to the southern boundary.

Floral Targets

Chaparral is the primary upland vegetation type, covering roughly 57 percent of the area (see Maps 22, *Castaic Canyon Focal Targets*, and 23, *Castaic Canyon Nested Targets*). Roughly 93 percent of the chaparral is on public lands. The chaparral occurs in large contiguous patches that are adjacent to other intact communities. The current threats to chaparral in the focus area appear moderate. However, the potential for human-ignited fire will increase as development continues north along I-5 toward public lands. Management of the urban-wildland interface will be increasingly important in providing safety for people and maintaining healthy chaparral communities. Because a number of aquatic targets occur in the focus area, it is important to minimize the potential for a single large fire event. The structure of creeks can be significantly altered by sediment deposition and increased peak flows following large fires.

Sage scrub covers roughly 23 percent of the focus area, with 40 percent under public ownership. A large majority of high-quality California sagebrush scrub is located on private lands in the lower

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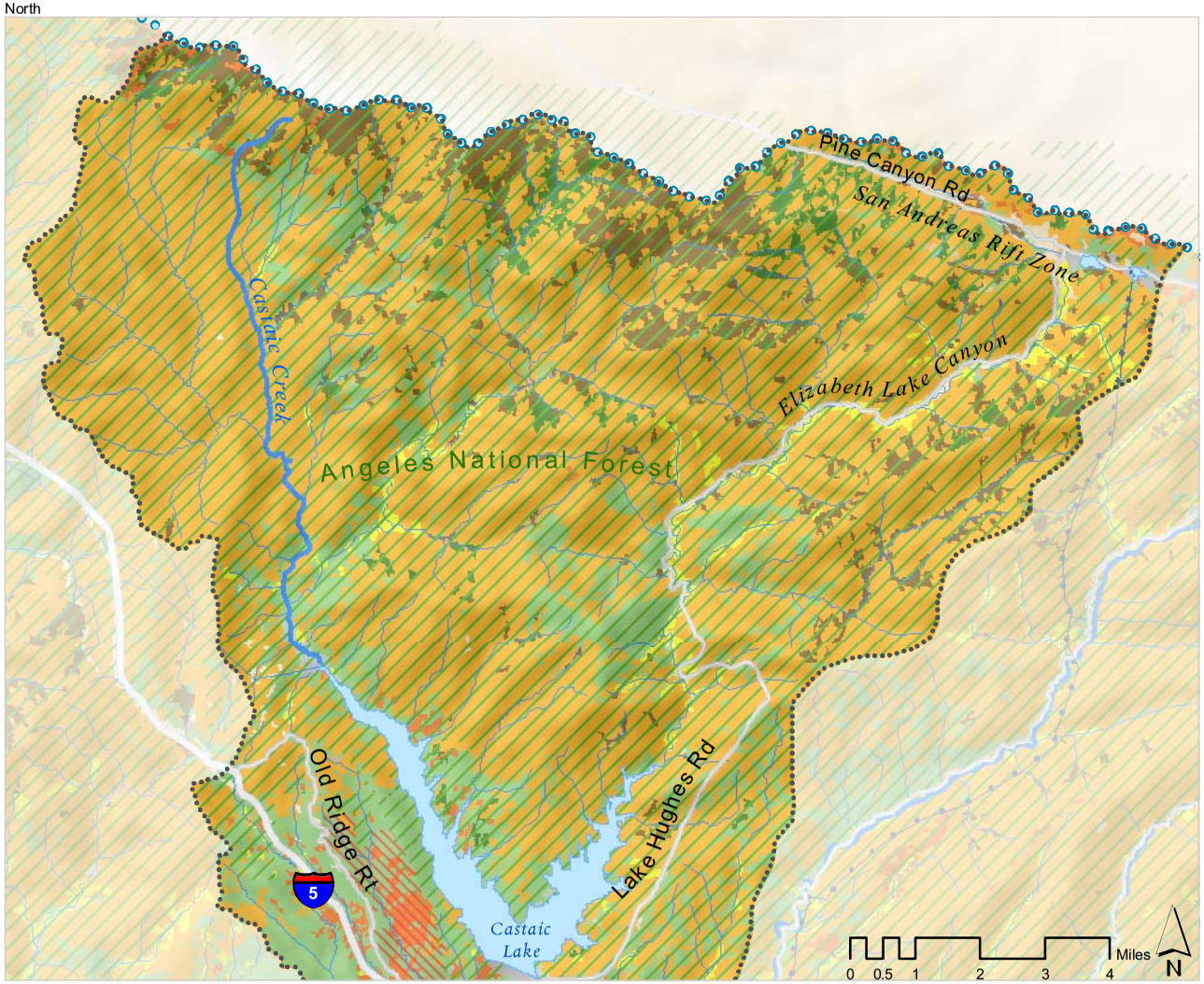
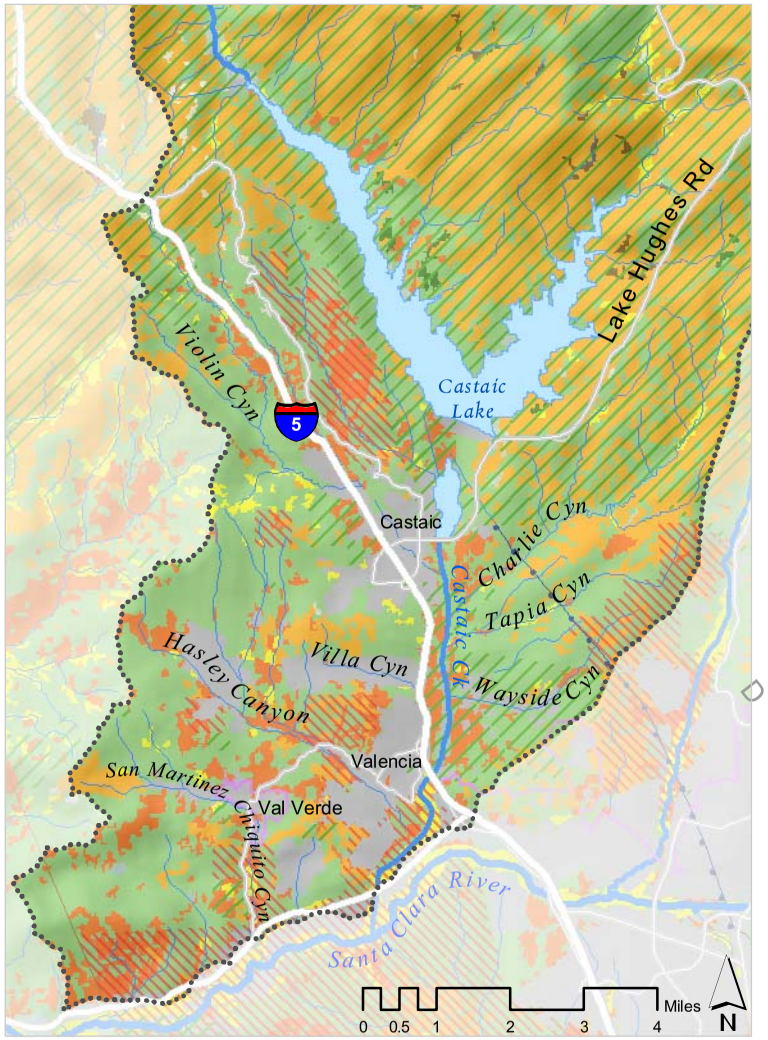
Santa Clara River, Upper Watershed

Map 22: Castaic Canyon Focal Targets

North



South



Focal Targets

- Riparian
- Grasslands
- Scrub
- Chaparral
- Woodlands
- Conifers

Administrative

- Upper Watershed
- Castaic Canyon Conservation Focus Area

Land Status

- Public or Privately Protected Lands
- Proposed Projects

Urban

- Developed
- City Boundary

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Focal Targets from California Department of Forestry, 2003

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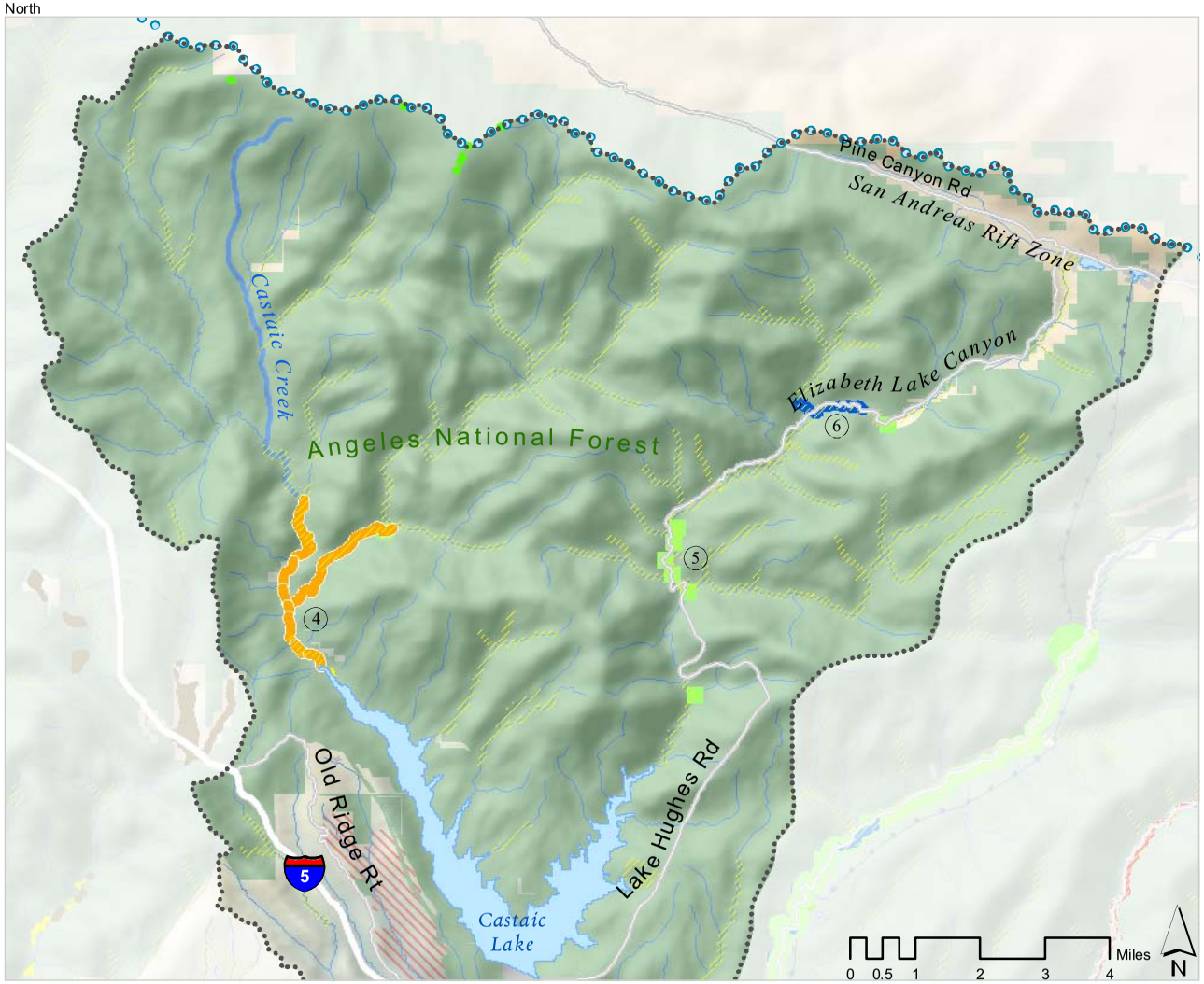
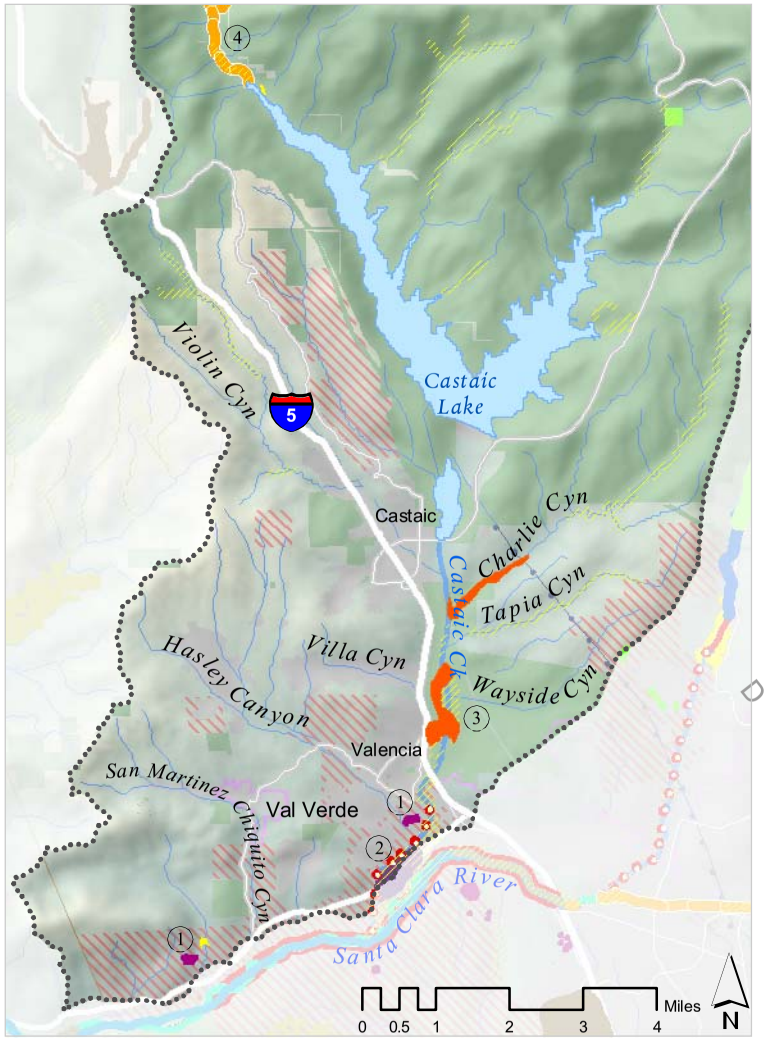
Santa Clara River, Upper Watershed

Map 23: Castaic Canyon Nested Targets

North



South



Targets Note: Not all Targets listed in the Plan are well represented in spatial datasets, and may / do occur in areas that are not shown on this map.

- (6) California Red Legged Frog
- (4) Arroyo Toad
- (2) Least Bell's Vireo
- (5) Southwestern Willow Flycatcher
- (1) San Fernando Valley spineflower
- (3) Riversidian Alluvial Fan Sage Scrub
- Riparian***

UTS, Formely Occupied

*** Southern Coast Live Oak Riparian Forest; Southern Cottonwood Willow Riparian Forest; Southern Mixed Riparian Forest; Southern Riparian Scrub; Southern Sycamore Alder Riparian Woodland; Southern Willow Scrub

Administrative

- Upper Watershed
- Castaic Cyn Conservation Focus Area

Land Status

- Public or Privately Protected Lands
- Proposed Development

Urban

- Developed
- City Boundary

California Department of Fish & Game, 2004
USFS, Los Padres National Forest, 2004
Personal Communication, summer 2005 workshops
Proposed Projects - CBI, via LA County, 2005

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elevations adjacent to the two main transportation corridors, I-5 and State Route 126. As a result, the greatest threats to sage scrub are direct habitat loss and degradation resulting from fragmentation and frequent disturbance. Additionally, the San Fernando Valley spineflower is found with the California sagebrush scrub in close proximity to the two major transportation routes in the southern portion of the focus area.

Riparian forest and scrub communities include southern coast live oak riparian forest, southern cottonwood willow riparian forest, southern willow scrub, southern mixed riparian forest, southern riparian scrub, and southern sycamore alder riparian woodland. Additionally, the focus area contains roughly 25 percent of the alluvial fan scrub found in the upper watershed, with all occurring on private lands.

Faunal Targets

The arroyo toad occurs along Castaic Creek and Fish Canyon above Castaic Lake. The southwestern pond turtle has been documented in Fish Canyon. The northern occupied reaches of Castaic Creek and Fish Canyon lie on public land, while the southern reaches occur on private lands. Threats to these species on private lands include direct loss of habitat, water quality degradation, and altered flow regime.

The southwestern willow flycatcher has been documented in riparian habitats along Elizabeth Lake Canyon with observations concentrated around Warm Springs Camp.

The spotted owl has been documented on public lands in the northern portion of the focus area in the vicinity of Warm Springs, Fish, Shake, and Lion Canyons.

Conservation Strategies

In areas south of public lands, land acquisition along creeks and canyons should be considered to protect riparian corridors to the Santa Clara River. Invasive species removal and restoration are likely necessary to ensure long-term viability of conservation targets. Influencing land use policy and planning is a necessary strategy to address the threats of incompatible development and land management. The formation of a watershed stakeholder group to implement these conservation strategies and promote the river and its tributaries as valuable assets is essential to the long-term success of the plan.

Piru Creek

Land Use Patterns

The Piru Creek conservation focus area is roughly defined as the watershed of Piru Creek. Approximately 80 percent is under public ownership. Public lands are located in the northern portion above Lake Piru. The remaining 20 percent is under private ownership, with most of the lands currently undeveloped (about 18 percent of the focus area). Although Piru Creek is dammed in two locations, the creek system supports a high number of aquatic and riparian conservation targets.

Floral Targets

Chaparral and coniferous forest are the primary upland vegetation types in total covering roughly 62 percent of the focus area (see Maps 24, *Piru Creek Focal Targets*, and 25, *Piru Creek Nested Targets*). Roughly 90 percent of each community occurs on public lands. The fire regime of conifer forests has been altered by human suppression, resulting in the accumulation of larges amounts of biomass and fuel. Threats to the coniferous forests and aquatic resources result from the potential for large, intense crown fires. The coniferous forests are better adapted to tolerate frequent low-intensity fires than infrequent high-intensity fires. Aquatic resources can be highly altered by erosion following large fires.

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Santa Clara River, Upper Watershed

Map 24: Piru Creek Focal Targets

Focal Targets

- Riparian
- Grasslands
- Scrub
- Chaparral
- Woodlands
- Conifers

Administrative

- Upper Watershed
- Piru Creek Conservation Focus Area
- Landscape Linkage

Land Status

- Public or Privately Protected Lands
- Proposed Projects

Urban

- Developed
- City Boundary

Focal Targets from California Department of Forestry, 2003
Linkage from South Coast Wildands, 2006

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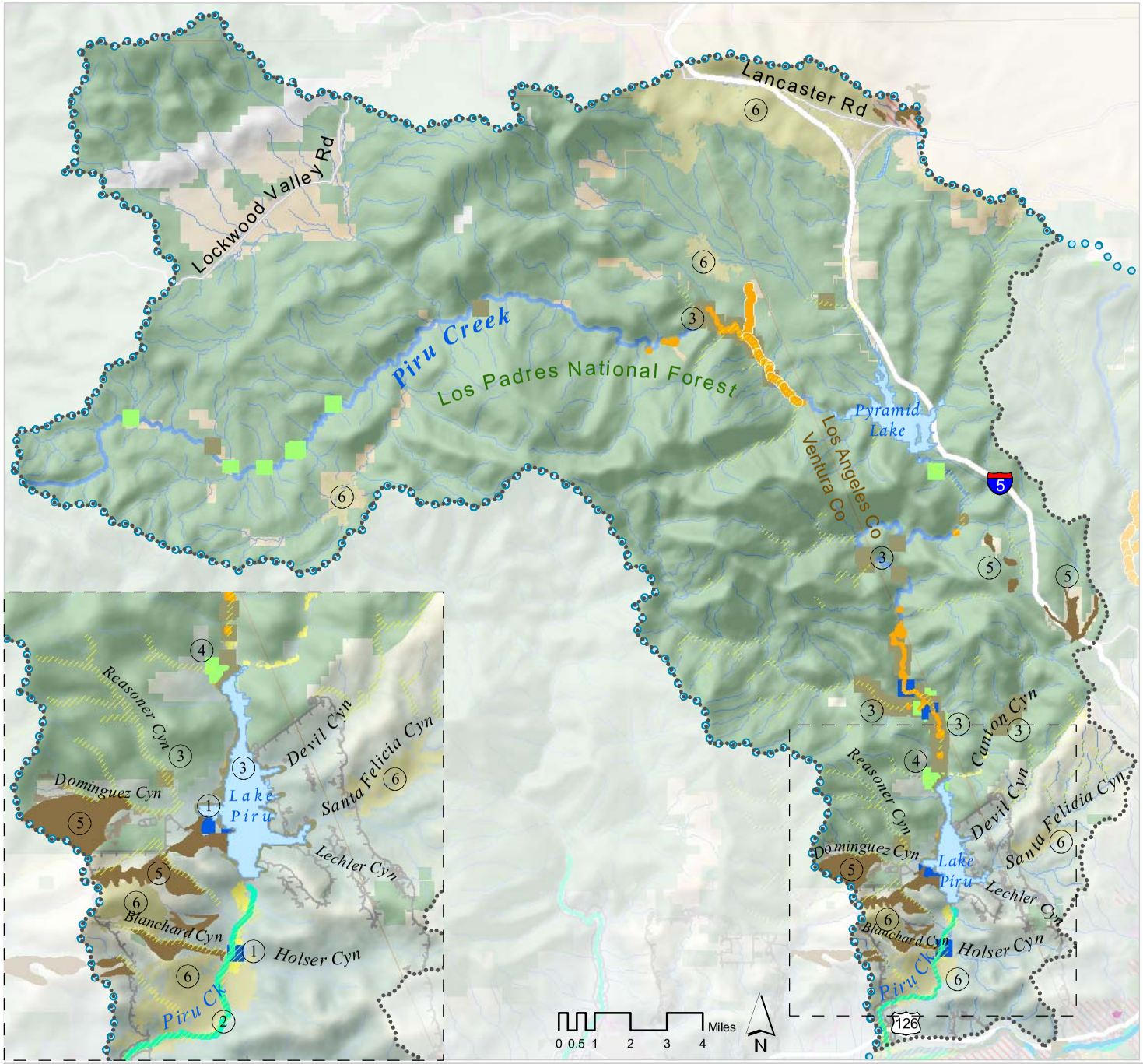
Santa Clara River, Upper Watershed

Map 25: Piru Creek Nested Targets



Targets Note: Not all Targets listed in the Plan are well represented in spatial datasets, and may / do occur in areas that are not shown on this map.

- (1) California Red Legged Frog
- (2) Santa Ana Sucker
- Arroyo Toad
- (3) Southwestern Pond Turtle
- (4) Southwestern Willow Flycatcher
- (5) Rare Woodlands
- (6) Rare Grassland & Wildflower Field
- Riparian***

Administrative

- Upper Watershed
- Piru Creek Conservation Focus Area
- Landscape Linkage

Land Status

- Public or Privately Protected Lands

Urban

- Developed
- City Boundary

*** Southern Coast Live Oak Riparian Forest; Southern Cottonwood Willow Riparian Forest; Southern Mixed Riparian Forest; Southern Riparian Scrub; Southern Sycamore Alder Riparian Woodland; Southern Willow Scrub

California Department of Fish & Game, 2004
USFS, Los Padres National Forest, 2004
Personal Communication, summer 2005 workshops
Proposed Projects - CBI, via LA County, 2005
Linkage from South Coast Wildlands, 2006

Sage scrub covers roughly 20 percent of the focus area, with 58 percent under public ownership. The greatest threats to sage scrub are direct loss of habitat and degradation resulting from fragmentation and disturbance. Riparian vegetation covers 25 percent, with roughly 60 percent on public lands. Riparian corridors from public lands to the north through private lands to the Santa Clara River are important to protect to provide movement corridors for wildlife and help maintain water quality and natural flow regimes.

The focus area supports roughly 56 percent of the grassland and wildflower fields located within the upper watershed; however, only 35 percent are located on public lands. Additionally, a large portion of the high-quality wildflower fields along the northern watershed boundary are on private land. These wildflower fields are important not only for their intrinsic biodiversity, but also for their location near the convergence of other ecoregions. The convergence point is critical for species movement and evolution in response to shifts in global climate patterns.

The focus area supports two woodland types that are not well represented elsewhere in the upper watershed — valley oak and California walnut woodlands. Roughly 80 percent of the California walnut woodland in the upper watershed is found within the focus area; however, only 13 percent is on public lands. More than half of all the valley oak woodlands within the upper watershed occurs within the focus area, but only 0.5 percent is located on public lands. The greatest threats to these woodlands are habitat loss and fragmentation.

Riparian forest and scrub communities include southern coast live oak riparian forest, southern cottonwood willow riparian forest, southern willow scrub, southern mixed riparian forest, and southern sycamore alder riparian woodland.

Faunal Targets

Two populations of the arroyo toad occur within the focus area. One population is located on public lands on Dry Creek above Pyramid Lake. The second population occurs on both public and private lands on Blanca and Piru Creeks above Piru Lake. The southwestern pond turtle occurs in these areas as well as in Canton Canyon. The Santa Ana sucker occurs along Piru Creek below Lake Piru. Threats to these species above Lake Piru on private lands include direct loss of habitat, water quality degradation, and altered flow regime.

The southwestern willow flycatcher has been documented in riparian habitats along upper Piru Creek and above Lake Piru on Blanca and Piru Creeks.

The spotted owl has been documented in the coniferous forests in the central portion of the focus area near Buck Creek and in the western portion of focus area near upper Piru Creek.

Conservation Strategies

In areas to the south of public lands, land acquisition along creeks and canyons should be considered a high priority to protect riparian corridors to the Santa Clara River. Invasive species removal and restoration are likely necessary to ensure long-term viability of conservation targets within the canyons. Influencing land use policy and planning is a necessary strategy to address the threats of incompatible development and land management. The formation of a watershed stakeholder group to implement these conservation strategies and promote the river and its tributaries as valuable assets is essential to the long-term success of the plan.

The Nature Conservancy's mission is to

Preserve the plants, animals and natural communities
that represent the diversity of life on Earth
by protecting the lands and waters
they need to survive.