

chapter 2 **The San Gabriel River: Past and Present**



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chapter 2 The San Gabriel River: Past and Present

2.1 OVERVIEW

A realistic appraisal of how biological, physical and social forces worked together to create the river as it is today helps clarify the gap between its current state and the vision of what the river corridor might be in the future.

“The San Gabriel River Watershed Through Time” (section 2.2) describes the natural processes that created and shaped the river over millions of years and how human habitation has affected these natural conditions and processes in recent times.

“The San Gabriel River Today” (section 2.3) presents the existing conditions of the river corridor with maps and accompanying text. Each map looks at the river through a different lens, highlighting the issues and challenges that will be addressed in the San Gabriel River Corridor Master Plan. This section is organized in two parts:

BIOLOGICAL AND PHYSICAL RESOURCES. The *natural ecology* of the river corridor, such as flora and fauna, and the human-built elements including parks and trails, and infrastructure (roads, utilities, drains, etc.).

CULTURAL AND SOCIAL RESOURCES. The *human ecology* of the river corridor, such as political boundaries, social demographics and land use.



Figure 2-1. Dramatic mountains and gently sloping alluvial plains characterize the upper part of the watershed.

2.2 THE SAN GABRIEL RIVER THROUGH TIME

Today's San Gabriel River Watershed is the result of thousands of years of natural processes: geology, climate, hydrology and ecology. An understanding of these processes will help determine the habitat, recreation and open space enhancements that are possible now and in the future.

2.2.1 Pre-Human Habitation

The river and its watershed provide a diverse landscape and a spectacular array of abundant resources. During the past few centuries, these natural riches have provided the foundation for equally spectacular human achievements.

Geology and Topography

The geologic structure of the San Gabriel River Watershed creates a relatively unusual drainage pattern. It directs the main corridor of the San Gabriel River to the western boundary of the watershed for most of its length.

The watershed can be divided into four distinct sections or physiographic areas, each with very different hydrological characteristics:

1. The rugged upper watershed of the San Gabriel Mountains
2. The San Gabriel Basin area, including the urban communities of the east San Gabriel and Pomona Valleys
3. Whittier Narrows
4. The Central Basin and Los Angeles Coastal Plain, including the communities of southeastern Los Angeles and northern Orange Counties

SAN GABRIEL MOUNTAINS

The Upper San Gabriel River Watershed falls largely within the San Gabriel Mountains. It is framed by surrounding ridgelines, and a small portion of the mid-San Gabriel Valley. The mountains contain the headwaters of the San Gabriel River Watershed and the West, North, and East Forks, as well as the main stem of the San Gabriel River.

The San Gabriels are one of several mountain ranges in Southern California that make up the Transverse Ranges. The Transverse Ranges run east-

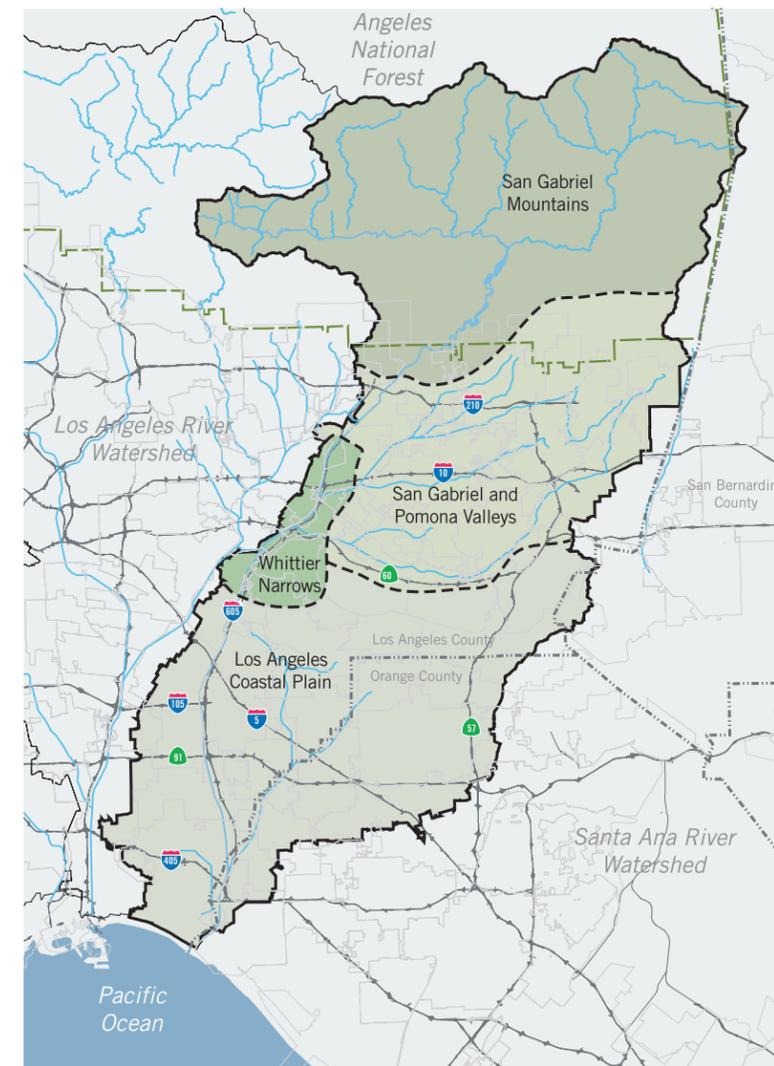


Figure 2-2. Physiographic areas of the San Gabriel River Watershed.

west—crosswise to nearly all other mountain ranges and valleys in California. The Pacific and North American plates converge in this area along an eastward-trending bend in the San Andreas Fault. The geologic compression caused by the merging of these two plates is expressed primarily in a north-south direction—it is squeezing the region together. The result is uplift in some areas, which forms the San Gabriel Mountains, and push down in other areas, which forms basins. The transverse nature of the San Gabriel Mountains and their extreme elevation change create diverse climatic conditions and habitat.

These geologic processes have affected the rugged San Gabriel Mountains for more than 100 million years. Even so, the San Gabriel Mountain range is still one of the fastest growing in the world. Over 60 percent of the landscape slopes at grades over 60 percent, with great expanses of steep, inaccessible terrain. Elevation in the upper watershed ranges from just 700 feet above sea level in Azusa to the peak of Mt. Baldy at over 10,000 feet high. The San Gabriels stand on a massive block of the earth's crust that is separated from the surrounding landscape by a network of major faults, including the San Andreas Fault on the north and the San Gabriel and Sierra Madre faults on the south. The San Gabriels are also fractured by many subsidiary faults. Most of the parent bedrock is igneous, but the rocks are highly fractured and weathered, decomposing rapidly when exposed to the elements.

In the transverse province of Southern California, this bedrock erosion forms natural aggregate deposits that are transported and deposited as sediment and rock fragments by the creeks, streams and rivers that flow from the mountains to the valleys. As a result, the valleys below the south face of the San Gabriel Mountains have exceptionally rich and deep alluvial deposits within and around the natural rivers and streams, and in the alluvial fans of these rivers and streams that form at the base of mountains and hills. The sand and gravel deposits in the area adjacent to the San Gabriel River form one of the most significant aggregate mining districts in the world and have become one of the region's major economic ventures.

SAN GABRIEL BASIN

The San Gabriel Basin lies to the south of the San Gabriel Mountains. The eastern portions of the basin fall within the San Gabriel River Watershed and the western portions fall within the Rio Hondo Watershed. Historically, these drainages shifted and braided, periodically interweaving. The two primary tributaries within the San Gabriel Basin portion of the San

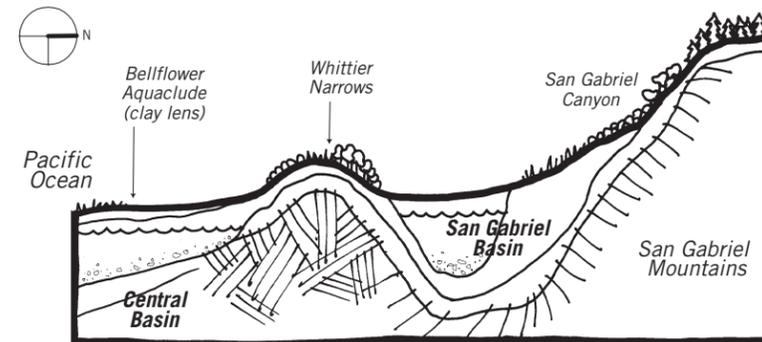


Figure 2-3. Physiographic cross-section of the basins below the San Gabriel River.

Gabriel River Watershed—San Jose Creek and Walnut Creek—flow from east to west. Each has its own sub-watershed.

The Puente Sub-Basin is an offshoot of the San Gabriel Basin, mainly underneath the San Jose Creek Sub-Watershed. Vast portions of the San Gabriel Basin and Puente Sub-Basin are characterized by mildly sloping to nearly flat terrain. These areas consist mostly of alluvium, terrace and shale soil. The Merced and San Jose Hills and the Puente-Chino Hills complexes, which define the basin to the east and south, largely consist of shale and sandstone.

The Walnut Creek Sub-Watershed is formed by the foothills of the San Gabriel Mountains on the north and the Merced and San Jose Hills to the south. This sub-watershed contains the upper east San Gabriel Valley, characterized by mildly sloping alluvial conditions. The Merced and San Jose Hills form the northern edge of the San Jose Creek Sub-Watershed with the Puente-Chino Hills to the south. This sub-watershed contains the majority of the lower, east San Gabriel Valley, characterized by mildly sloping to nearly flat terrain.

WHITTIER NARROWS

Shaping the bottom of the San Gabriel Basin, the Whittier Narrows forms a division between the San Gabriel Basin to the north and the Central Basin and the Los Angeles Coastal Plain to the south. It is an area of geologic uplift between the Puente-Chino Hills complex on the east and the Montebello Hills on the west. This formation provides a barrier to groundwater movement. It is a natural collection and convergence point for both surface water and groundwater.

CENTRAL BASIN—LOS ANGELES COASTAL PLAIN

The southern portion of the Central Basin is located within the San Gabriel River Watershed and the northern portion is within the Los Angeles River-Rio Hondo Watersheds. Most of the San Gabriel River Watershed downstream of Whittier Narrows is formed by the Coyote-Carbon Creeks Sub-Watershed, which is formed by the Puente-Chino Hills on the north and the Coyote Hills and Santa Ana River Watershed on the south. It is characterized by a mildly sloping to nearly flat coastal plain, with the exception of the Coyote Hills. The western boundary of the watershed is divided from the Los Angeles River Watershed by a slightly elevated area of the plain. The Central Basin aquifer underlies this portion of the San Gabriel River Watershed. It is formed by the Whittier Fault Zone and an uplift along the Newport-Inglewood Fault. The West Coast Basin underlies the lower end of the San Gabriel River Watershed. The lower end of the watershed includes the Los Cerritos Wetlands system and other lands that were once associated with a complex coastal estuary at the mouth of the San Gabriel River.

Climate

The climate and precipitation patterns of the region are key to understanding the hydrologic patterns of the watershed. In general, the climate is Mediterranean-type. This rare climate type covers only 3 percent of the earth's land surface, including regions adjacent to the Mediterranean Sea and portions of Australia, Chile and South Africa. Long, hot, dry summers and cool, wet winters are typical. This pattern is an important factor in the



Figure 2-4. Many coastal sage scrub plants drop their leaves during periods of drought and resprout after the first winter rains.

hydrology and habitat structure of the watershed. About 75 percent of precipitation falls between December and March, with the remainder mostly falling in November and April. Precipitation levels increase with altitude, and at the highest elevations, some of it falls as snow. The average annual precipitation in the San Gabriel Mountains is 36 inches a year, while the San Gabriel Valley averages 20 inches and the coastal plain averages 13 inches. Most years vary substantially with many seasons of drought and floods. In addition, geologic records reveal dramatic cyclic variations in climate with little predictability.

Erosion and Fire

Four main factors cause erosion in this region: steep slopes, soil characteristics, vegetative cover and rainfall patterns. Fire is also an indirect cause of erosion. It is a significant ecological process in the watershed, particularly in the mountainous hillside areas. Adaptations to fire are evident in the physiological and physical characteristic of the many chaparral and coastal sage scrub species that dominate the lower



Figure 2-5. The Williams Fire of 2002 is seen burning in the mountains, as viewed from Santa Fe Dam.

COURTESY OF TIM BAAL, U.S.D.A. FOREST SERVICE



Figure 2-6. The ceanothus crassifolius or hoaryleaf ceanothus has regenerated five years after a fire in the San Gabriel Mountains.

COURTESY OF GABI MCGLEAN ©2003

elevations of the San Gabriel Mountains and the hills of the San Gabriel Valley. These biomes naturally depend on fire for healthy and sustainable nutrition, soil renewal and disease reduction. The natural ignition source for fire in the watershed is lightning strikes. Lightning fires occur during summer storms that form at high elevations in the San Gabriel Mountains where there is little rain to suppress the fire. In fall, Santa Ana winds often blow from the north and northeast, creating the extremely dry, hot conditions that spread wildfires. After a fire, depletion of vegetative cover creates greater erosion potential. During heavy storms after the fire season, streams often transport large quantities of sediment, increasing the potential for floods.

Hydrology

The San Gabriel River was originally wide and shallow, surrounded by native vegetation. It was a braided series of slow-velocity channels that used a large flood plain to disperse sediment. It was an unpredictable river, not unlike other river systems in the American Southwest. During large storms, the river often created new channels, sometimes even intermingling with the Los Angeles River. Over time, the San Gabriel River system returned to equilibrium where the amount of sediment deposition and level of erosion were balanced.

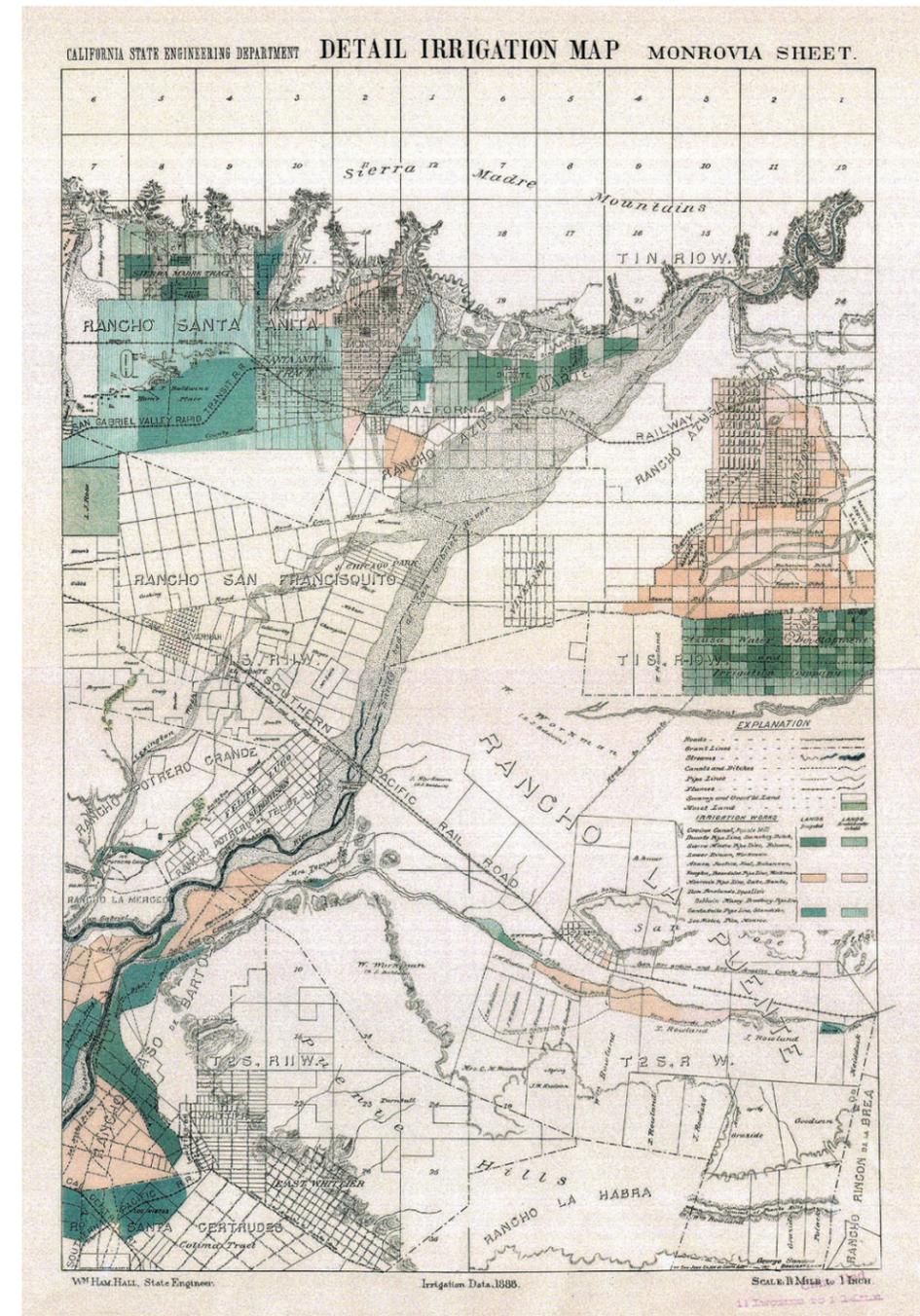


Figure 2-7. This 1887 irrigation map shows the broad floodplains and stream braiding that was characteristic of the San Gabriel River before dams and channelization.

COURTESY OF CALIFORNIA STATE ARCHIVES

The San Gabriel River Watershed consists of three primary basins:

1. The San Gabriel Basin including Puente Sub-Basin in the San Gabriel Valley (see Figure 2-8)
2. The Central Basin along the Coastal Plain (see Figure 2-9)
3. The West Coast Basin at the lower end of the watershed (see Figure 2-9)

The San Gabriel Basin is an unconfined aquifer; the soil allows water to easily percolate from the surface through the basin. Historically, water entered this basin through natural percolation and from subsurface flows from the San Gabriel Mountains, Chino Basin to the east and the Raymond Basin to the northwest. Water flow within the basin has been toward the Whittier Narrows, where water migrates from the San Gabriel Basin into the Central Basin.

The Central Basin, north of the City of Downey, is also an unconfined aquifer. However, from Downey south to the estuary, it is a confined aquifer; a basin with a clay lens or aquaclude that only allows water to naturally percolate in a few specific locations. The Central Basin is formed by the Whittier Fault Zone on the northeast and the Newport-Inglewood Fault on the southwest. Historically, the Central Basin fed numerous artesian flows throughout the lower watershed.

The West Coast Basin underlies a small portion of the watershed near the outfall of the San Gabriel River. The basin also underlies portions of the Los Angeles River and the Santa Monica Bay Watersheds to the north. Historically, freshwater in the West Coast Basin has acted as a barrier preventing saline seawater from migrating into the West Coast and Central Basins.

Habitat and Vegetation

The San Gabriel River Watershed contains a rich variety of plant communities. In this area, as in the greater Southern California region, many plant communities merge to form very complex habitat relationships and ecosystems. The San Gabriel River Watershed contains eight geographical plant regions, placing it among the top regions worldwide in regards to biodiversity.

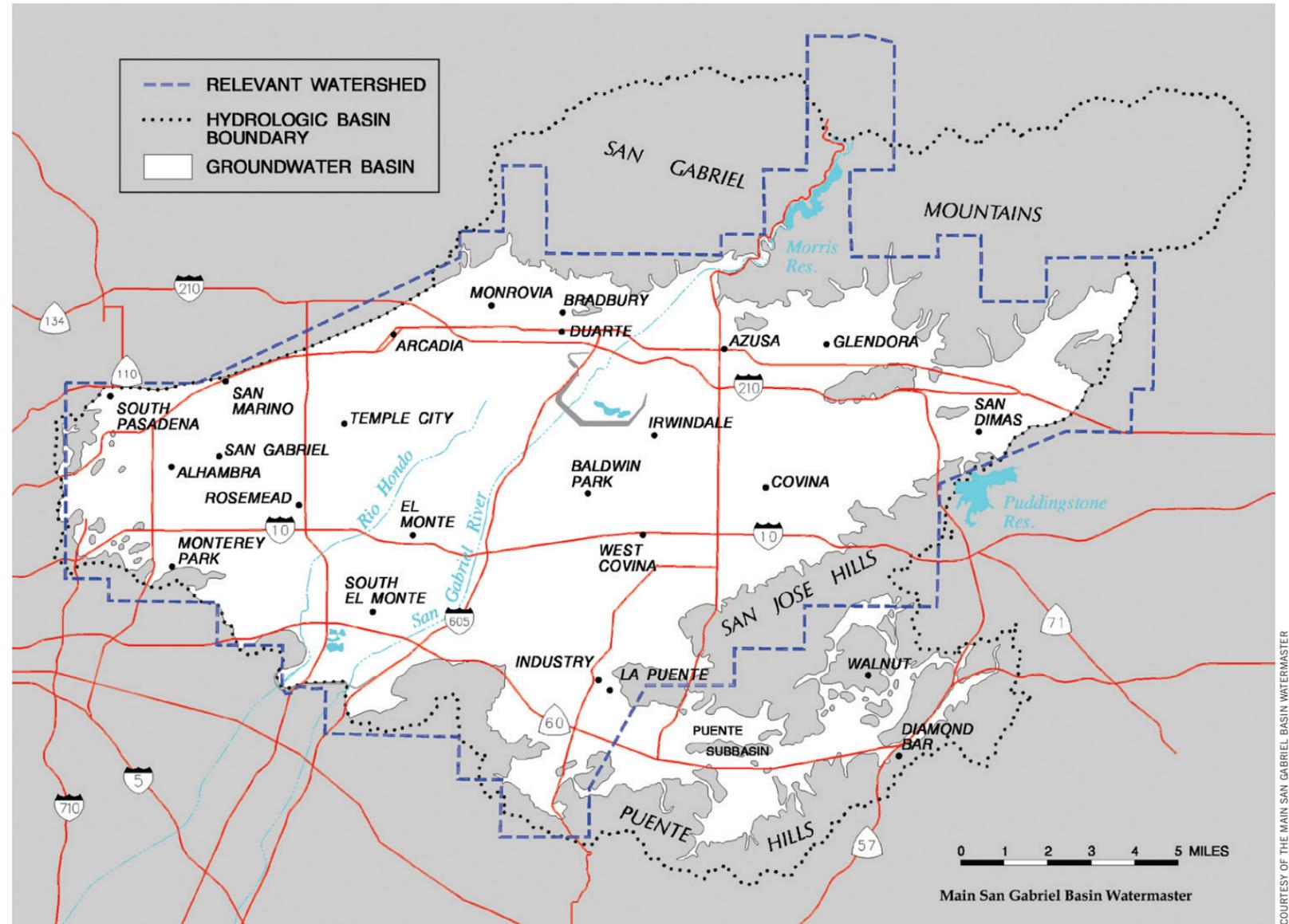


Figure 2-8. The Main San Gabriel Basin is an important natural water storage area for the Los Angeles region.

SAN GABRIEL MOUNTAINS

In the steep, upper mountainous reaches of the watershed, the majority of land, particularly south-facing slopes, is covered by shrub-dominated chaparral and coastal sage scrub. There are substantial patches of oak

woodland and oak riparian woodlands in the more protected canyons and north-facing slopes. Higher elevations include significant patches of mixed conifer woodlands. The many riparian corridors throughout the San Gabriel Mountains contain sycamore and alder riparian woodlands.

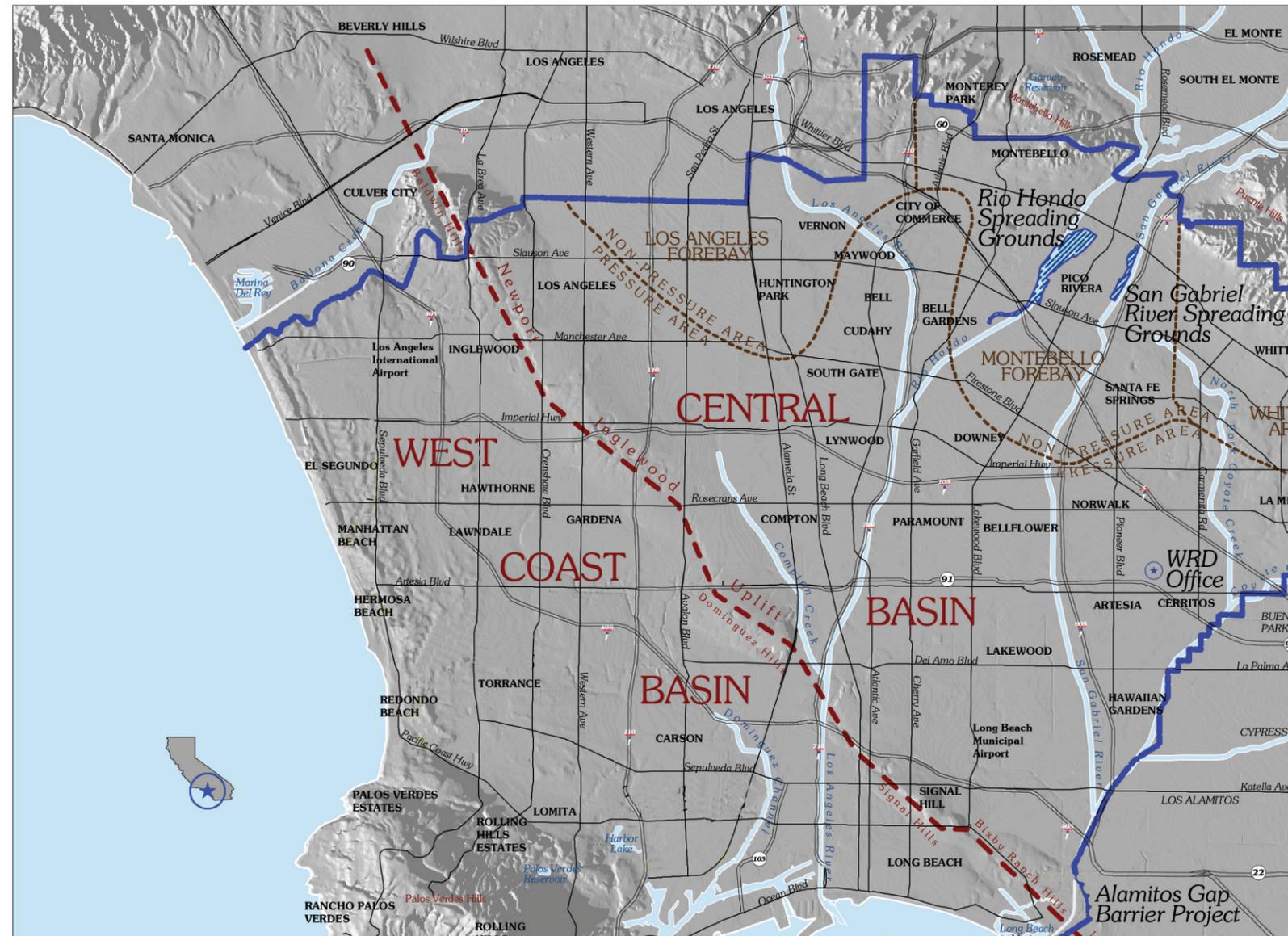


Figure 2-9. The Central and West Coast Basins are also important natural water storage areas.

FOOTHILLS OF THE SAN GABRIEL MOUNTAINS

Foothill areas are characterized by masses of chaparral on slopes and coastal sage scrub in the flatter areas. These areas have intermittent oak, oak woodland, and grassland communities. Sycamore and alder riparian corridors occur sporadically throughout the foothill areas at all elevations.

The San Gabriel River and other tributaries in the watershed (including Big Dalton Wash, San Dimas Creek, Live Oak Creek, and Thompson Creek) emerge from the San Gabriel Mountains in this area. Large stands of alluvial fan sage scrub often indicate alluvial fan areas below.

PUENTE-CHINO HILLS, MERCED HILLS, AND SAN JOSE HILLS

These hills are characterized by large stands of coastal sage scrub, chaparral, walnut woodland and oak woodland, as well as intermittent corridors of oak riparian forest.

FLOOR OF THE SAN GABRIEL VALLEY

The Valley floor is dominated by coastal sage scrub, including alluvial fan sage scrub associations along the river corridor above Whittier Narrows. Upper portions of this area were once graced with periodic stands of open Engelmann Oak forest. In the past, the valley floor was braided with ribbons of oak and sycamore riparian forest that followed the river and tributaries such as Walnut Creek and San Jose Creek.



Figure 2-10. Below 5,000 feet, oak woodlands flourish on north-facing slopes and in protected canyons.



Figure 2-11. Riparian plants such as this arroyo willow thrive in areas where the river has a soft bottom.

WHITTIER NARROWS

The Whittier Narrows is a natural surface and groundwater collection point. Its moist conditions result in significant expanses of oak, sycamore and willow riparian woodlands and associated wetlands.

COYOTE-CARBON CREEK

The upper portion of the Coyote-Carbon Creek Sub-Watershed falls within the Puente-Chino Hills. It is characterized by stands of coastal sage scrub, chaparral, walnut woodland and oak woodland. The lower portion merges with the San Gabriel River coastal plain, where expanses of coastal sage scrub and grasslands, intermittent sycamore and oak riparian woodlands can be found.

SAN GABRIEL RIVER COASTAL PLAIN

The lower San Gabriel River corridor and surrounding watershed below the Whittier Narrows contains large expanses of coastal sage scrub and grasslands, as well as riparian woodlands and associated freshwater wetlands.

SAN GABRIEL RIVER ESTUARY

The river terminates at the Pacific Ocean with a large and fluctuating estuary. As is typical of the rivers of the western United States, the river often changed course in its past during large storms, so its outfall and the



Figure 2-12. Coastal wetlands, such as this one at the Seal Beach National Wildlife Refuge, once dominated the landscape at the mouth of the San Gabriel River.

associated estuary changed considerably. Sometimes the estuary and outfall connected with Los Angeles River estuaries to the north. Sometimes they connected with estuaries to the south, associated with the Santa Ana River.

Wildlife

Many large, predatory species of wildlife once inhabited the watershed, including grizzly bear, mountain lion, bobcat, gray fox and coyote. While the grizzly bear has disappeared from the region, the mountain lion, bobcat, and coyote still live in the Angeles National Forest and in some portions of the Puente-Chino Hills, San Jose Hills and foothills of the San Gabriel Mountains. The black bear, introduced into the region, inhabits secluded portions of the Angeles National Forest. Occasionally, this species also visits the urban portions of the foothills of the San Gabriel Mountains, drawn by readily available food sources such as trashcans.

The diverse environments of the watershed supported many other species, both terrestrial and aquatic. Hundreds of bird species frequented the watershed; more than 350 bird species used the rich habitat found within the Whittier Narrows. Steelhead trout, Pacific lamprey, unarmored threespine stickleback, arroyo chub, Santa Ana sucker, and Santa Ana speckled dace are among the fish species that lived in the San Gabriel River and some of its tributaries. Without today's impediments to wildlife movement, populations of wildlife were able to disperse from this watershed into other habitats, including the Pacific Ocean. This maintained a healthy gene flow between populations. The ability to disperse also provided opportunities for seasonal migration and for escape during episodic disturbance such as fire and floods.



Figure 2-13. Bobcats prefer rocky, shrub hillsides and eat small mammals such as rabbits and rodents.

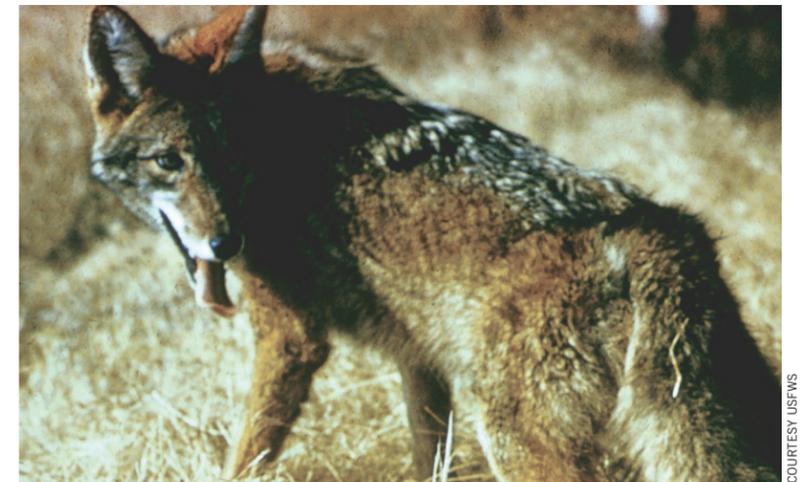


Figure 2-14. Coyotes have adapted to the wildland-urban interface areas.

The San Gabriel River also functioned as a terrestrial and aquatic wildlife corridor, linking the Puente-Chino Hills and Montebello Hills with the San Gabriel Mountains. Prior to the dams being built, thousands of steelhead trout traveled up the river in the winter/spring season, returning to their birthplaces to spawn.

Today, Southern California's South Coast Ecoregion is host to many endangered species of plants and animals found nowhere else on earth.



Figure 2-15. The endangered brown pelican is usually found on the coast, but occasionally ventures inland to lakes and rivers.

Because of urban development and natural resource use, the river and watershed have experienced significant loss of plant and animal species. However, large patches of open space, including the San Gabriel Mountains and the Puente-Chino Hills, are still viable habitat for some species. Relatively large species, including predators like the mountain lion, cannot sustain healthy populations over the long term without access to relatively large habitat areas nearby.

COURTESY BONTERRA CONSULTING ©2003

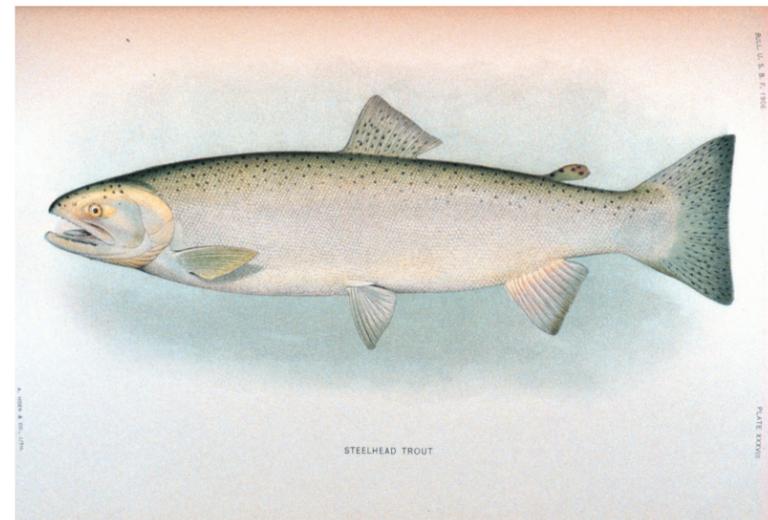


Figure 2-16. Steelhead trout were once abundant in the San Gabriel River.

2.2.2 Human Habitation

The San Gabriel River Watershed has a long, rich history of human habitation. From the early Native Americans to European arrival and periods of rule by Spain, Mexico and the United States, each successive wave of inhabitants left its indelible mark on this region. The cultural and economic diversity of the many communities found today in the watershed is a direct result of this historic legacy.

Land Use and Urban Development

Native Americans may have arrived in this area 40,000 years ago. The first recorded inhabitants arrived about 500 B.C. About 5,000-10,000 indigenous people were estimated to be in the region when the Spanish arrived. The Spaniards established the San Gabriel Mission in 1771 in the San Gabriel Valley near present day El Monte. In 1775, after significant flooding along the San Gabriel River and the Rio Hondo River, the mission was moved to its current location in the City of San Gabriel. Watershed lands were used as part of the mission's system of ranching and agriculture. This period ended in 1834 when control of California was transferred to Mexico and Mission lands were secularized.

COURTESY OF NOAA/DEPARTMENT OF COMMERCE



Figure 2-17. A bird's-eye view of Azusa in 1887 illustrates early town planning concepts.

COURTESY THE BANCROFT LIBRARY, U.C. BERKELEY



Figure 2-18. Tongva Indian pictographs can be found near Azusa, as shown in this 1928 photograph.

COURTESY OF THE AZUSA HISTORICAL SOCIETY



Figure 2-19. The Pio Pico Adobe in Pico Rivera is an example of the ranchos of the 1800s.

Private ranchos became a defining landscape pattern during the Rancho Period, when former mission lands were dispersed to private individuals. Although the period was short, the massive ranches provided the foundation for the development of Southern California. The end of the Rancho Period began in 1846, when the U.S. occupied California, which became a state in 1850. Soon after, a series of devastating floods and droughts resulted in the economic collapse of the rancho lifestyle.

After California statehood, the ideal climate and landscape conditions found in Southern California, particularly in the coastal watersheds such as the San Gabriel River, led to the discovery of agriculture as an economic activity. Agricultural production, including citrus, wine grapes, walnuts, dairy products and field crops, became the basis of the Valley's agricultural economy. The watershed was a haven for farming and ranching for almost 100 years.

During and following World War II, the area shifted away from its agricultural roots toward an industrial economy with growing suburban communities—which is still the basis of the area's economy today. The watershed is now largely built out. Residential, commercial, and industrial development is present in most of the lower elevations, including the former flood plain of the San Gabriel River. Land use development continues through infill projects, redevelopment of more dense urban communities, and development of open space in foothill areas of the watershed.



Figure 2-20. Communities of the San Gabriel Valley relied on the citrus industry from the 1800s to mid-1900s.

Flood Protection and Water Supply

From the moment agricultural and urban development began appearing in the watershed, communities along the San Gabriel River have had to deal with periodic major flooding. In the upper San Gabriel Valley, debris flows out of the canyons of the San Gabriel Mountains often accompanied these floods. In response, the U.S. Army Corps of Engineers (COE) and the County of Los Angeles made a commitment to protect the communities along the river from flood damage to the extent possible. Los Angeles County officials discussed flood control as early as 1893 to address the unpredictable and often rampaging storm flow from the San Gabriel Mountains. Major storms in 1914 and 1916 led to the creation of the Los Angeles County Flood Control District and, ultimately, implementation of flood control measures on the San Gabriel River and its tributaries. Over time, a series of dams, debris basins and formal river channels to protect against flood flows and sediment transport have been constructed. The result is a weakening of the physical connections between upper portions of the watershed and the Pacific Ocean, resulting in barriers for sand, sediment, people and wildlife. Sediment that once was carried across the watershed (replenishing soils) and out to sea (replenishing beach sands) is now captured behind debris basins and dams resulting in significant maintenance requirements at each dam and debris facility, and in beach erosion.

Flooding is not the only environmental factor driving the change in natural conditions. The tremendous mosquito populations in California's early

history caused major public health and economic problems, leading to removal of many of California's wetlands, illustrating the significant impact mosquito reproduction has had on the lives of California residents.

Because the region has a semi-arid Mediterranean climate, water resource development was necessary to support population growth, agriculture and industry. The first recorded diversion of water from the San Gabriel River was made in 1812 for agricultural purposes. In 1871, the County of Los Angeles Board of Supervisors created the San Jose Water District, the first official water district in the watershed. Today, many water agencies are charged with managing and protecting local surface water and groundwater supplies. The water in the San Gabriel River and the watershed's groundwater basins has been adjudicated and has been fully appropriated according to the State Water Resources Control Board. Specific water rights' holders own precise amounts of surface flow in the river and/or water stored in groundwater basins.

Urban development has converted open space to land uses that include hard, impervious surfaces. These surfaces cause stormwater to run off, rather than percolate into the ground. To compensate for this reduction of



Figure 2-21. A housing boom started when the City of Lakewood incorporated in 1954.



COURTESY CITY OF LAKEWOOD

Figure 2-22. The streets of Lakewood flooded after a large storm in 1950.

groundwater recharge, percolation and settling basins have been introduced, concentrating recharge in smaller areas. Although a large amount of water is captured and infiltrated in percolation basins, the region's natural ability to provide enough water has long since been exceeded. So watershed agencies import significant quantities of water from the State Water Project and the Colorado River, through the Metropolitan Water District of Southern California.

The amount of water flowing through the watershed has been increased over time because of this imported water. It contributes to surface runoff as a result of uses such as irrigation and from discharge of treated wastewater. These sources of runoff now occur year-round in a watershed that was traditionally ephemeral.

Fire Protection, Erosion and Fire

Over time, urban development in the San Gabriel River Watershed continued to encroach onto historically fire-prone areas. To protect property, agencies and local communities adopted strict fire suppression policies. Over time, that suppression has led to increased vegetation build-up. The result was hotter-burning and often larger, more devastating fires than what once occurred historically. These altered disturbance patterns can have an adverse effect on native plant communities by changing the conditions in which these species had evolved. Increasingly, human-

induced fires became the common cause of wildfires in the watershed, producing massive fires that are costly to fight and damaging to human property, plant communities and wildlife. They leave behind burned areas, which, during rainstorms, can cause massive sediment flows that must be managed in order to maintain flood protection levels.

Habitat Health and Connectivity

During the last 150 years, urban development has largely eliminated or degraded habitat along the river corridor. The majority of the valley and coastal plain areas and the lower elevation foothill areas have long been developed for urban uses. Changes in the hydrological functioning in the watershed, such as channelization, dams and importation of water, has altered the historic vegetation patterns and increased barriers to wildlife movement.

The San Gabriel River itself once functioned as a major habitat corridor, but urban development has fragmented remaining habitat along the river corridor and throughout the watershed. Only small patches of habitat remain along the river, such as the Santa Fe Dam Recreation Area, the Whittier Narrows Recreation Area, Bonelli Regional Park and Schabarum Regional Park. Some large intact habitat patches within the San Gabriel Mountains and the Puente-Chino Hills can still be found. However, these habitat patches are not well connected, which isolates plant and wildlife communities and limits the species' gene pools. This will affect the long-term viability of regional habitat communities and remaining wildlife.

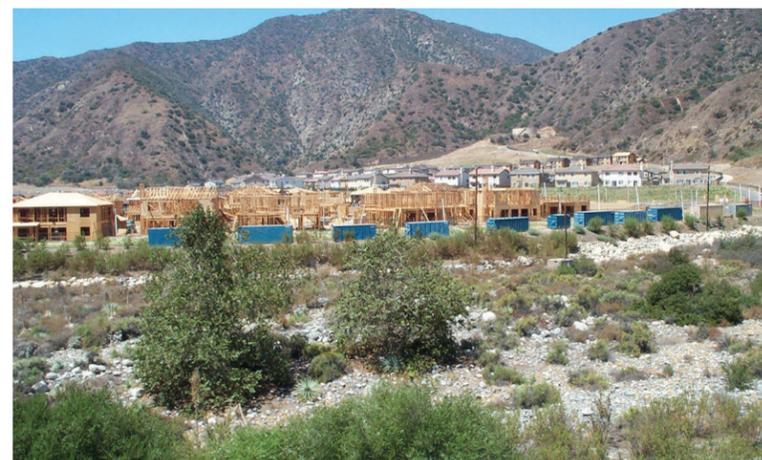


Figure 2-23. Residents at the edge of the wildland-urban interface area face critical habitat management issues.



COURTESY GABI MCLEAN ©2003

Figure 2-24. Although horseweed is native to California, it mainly grows in disturbed areas.

Another variable is the introduction and spread of invasive, non-native plant species. While the distribution of plant species shifts during an evolutionary timescale, human activities have accelerated this process. Invasive plants have been brought to Southern California via livestock, agricultural practices, movement of goods and landscaping practices. Many of the tenacious species that have become problematic have adapted to already disturbed areas. Invasive plants can displace native vegetation, alter hydrologic patterns and reduce habitat quality.

2.3 THE SAN GABRIEL RIVER TODAY

Today, the San Gabriel River is as multi-faceted as are its many different stakeholders. An engineer at County of Los Angeles Department of Public Works (LADPW) may perceive the river as a flood control channel that efficiently protects nearby residents from swift waters. To San Gabriel Valley water purveyors, the river is a critical source of precious local drinking water. Fly-fishermen see the river as a local destination. Environmentalists see the river as a significant biological resource. For community groups and conservancies, the river is a potential greenbelt of open space,



Figure 2-25. The river flows through a concrete channel for ten miles in the lower coastal plain.

providing a respite from urban sprawl. This complexity and richness have increased the river's function and value to all residents of Southern California.

2.3.1 Biological and Physical Resources

The river ties our natural and urban environments together, providing a sense of place for all the communities along its banks. The physical environment encompasses biological and material conditions, both natural and human-made, that are tangible features of the present-day river:

GEOLOGY—the rock, sand, and gravel (aggregate) resources that Southern California relies upon for roads, schools, homes, and commercial and industrial buildings.

HABITAT—the present state of plant and animal communities along the San Gabriel River as defined by Significant Ecological Areas (SEAs) and sightings of rare plant and animal species.

TRAILS AND BRIDGES—the many physical structures designed to provide people access to or through the river corridor.

PARKS, SCHOOLS AND OPEN SPACE—the “empty” spaces in the built-environment along the river corridor that offer people an escape from buildings and streets that otherwise define their world.

FLOOD PROTECTION—the many dams, levees and other physical infrastructure built to help control and manage the river.

WATER SUPPLY—the water sources, the major agencies responsible for the water supply, the groundwater basins, and the water supply infrastructure, including water reclamation plants and spreading grounds.

WATER QUALITY—the current baseline conditions of ground and surface waters along the river and its tributaries.

Where applicable, current biological and physical resources are described within the context of each of the seven reaches as defined by the San Gabriel River Corridor Master Plan.



Figure 2-26. Aggregate is carried on a conveyor belt to a processing plant.

Geology

The San Gabriel River and the rocks and soils that lie along its channel are a creation of the continuing uplift and ongoing erosion of the San Gabriel Mountains. As the mountains have eroded, rocky pieces of boulders, rocks, gravel and sand have flowed out of the mountains and have been deposited by the river on top of the deep bedrock of the valley. The valleys below the south face of the San Gabriel Mountains still have particularly rich alluvial deposits (sediment deposited by flowing water). The alluvium fan deposit is estimated to be thousands of feet deep (up to 3.4 miles) and forms the 167-square mile aquifer, or groundwater basin, that is the



Figure 2-27. Exposed weathered rock outcrops are visible along Highway 39 in San Gabriel Canyon.

San Gabriel Valley's primary water source. In places the deposits are so deep geologists are unable to determine the make-up of the bedrock underneath.

Geologic maps tell the story, showing the range of rock and soil types existing along the path of the river.

HEADWATERS (REACH 1)

The West Fork consists predominately of two rock types: granitic and quartz diorite rocks from the Mesozoic era (55- to 245-million years ago). There are occasional alluvial sand and gravel deposits interspersed in a band along and near the channel of the West Fork.

SAN GABRIEL CANYON (REACH 2)

The San Gabriel Canyon is also dominated by quartz diorite rocks from the Mesozoic, and has significant deposits of Precambrian era (544- to 4,600-million years ago) gneissic rocks, a type of igneous and metamorphic rock. There are alluvium deposits along the river channel between these solid rock formations.

UPPER SAN GABRIEL VALLEY (REACH 3)

The alluvial fan deposit begins at this point, where the river flows out of the San Gabriel Canyon and spreads alluvium out and into the Valley. These alluvium deposits consist of gravel and sand from the Pleistocene and Holocene era (10,000 years ago to the present).

LOWER SAN GABRIEL VALLEY (REACH 4)

The alluvial fan deposit continues south into the San Gabriel Valley. The alluvium directly deposited by the outflow of the river from the mountains narrows as it approaches Whittier Narrows, surrounded to the east and west by the alluvial gravel, sand and silt of the valleys and floodplains. The Puente-Chino and Montebello Hills consist of sandstone and claystone deposits from the Pliocene era (1.8- to 5.3-million years ago).

UPPER COASTAL PLAIN (REACH 5), LOWER COASTAL PLAIN (REACH 6), AND ZONE OF TIDAL INFLUENCE (REACH 7)

The Los Angeles Coastal Plain includes Pleistocene- to Holocene-age alluvium deposited from the river and marine sediments deposited during periodic encroachments of the sea. These sediments are grouped in four different formations: recent alluvium, the Lakewood Formation, the San Pedro Formation and the Pico Formation.

AGGREGATE MINING

Because of its the abundant aggregate resources, the San Gabriel Valley is called the “mother lode” of Southern California. Aggregate from the Holocene and Pleistocene eras are very durable and suitable for making concrete and asphalt. Rock, sand and gravel from the alluvial fans of the San Gabriel River have been used to build roads, schools, shopping centers, industrial plants and homes in Southern California.

Since the early 1900s, over a billion tons of aggregate have been produced for the construction industry in the Los Angeles region. Rock, sand, gravel, cement, water and other “ad mixtures” are the primary components of Portland Cement Concrete or PCC. PCC is specified in many construction projects for buildings, streets, sidewalks and landscapes. Asphaltic Concrete or AC is the basic material for building and maintaining roads and parking lots. AC contains crushed rock, manufactured natural sands and hot, liquid asphaltic oil. Many famous landmarks, including the Los Angeles Memorial Coliseum, the Los Angeles Harbor and the Los Angeles freeways were built with San Gabriel Valley aggregates.

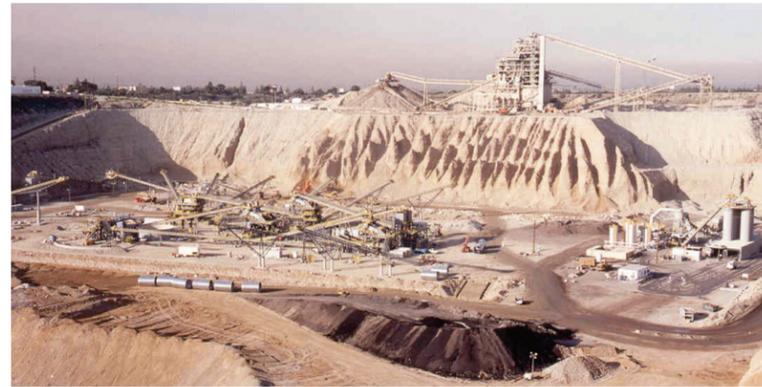


Figure 2-28. Aggregate—sand, stone and gravel—is mined at the Reliance facility and used for construction.

COURTESY OF VULCAN MATERIALS COMPANY



Figure 2-29. Once mined, aggregates are sorted by size.

COURTESY OF VULCAN MATERIALS COMPANY

Aggregates come in a natural smooth rounded form or in an angular form, also called “crushed stone.” Rounded rocks result from years of wearing down by the sediment transport process as mountains erode and are carried by water downstream. They tend to be found in or near current or historic riverbeds. The smooth larger rocks or cobbles, also known as “river rock,” are the primary building material for Craftsman bungalows and landscapes of the Arts and Crafts era. Crushed stone is created by either blasting or crushing large rocks. Because it compacts more tightly than rounded pebbles or gravel, crushed stone is used as a base layer for building roads and sidewalks to ensure an even surface.

Rock, sand and gravel are obtained through “surface mining” or “open pit mining.” Once mined, materials are washed and sorted at a local production plant and sold to market.

There are 11 mines located within one-half mile of the San Gabriel River. These mines are currently operated by three companies: Hanson Aggregate West, United Rock Products and Vulcan Materials Company. There are additional mines in the area, but beyond the project area of the Master Plan. Mines in the San Gabriel Valley are privately owned and are currently operated under various entitlements such as conditional use permits, vested rights and reclamation plans. All but the Rodefer Quarry are now producing rock, gravel and sand for the construction industry. Rodefer Quarry is in the early reclamation stages. The mines are concentrated in Reaches 3 and 4, in the Cities of Azusa, Duarte, Irwindale and Baldwin Park:

- Azusa Rock Quarry
- Azusa-Largo Quarry
- Reliance #2 Quarry
- United Rock Products Quarry #1
- United Rock Products Quarry #2
- United Rock Products Quarry #3
- United Rock Products Quarry #4
- Bubalo Quarry
- Hanson Quarry
- Durbin Quarry
- Rodefer Quarry



Figure 2-30. This diagram shows mine locations.

The California State Department of Conservation’s Division of Mines and Geology (DMG) tracks supply and demand of aggregate resources within the State. According to the DMG, each person in Los Angeles “requires approximately 3.7 tons of new aggregate resources each year for the construction of streets, schools, shopping centers, homes and other basic structures. That means California uses over 180 million tons of aggregate each year, making the San Gabriel River one of the State’s most important resources.

The State of California Department of Mines and Geology has incorporated land use designations with proven mineral deposits for the development of aggregate resources. The Surface Mining and Reclamation Act provides for mineral land classification in Sections 2711, 2712, 2761, 2762, 2763 and 2764 of the Public Resources Code. Land is either designated as urban or as a mineral resource, which differs from the land use designations as developed by the Southern California Association of Governments (see Section 2.3.2.3-Land Use and Economic Development). Existing mines are generally within Mineral Resource Zone-2 (MRZ-2), with the exception of Azusa Rock Quarry (Fish Canyon Quarry Property), which has recently been reclassified from MRZ-3 to MRZ-2 for Portland Cement Concrete Aggregate.

The land use zones from the Mineral Land Classification Map—Aggregate Resources Only, June 1, 1982, are:

OUTER BOUNDARIES SUBJECT TO URBANIZATION shows areas undergoing urbanization

EXISTING URBAN BOUNDARIES shows present conditions of urban areas

PRODUCTION-CONSUMPTION REGION BOUNDARY shows areas under classification for minerals

MINERAL RESOURCE ZONE BOUNDARIES include the following sub-areas:

- MRZ-1 areas have little to no significant mineral deposits
- MRZ-2 areas contain significant mineral deposits, based on adequate information
- MRZ-3 areas contain mineral deposits but the significance cannot be established
- MRZ-4 areas have inadequate information to assign to any other MRZ zone

These privately owned mines are a current and future resource for local and regional communities, providing materials for building the urban infrastructure. At this time, mining is projected to occur for another 30 to 40 years. In the future, reclaimed mines will provide land for a variety of uses. Each mine has a closure plan detailing the reclamation procedures of the mine and a re-use plan for future commercial, industrial, residential or open space and habitat land uses once its resources are exhausted. Mining companies are partnering with local communities to develop closure plans (for more details on closure plans, see Section 3.5, Master Plan Projects).

Habitat

Due to its Mediterranean climate and other factors, Southern California has one of the rarest ecosystems in the world. The biodiversity that characterizes a Mediterranean ecosystem exists only on three percent of the surface of the earth. Locally, the San Gabriel Mountains, Whittier Narrows and the estuarine area of the San Gabriel River Watershed contain good quality habitat as shown by the following two maps:

SIGNIFICANT ECOLOGICAL AREA (SEA). These are “ecologically important fragile land and water areas that are valuable as plant or animal communities and to the preservation of threatened or endangered species” according to the 1988 Los Angeles County General Plan (see Map 2-1).

SENSITIVE SPECIES OCCURRENCES. These are sensitive species as compiled and presented in the California Natural Diversity Database-CNDDDB (see Map 2-2).

SIGNIFICANT ECOLOGICAL AREA

The County of Los Angeles Department of Regional Planning has designated areas within some unincorporated portions of the county as SEAs, adding a layer of protection for biotic resources. SEAs do not take away a property owner’s right to build, but outline land use management practices that require development projects to be designed around existing habitat.

There are 10 SEAs in the San Gabriel River Watershed. Two SEAs lie directly on the river, including the Santa Fe Dam Floodplain and Whittier Narrows Dam County Recreation Area. Within a mile of the river are the Rio Hondo College Wildlife Sanctuary, the Sycamore-Turnbull Canyons and Alamitos Bay. Other SEAs are dispersed throughout the Puente-Chino Hills and San Jose Hills to the east of the river, as well as in the San Gabriel Mountains. Two proposed SEAs are in development, San Gabriel Canyon and Puente Hills. Once adopted, both SEAs will significantly increase the



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Figure 2-31. The valley cholla, an alluvial fan sage scrub plant, only occurs in the Santa Fe Dam Recreation area.

area of protection within the San Gabriel Mountains and Puente Hills areas. Existing SEAs within these regions will be included into the new designations.

The following existing and proposed SEAs are located along or near the San Gabriel River.

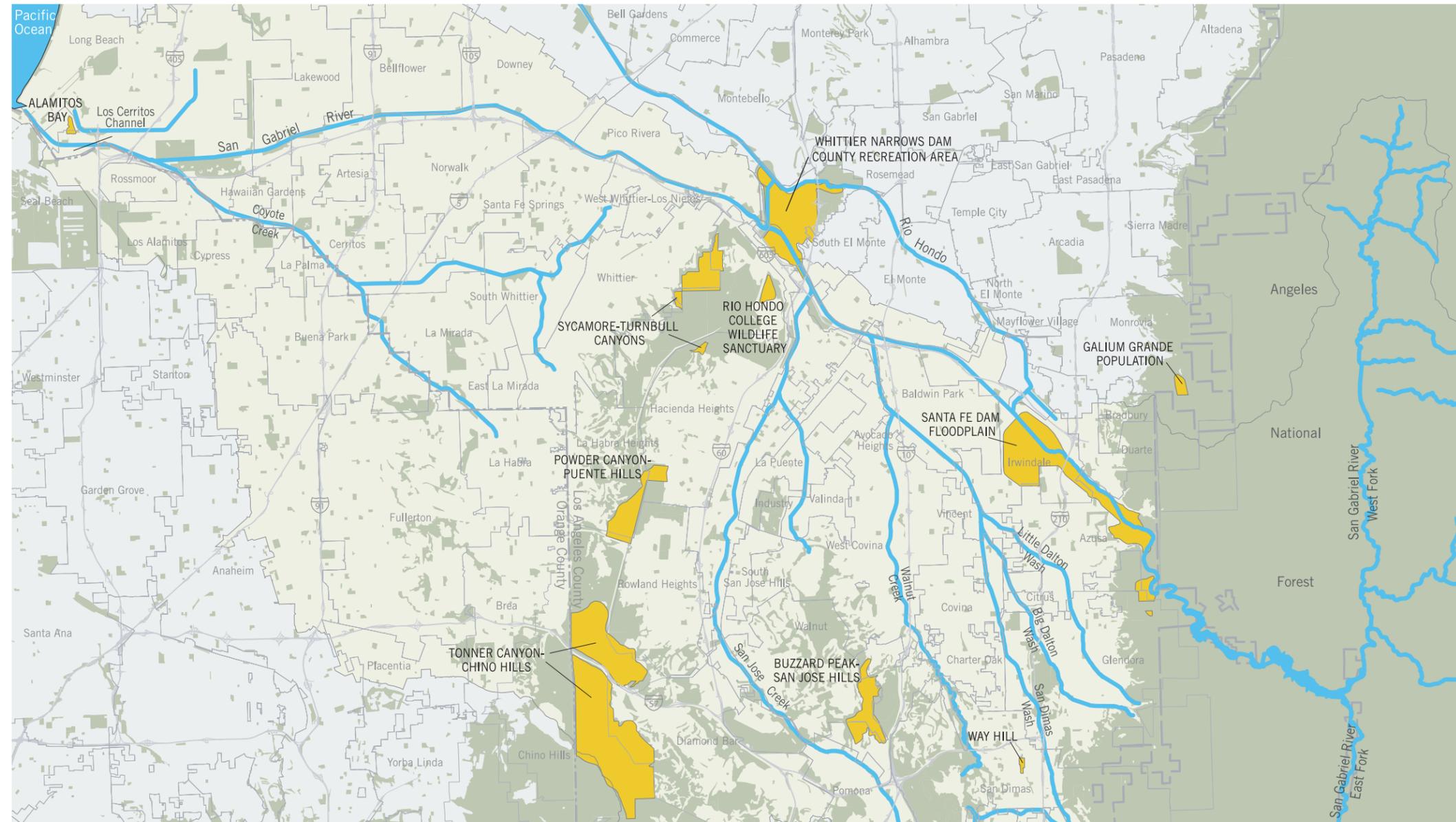
Headwaters and San Gabriel Canyon (Reaches 1 and 2)

There are currently no SEAs in these reaches, but there is a proposed SEA expansion.

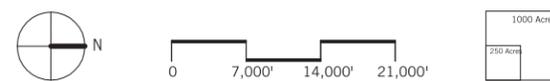
SAN GABRIEL CANYON (PROPOSED). The new San Gabriel Canyon SEA will incorporate the existing SEA, “Santa Fe Dam Floodplain.” Once approved, it will include the San Gabriel, Sawpit and Santa Anita Canyons and lands associated with those canyons, for a total area of 22,966 acres. Within this proposed SEA are steep slopes, elevation changes and a wide variety of plant communities including grasslands, riparian, shrublands, woodlands and forests. The majority of this SEA is in the Angeles National Forest, with portions in unincorporated Los Angeles County and the foothill Cities of Arcadia, Azusa, Duarte, Glendora and Monrovia.

Upper San Gabriel Valley (Reach 3)

SANTA FE DAM FLOODPLAIN. This SEA stretches almost five miles along the San Gabriel River, from Azusa down to Santa Fe Dam in Irwindale. It straddles both sides of the river, and includes the entire open space area



MAP PREPARED BY M/G, INC.—DECEMBER 2003



Source: County of Los Angeles Departments of Public Works & Regional Planning and Rivers and Mountains Conservancy

- San Gabriel River and tributaries
- Existing Significant Ecological Areas
- San Gabriel River Watershed
- Parks and open space

Note: Does not include Orange County data. From 1976 study by County of Los Angeles Department of Regional Planning and as amended through the adoption of the 1980 Revised General Plan.

Significant Ecological Areas (SEA)

County of Los Angeles Department of Public Works

San Gabriel River Corridor Master Plan

Map 2-1. Significant Ecological Areas.