SAN MATEO CREEK WATERSHED PROFILE

http://wrpinfo.scc.ca.gov/watersheds/sm/sm_profile.html

Introduction

The San Mateo Creek (SMC) watershed covers approximately 139 square miles of relatively undeveloped terrain. The majority of the SMC watershed's drainage area lies within western Riverside and northwestern San Diego Counties, with approximately 20% within the boundary of southeastern Orange County (Jorgensen, et al., 1971; Feldmeth, 1987). San Mateo Creek is one of the last undammed streams in southern California. The mainstem of the San Mateo Creek is over 22 miles long and has four main contributing tributaries: Cristianitos Creek, Talega Creek, Tenaja Creek, and Devil's Canyon (USFS, 1999b). Other contributing drainages within the watershed include Gabino Creek, La Paz Creek, and Cold Spring Creek (PCR et al., 2001). The SMC mainstem flows in a southwestern direction before reaching the Pacific Ocean just south of the City of San Clemente. The SMC watershed drains portions of the Santa Margarita Mountains, Sitton Peak, and the western slopes of the Elsinore Mountains. Cristianitos Creek, the main tributary, joins the mainstem approximately three miles inland from the coast and accounts for 29 square miles of the total watershed (Jorgensen, et al., 1971).

The watershed contains two distinct topographical regions: the upper and the coastal. The upper region lies mostly within San Mateo Canyon Wilderness in the Cleveland National Forest. Its lower reaches run through Camp Pendleton Marine Corps Base and San Onofre State Beach. The upper mountainous drainage area consists mostly of the rugged, steep sloped, Santa Ana Mountains, which are bisected by intermittent streams. In the northern region of the watershed, these ridges and mountain peaks rise to an elevation of over 3,576 feet above mean sea level (MSL). The Santa Margarita Mountains form the eastern and southern boundary to the upper basin and have elevations of up to 3,189 feet above MSL. The coastal region contains a wide alluvial valley formed by San Mateo Creek and its major tributary, Cristianitos Creek. The lower San Mateo Creek Valley is approximately 1 mile wide by 2 ½ miles long, and consists of mostly flat alluvial terraces. The creek consists of a wide, braided channel and flood plain of up to 851 feet wide. The San Mateo lagoon, a blind estuary protected from the Pacific Ocean by a sandbar, is located at the mouth of the San Mateo Creek. This estuary contains dense wetland vegetation and is breached only after heavy storms (Feldmeth, 1987).

Land use within the SMC watershed is primarily classified as open space. By the 1920s, the lower SMC watershed and the lands between the cities of Oceanside and El Toro were subsumed into the vast Rancho Mission Viejo. In 1942, the U.S. Department of Defense purchased the southern half of Rancho Mission Viejo and a large section of the lower drainage basin became part of the Camp Joseph Pendleton Marine Corps Base. The Cristianitos Creek sub-watershed in the northern part of the lower watershed remained in private ownership, primarily by the Rancho Mission Viejo Development Corporation. Small islands of private property also remain in the upper San Mateo drainage of the

Cleveland National Forest and the Experian (formerly TRW) research facility located within the Talega Canyon drainage basin. One of these inholdings, located on the upper western divide of the drainage area, was developed into the Carillo residential community, which contains approximately 50 homes with horse facilities.

The majority of the Upper San Mateo Creek watershed lies in the Cleveland National Forest. Large portions of the lower watershed fall into the Camp Joseph Pendleton Marine Corps Base. However, in the 1970s, the California Department of Parks and Recreation entered a lease agreement with Camp Pendleton (USFS, 1999b). At present, the beach area, marsh and lagoon, as well as the land along the creek inland and up Cristianitos Creek to the Orange County boundary, are parts of the San Onofre State Park. Today over 90% of the SMC watershed is public land with the remaining 10% being owned by private parties (USFS, 1999b).

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History

The landscape of the SMC watershed remained relatively undisturbed until the Spanish and European settlement of the region. With the arrival of a ranching culture, the landscape underwent significant changes. Native grasslands were slowly replaced by European and Asian weeds and other introduced plants. Some botanists argue that this invasion of exotic plants had more affect on the area than any other single factor (USFS, 1999a). [CS-ADD LINK TO WATERSHED MAP]

Many historic factors have affected the condition of the SMC watershed. The following representative eras summarize the SMC watershed's history.

Native Americans

The early native American inhabitants of the coast and the Santa Ana Mountains included the Kumeyaay, Luisaños, Cahuella, and Capeño. These groups fished the streams and found an ample food supply among the abundant plant life. The explorers Vizcaíno and Cabrillo reported that the native Indians did considerable burning of the brushlands, but the overall impact was probably not very great (USFS, 1999a).

Mission Period

In 1769, the Spanish mission expeditions led by Junipero Serra and Gaspar de Portolá established settlements from San Diego to Monterey. European settlement of the SMC watershed was centered around the Mission San Juan Capistrano. Portolá camped at an Indian village north of San Onofre on July 22, 1769 on his way north to Monterey Bay. This 133,441-acre area was part of Rancho Santa Margarita y Las Flores, which was granted to Pio and Andres Pico in 1841.The Mission Period, which began in 1769, initiated the changes to the river system through the introduction of irrigation systems. The Spanish brought knowledge of aqueducts, and they built a huge system of them throughout California. Water was supplied from surface water bodies irrigating extensive gardens, orchards, and vineyards. The missions prospered until the separation of Mexico

from Spain in 1821. The Secularization Act of 1833 ended the Mission Period and virtually eliminated the mission-owned lands. This resulted in the opening of large portions of land to settlement by private ranchers and the beginning of the Rancho Period.

Rancho Period

During this period, the land within the watershed was parceled out in the form of large Mexican land grants. These "ranchos" brought large numbers of cattle and sheep, which grazed upon the grasslands of the lower San Mateo Creek drainage basin. With the arrival of the Spanish, ranching became the predominant activity in the watershed. Large numbers of cattle and sheep grazed upon the grasslands of the lower San Mateo Creek drainage basin, drastically altering the native landscape. Widespread overgrazing throughout the area destroyed native vegetation. Rancheros cut brush and trees for fence posts and cleared underbrush with fires for foraging. Also, the introduction of plants from Europe and Asia displaced native grasslands, which probably created the single most destructive assault on the landscape.

Ranching continued with European settlement and became the main land use activity in the area until the early 20th century. The San Mateo coastal plain and foothills provided not only ample grazing territory, but also the creek itself served as the major water supply for livestock in the region. At least three historic windmill wells pumped water from the creek bed, the remnants of which are still present.

Pioneer Settlers

In the late 1860's, an influx of gold miners from northern California descended upon the canyons of the Santa Ana Mountains within the upper SMC watershed. In addition to gold, other metals such as zinc, lead, and silver were mined and consequently altered the landscape. Trees were cut for mine timbers and firewood, and great expanses of brush were burned to make way for mineral exploration. Early reports from the 1870s and 1880s document uncontrolled fires that burned for weeks at a time. These events caused serious damage to irrigation works and threatened the water supplies of the surrounding rural areas and coastal towns. In response, the California Forestry Commission, established by Governor Stone in 1886, voiced the necessity for special protection of the watershed to prevent fires and subsequent erosion, which were "injuring the climate, agriculture and future prospects of southern California."

Contemporary Period

The Forest Reserve Act was signed by President Benjamin Harrison in 1891 to curb illegal timber cutting, mining and other wasteful practices. This Act established the boundaries of the Cleveland National Forest, which included a majority of the SMC's upper watershed. The Cleveland National Forest originally encompassed over 1.9 million acres. However, between the years of 1908 to 1925, several transfers of forest lands to private and public entities significantly reduced the size of the forest (USFS, 1999a). Today the Cleveland National Forest consists of approximately 420,000 acres.

Early modifications to the San Mateo Creek included construction of the railroad embankment and trestle by the Santa Fe Railway, which stabilized the mouth of the creek (Fledmeth, 1987). In the 1930s, during construction of the old State Highway 1, a straight channel and associated leeves were constructed between the bridge and railway trestle. Upstream, several earthen reservoirs were constructed by farmers adjacent to the creek to increase percolation of runoff into the water table (Feldmeth, 1987). Levees were also constructed north of the current location of the I-5 freeway and on the western edge of agricultural fields. These leeves were constructed to prevent the San Mateo Creek from meandering and destroying cultivated areas on the river terrace.

In 1950, the U.S. Marine Corps built Camp San Mateo to house recruits on the stream terrace just north of the confluence of Cristianitos Creek and San Mateo Creek. Sand and gravel were removed from the creek bed to supply construction material for the base. A sewage treatment facility for the base was also constructed, and it discharges treated effluent to the creek. The Marine Corps recently constructed additional housing east of Camp San Mateo on San Mateo Point, a coastal bluff adjacent to the San Mateo Wetlands Preserve and the Trestles surfing area.

In 1984, 39,540 acres of land in the SMC upper watershed were designated as the San Mateo Canyon Wilderness. This designation prohibited the construction of roads, vehicles, and structures while allowing camping, hiking, and hunting in both the wilderness area and the rest of the National Forest.

Recently, steelhead trout have been found within the creek. The Federal Register listing of the Proposed Range Extension for the Endangered Steelhead in Southern California can be found at http://www.eswr.com/n12190.txt.

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Climate

The climate of the SMC watershed is characterized as Mediterranean and typically has hot, dry summers, and cooler, wetter winters. Average annual precipitation ranges from 10 inches per year in the coastal plain to 18 inches per year in the inland alluvial valleys. Intense storms occur between November and March with a majority of the annual precipitation (approximately 90%) falling during a few storms which occur in close proximity to each other (CDPR, 1973). Rainfall patterns are subject to extreme variations from year to year and long-term wet and dry cycles. Typically the higher elevation portions of the watershed receive significantly greater precipitation. The combination of steep, short watersheds; brief intense storms; and extreme temporal variability in rainfall result in "flashy" systems where stream discharge can vary by several orders of magnitude over very short periods of time (PCR, et al., 2001).

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Geology

The SMC watershed is located on the western slopes of the Santa Ana Mountains, which are part of the Peninsular Ranges that extend from the tip of Baja California northward to the Palos Verdes peninsula and Santa Catalina Island (PCR, et al., 2001). The geology of the Santa Ana Mountains is dominated by igneous, metavolcanic, and metasedimentary rocks of Jurassic age and younger. These slightly metamorphosed volcanics have been intruded by granitic rocks of Cretaceous age (granites, gabbros, and tonalities). Overlying these rocks are several thousand stratigraphic feet of younger sandstones, siltstones, and conglomerates of upper Cretaceous age. These rocks are composed largely of material eroded from the older igneous and metavolcanic rocks now underlying the Santa Ana Mountains (PCR, et al., 2001). Younger sedimentary rocks comprise the bedrock between the Santa Ana Mountains, their foothills, and the Pacific Ocean. This portion of the SMC watershed is underlain by marine and non-marine sandstones, limestones, siltstones, mudstones, shales, and conglomerates (PCR, et al., 2001). Overlying these units are Quaternary stream terrace deposits and Holocene stream channel deposits. The lower SMC watershed consists of mostly coastal hills and valleys, and is underlain by Cretaceous and Tertiary marine and non-marine sedimentary formations and extensive marine and fluvial terrace deposits. The following geologic formations occur within the lower watershed from oldest to youngest: Miocene Santiago, Middle to Upper Miocene Monterey, Upper Miocene to Pliocene Capistrano, Pliestocene San Mateo, Pliestocene to Recent Landslide Terrain, Pliestocene to Recent Landslide Deposits, Upper Pliestocene Marine Terrace Deposits, Upper Pliestocene to Recent Non-Marine Terrace Deposits, Recent Stream Terrace Deposits, Recent Alluvial, Terrace and Beach Sand Deposits. Marine terraces consist of stratified mixtures of sand, silt, clay, gravel, and cobbles. Fluvial terraces occupy benches along San Mateo Creek and are composed of gravel, cobbles, and boulders in a red silty-sand matrix (Feldmeth, 1987; Woefel, 1991).

Located adjacent to the SMC watershed within the northwestern portion of the Peninsular Range Province, the Cristianitos Fault occurs in both the San Onofre Bluffs Formation and the San Mateo Formation. The fault is exposed along the 125-foot seacliff approximately one mile southeast of the San Onofre Nuclear Power Plant and trends north-south exhibiting vertical displacement in the San Mateo Creek Formation (CDPR, 1973). Many adjacent landslides have occurred within the fault's vicinity (CDPR, 1973).

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Soils and Mineral Resources

Soils in the SMC watershed vary widely in appearance, composition, and productivity. Soil characteristics are taken from the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service, soil surveys for Orange County and the Western Part of Riverside County (USDA, 1978). Mountain soils are excessively drained to well-drained loamy coarse sands to loams. In most areas, rock outcrops and large boulders are distributed widely. The hillsides have extremely shallow depth to granitic hardpan (Steinitz et al., 1996). Foothills soils are moderate to very well-drained sandy loams to silt loams that have a coarse sandy loam to clay subsoil. These upland soils are primarily of a residual nature with moderate depth to bedrock and characterized by dark colors of

the Prairie, Chernozem, and Rendzina Great Soil Groups (CDPR, 1973). Coastal plains soils are typically well-drained sandy loams with a component of sandy clay.

Highly productive agricultural lands occur within the SMC watershed. The soils within the coastal plains are characterized as highly fertile and generally used for citrus, truck crops, avocados, and flowers. The Foothill soils are used for citrus, avocados, and irrigated field crops. The Mountains soils are generally unusable for crop cultivation and are suitable only for range and wildlife habitat (Steinitz et al., 1996).

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Hydrology

The SMC watershed is located in the Regional Water Quality Control Board's (RWQCB) San Juan Hydrologic Unit - 1.00 (RWQCB, 1994). This water resource designation covers approximately 500 square miles and includes San Mateo Creek, its tributaries, and San Juan Creek. Major drainages within the SMC watershed include Cristianitos Creek, Gabino Creek, La Paz Creek, Talega Creek, Cold Spring Creek, and Devil Canyon Creek. During the summer months in this Mediterranean climate, the frequency of extremely low flows in unregulated streams is particularly high. It is common for the San Mateo Creek to be dry from July through October. Most of the tributaries to the river are also intermittent (Steinitz, et al., 1996).

Flows in San Mateo Creek are described as exhibiting the wide annual and seasonal variation typical of the region; the maximum normal discharge for 1966 to 1967 was 2,760 cubic feet per second (cfs). Except during winter high flows, the streambed upstream of I-5 is dry; downstream, flows have been year-round in recent years (USFS, 1999). The channel meanders across a flat sandy floodplain near the mouth; the deepest portion in October and November 1993 was 6 inches (15 cm). Other sources of flow include groundwater, agricultural and urban runoff, and wastewater from an upstream sewage plant (USFS, 1999). The predicted 2-year, 10-year, and 100-year flows at the mouth of the San Mateo Creek are 3,200 cfs, 19,160 cfs, and 47,530 cfs, respectively (PCR, et al., 2001).

Gabino Creek

Gabino Creek flows approximately 10 miles within the Gabino Canyon (8.3 square miles) before its confluence with La Paz. From there the drainage joins Cristianitos Canyon further downstream (PCR, et al., 2001). Along with Talega Canyon, it is the largest sub-basin in the upper SMC watershed. Its size along with its position high in the watershed and steep terrain produce the highest absolute peak flows and runoff volumes in the upper San Mateo watershed (PCR, et al., 2001).

La Paz

La Paz Creek is the major tributary drainage to Gabino Creek and has several fourth order parallel drainages joining it from the eastern hill slopes. Approximately two-thirds of the 7.3 square mile La Paz sub-basin is within the Rancho Mission Viejo boundary

(PCR, et al., 2001). Like most of the sub-basins in the upper San Mateo watershed, the steep crystalline terrains produce high drainage density and multiple confluence points with the longest tributary being approximately 6.8 miles (PCR, et al., 2001). The narrow western strip of La Paz Canyon is characterized by short, second order streams associated with the Upper Gabino Canyon. The eastern portion of the sub-basin is characterized by fourth order confluence points associated with dense stands of oak and sycamore woodland and may represent zones of relatively high geomorphic and habitat function (PCR, et al., 2001).

Cristianitos

Upstream of the confluence with Gabino Creek is the 3.7 square mile Cristianitos Canyon. The upper Cristianitos Canyon contains a network of fifth order drainages adjacent to the dividing ridge with the San Juan watershed (PCR, et al., 2001). Nearly half of the gently sloping canyons contain first order drainages with third and fourth order tributary arms being distributed fairly evenly and with similar lengths. Due to the canyons' topography, high infiltration rates, and a drainage network which dampens flow peaks, a less "flashy" hydrograph than observed in other sub-basins of the upper San Mateo watershed results (PCR, et al., 2001). Review of aerial photographs shows that prior to the extreme flow event of 1938, the lower portion of Cristianitos Creek was little more than a swale (PCR, et al., 2001). Since that time the lower portion of Cristianitos Creek appears to be actively incising a stream course. The substrate type in Cristianitos Creek is primarily sands and silts, with a significant portion of clays. Sediment transport rate per unit area for the Cristianitos sub-basin is the highest of any San Mateo sub-basins (PCR, et al., 2001).

Talega

The 8.3-square mile Talega Canyon sub-basin straddles the boundary of Rancho Mission Viejo and Camp Pendleton. Talega Creek is a fifth order system where it meets Cristianitos Canyon, downstream of the Gabino Confluence. The drainage area is extremely elongated and contributes approximately 33 percent of the runoff volume to Cristianitos Creek at their confluence (PCR, et al., 2001). The Talega Canyon sub-basin comprises approximately 28.76 percent of the upstream SMC watershed and contributes approximately 25 percent of the peak flows in Cristianitos Creek at the confluence (PCR, et al., 2001). In terms of runoff per unit area, Talega Canyon produced between 66 percent and 78 percent as much runoff on a per-acre basis as the average for the San Mateo Creek watershed as a whole (PCR, et al., 2001).

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Groundwater

The vast majority of the SMC watershed is underlain by semi-consolidated sandstones and by alluvial and terrace sediments derived from the sandstones that have the capacity to store groundwater within the Coastal Basin (Williams, 1969; Morton, 1970). The Coastal Basin contains the San Mateo aquifer, which is overlain by unconsolidated alluvial deposits and underlain by the San Onofre Breccia. The direction of groundwater

flow is southwest (Palmer, 1994). The minimum thickness of the alluvial and San Mateo aquifer units ranges from 33 to 1,400 feet. Aquifer tests have been conducted at five locations within the coastal basin. Groundwater from this basin is an acceptable drinking water supply with total dissolved solids concentrations less than 900 milligrams per liter and nitrate concentrations less than 7 milligrams per liter.

Within the Gabino sub-basin and much of the upper SMC watershed, localized groundwater discharge was observed at several active headcuts. Although groundwater is not a significant component of the aquatic ecosystems, there may be localized areas of shallow groundwater in this sub-basin and other areas within the upper SMC watershed (PCR, et al., 2001). The California Department of Water Resources has identified two groundwater basins within the SMC watershed: · San Onofre Valley - 0.04 square miles (25.60 acres) · San Mateo Valley - 4.57 square miles (2,924.79 acres)

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Biological Resources

The canyons in the SMC watershed tend to be steep and narrow. The upper portions of Gabino and La Paz watersheds have been subject to intensive grazing, and many of the riparian zones are somewhat denuded. Landslides have facilitated expression of groundwater in some sections of the watershed, promoting development of isolated patches of alkaline marsh plant communities. The lower portion of the watershed that flows through Camp Pendleton Marine Corps Base has been subjected to some agricultural, recreational, and military uses. There are six main plant communities found within the SMC watershed: mixed chaparral, coast live oak woodlands, annual grassland, coastal sage scrub, and valley/foothill riparian. The SMC watershed is dominated by sycamore and oak woodland riparian forests. Riparian habitat (as mapped in the generalized NCCP/HCP vegetation database) comprises 1,089 acres (9 percent) (PCR, et al., 2001). The other dominant habitats are coastal sage scrub (3,876 acres or 32 percent of the study area), grassland (3,166 acres or 26 percent), and chaparral (2,808 acres or 23 percent). The remaining habitat/land cover is comprised of agriculture (3 acres), developed land (491 acres), disturbed habitat (233 acres), woodland (100 acres), forest (160 acres), open water (3 acres), streams (6 acres), marsh (0.6 acre), and cliff and rock (5 acres) (PCR, et al., 2001).

Common habitat types found within the SMC watershed include:

- *Mixed Chaparral*. Found in the upper drainage and in the rugged canyons of the Cleveland National Forest. Common plants include chamise, scrub oak, foothill ash, manzanita, California lilac, California coffeeberry, birchleaf mountain mahogany and tovon.
- *Coastal Live Oak Woodlands*. Found in the Cristianitos drainage. Common trees include: coast live oak, interior live oak, and California walnut.

- *Annual Grassland*. Found in the Cristianitos drainage and are dominated by introduced grasses. Common plants include wild oats, wild barley, and valley needlegrass.
- *Coastal Sage Scrub*. Inhabits sections of the coastal hills of the Camp Pendleton drainage area and suitable inland areas in the Cristianitos drainage. Common plants are: California buckwheat, California sagebrush, black sage, prickly pear cactus, Our Lord's candle, California encelia, lemonade-berry.·
- *Valley/Foothill Riparian*. Found along the canyon bottoms and creek channels of the lower drainage. Common tree and plant species include: western sycamore, white alder, canyon live oak, big leaf maple, foothill ash, willows, poison oak, wild rose, California blackberry, wild grape, tamarisk.

A majority of the riparian zones in the lower sub-basin are confined by the geology of the valley and contain seasonal pools, an abundance of coarse and fine woody debris, leaf litter, and a mosaic of plant communities (PCR, et al., 2001). The following breakdowns per sub-basin were summarized from the Baseline Biologic, Hydrologic and Geomorphic Conditions, Rancho Mission Viejo: San Juan and Upper San Mateo Watersheds (PCR, et al., 2001). Additional discussion of the integrity of the riverine and non-riverine aquatic resources in the study area can be found in the ACOE's Waterways Experiment Station study (Smith, 2000) and the PCR analysis (PCR, 2000), respectively.

Gabino

The upper portion of Gabino Canyon, above the confluence with La Paz Creek, is dominated by southern coast live oak riparian woodland. The adjacent uplands are primarily ruderal grasslands with sage scrub on the hillslopes. The upper watershed has been heavily grazed and is incised in places with vegetation that has been cropped or trampled. The riparian zone varies in width from relatively narrow to relatively wide and is well developed (depending on the intensity of grazing). Tributaries are a mix of oak riparian and broad floodplain sycamore habitats with portions exhibiting slumping and erosion. A man-made stockpond in upper Gabino canyon, informally known as "Jerome's Pond," captures water from Gabino Creek and three unnamed tributaries before joining Gabino Creek downstream. Surrounding vegetation consists of bulrush, mule fat, and willow species. Below the confluence with La Paz, mature oak and southern sycamore riparian woodland with dense chaparral on the adjacent slopes dominates. The center of the stream has a rock cobble substrate overlain by areas of shallow alluvial deposits that support mule fat scrub.

La Paz

La Paz Creek supports dense stands of structurally diverse, mature coast live oak and southern sycamore riparian woodlands. In the upper reaches of the sub-basin, the streams are narrow and form tight mosaics with the chaparral and sage scrub of the adjacent uplands. Portions of the active channel retain water for extended periods of time in shallow depressions and likely provide many habitat niches and support complex wildlife communities.

Cristianitos

The upper portions of the Cristianitos sub-basin consist of steep and narrow canyons that contain well-developed, mature oak riparian woodland in a matrix of intact chaparral and coastal sage scrub. Lower Cristianitos Creek is a meandering, actively incising stream that contains alkali marsh communities mixed with willow and mule fat species. The lower reaches have near-perennial flow supported by local groundwater discharge. This persistent saturation has facilitated development of well-structured hydric soils, and as the gradient flattens, there is a moderate width floodplain associated with the stream. This area supports the highest diversity of wetland species of any of the San Mateo sub-basins. There are several wetlands in the sub-basin associated with abandoned clay pits or stock ponds. These areas contain a mix of open water and emergent marsh vegetation surrounded by a mix of sage scrub and grasslands. The ponds generally appear to have low turbidity and are being used by fish, invertebrates, amphibians, and birds. Adjacent uplands in the sub-basin have a percentage of clay soils and may support sensitive plant populations.

Talega

The riparian zones of Talega Creek are similar to those found in upper Cristianitos and Lower Gabino Creeks. The riparian habitat consists of dense stands of structurally diverse, mature coast live oak, and southern sycamore riparian woodlands. Several reaches within the watershed are characterized by open sandbar habitat supporting mule fat scrub communities. Some of the highest concentrations of arroyo toads (Bufo californicus) in the San Mateo watershed are located along Talega Creek.

Sensitive Biological Resources

Lower Gabino Creek contains some of the highest quality riparian habitat within the SMC watershed. In addition to the oak and sycamore forests, portions of upper Gabino Creek supports degraded alkali marsh habitat. This area has high restoration potential, if the channel incision is stabilized.

The habitat by San Mateo Creek is a refuge for at least seven threatened and endangered species, including the southern steelhead trout (Oncorhynchus mykiss iridius), pacific pocket mouse (Perognathus longimembris pacificus), arroyo toad, least Bell's vireo (Vireo bellii pusillus), California gnatcatcher (Polioptila californica californica), Riverside fairy shrimp (Streptocephalus woottoni), tidewater goby (Eucyclogius newberryi), and southwestern willow flycatcher (Empidonax trailli extimus). Gabino and Talega Creeks support populations of the federally-listed endangered arroyo toad. The least Bell's vireo occurs in large numbers within the lower watershed along San Mateo Creek. Additionally, the southern steelhead and the federally listed endangered tidewater goby occur in lower SMC watershed.

Potentially occurring species specific to the SMC watershed include the following.

Common Name	Scientific Name	Status
Invertebrates:		
Riverside fairy shrimp	*Streptocephalus woottoni*	FE

Common Name	Scientific Name	Status
Plants:		
Aphanisma	*Aphanisma blitoides*	CNPS-1B
Blochman's dudleya	*Dudleya blochmaniae*	CNPS-1B
Chaparral beargrass	*Nolina cismontane*	
Cliff spurge	*Euphorbia misera*	CNPS-2
Catalina mariposa lily	*Calochortus catalinae*	CNPS-4
Fish's milkwort	*Polygala cornuta var. fishiae*	CNPS-4
Intermediate mariposa lily	*Calochortus weedii var. intermedius*	CNPS-1B
Many-stemmed dudleya	*Dudleya multicaulis*	CNPS-1B
Mesa clubmoss	*Selaginella cinerascens*	
Palmer's grapplinghook	*Harpagonella palmeri*	CNPS-4
Mesa brodiaea	*Brodiaea jolonensis*	
Mud nama	*Nama stenocarpa*	CNPS-2
Nuttal's lotus	*Lotus nuttallianus*	CNPS-1B
San Diego County viguiera	*Viguiera lanciniata*	CNPS-4
San Fernando Valley spineflower	*Chorizanthe parryi var. fernandina*	FSC/SSC/CNPS-1B
Seaside calandrinia	*Calandrinia maritime*	CNPS-4
Thread-leaved brodiaea	*Brodiaea filifolia*	FT/SE/CNPS-1B
Upright burhead	*Echinodorus beteroi*	
Vernal barley	*Hordeum intercedens*	CNPS-3
Western dichondra	*Dichondra occidentalis*	CNPS-4
***Fish*:**		
Southern steelhead trout	*Oncorhynchus mykiss iridius*	FE/CSC
Tidewater goby	*Eucyclogius newberryi*	FPD/CSC
***Birds*:**		
Cactus wren	*Campylorhynchus brunneicapillus*	CSC
California gnatcatcher	*Polioptila californica californica*	FT/CSC
California horned lark	*Eremophila alpestris actia*	CSC
Cooper's hawk	*Accipiter cooperii*	CSC
Grasshopper sparrow	*Ammodramus savannrum*	
Great horned owl	*Bubo virginianus*	
Least Bell's vireo	*Vireo bellii pusillus*	FE
Long-eared owl	*Asio otus*	CSC
Red-shouldered hawk	*Buteo lineatus*	
Rufous-crowned sparrow	*Aimophila ruficeps*	FSC/CSC
Southwestern willow flycatcher	*Empidonax trailli extimus*	FE
White-tailed kite	*Elanus leucurus*	SFP
Yellow-breasted chat	*Icteria virens*	CSC
Reptiles:		
Coastal western whiptail	*Cnemidophorus tigris multiscutatus*	FSC
Northern red-diamond rattlesnake	*Crotalus ruber ruber*	FSC/CSC
Orange-throated whiptail	*Cnemidophorus hyperythrus beldingi*	FSC/SFP
San Diego horned lizard	*Phrynosoma coronatum blainvillei*	FSC/CSC/SFP
Southwestern pond turtle	*Clemmys marmorata pallida*	FSC/CSC/SFP
Two-striped garter snake	*Thamnophis hammondii*	CSC/SFP
Western patch-nosed snake	*Salvadora hexaplepis virgultea*	FSC/CSC
***Amphibians*:**		
Arroyo toad	*Bufo californicus*	FE/CSC/SFP

Common Name	Scientific Name	Status
Western spadefoot toad	*Scaphiopus hammondi*	FSC/CSC/SFP
***Mammals*:**		
Mountain lion	*Puma concolor*	
Mule deer	*Odocoileus hemionus*	
Pacific pocket mouse	*Perognathus longimembris pacificus*	FE/CSC
San Diego desert woodrat	*Neotoma lepida intermedia*	FSC/CSC

Watch lists of such resources are maintained by the California Department of Fish and Game (CDFG), the United States Fish and Wildlife Service (USFWS), and special groups such as the California Native Plant Society (CNPS). For current information on the above list of special status species found in the watershed, refer to the CDFG's Natural Diversity Database (NDDB) at http://www.dfg.ca.gov/whdab/html/lists.html. Refer to "Special Animals List (July 2001)" and "Rare, Threatened, and Endangered Animals List (July 2001)" at http://www.dfg.ca.gov/whdab/html/animals.html or "Special Plant List (July 2001)" and "Rare, Threatened, and Endangered Plants List (July 2001)" at http://www.dfg.ca.gov/whdab/html/lists.html.
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Watershed Stressors

Urban Encroachment | Groundwater Depletion | Exotic Species
Erosion and Military Activities | Toll Road

Although the SMC watershed is situated in one of the most biologically diverse environments in the continental United States, numerous stresses continue to threaten the ecological health of the SMC watershed and lagoon. Below is a list of the major watershed stressors.

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Urban Encroachment

Southern California has grown more rapidly since World War II than any other area in the country. This population increase has led to suburban sprawl and the depletion of the agricultural and open space lands that surround the major urban cities. Although much of the SMC watershed is public land, development is rapidly encroaching upon the last vestiges of developable land that surrounds the watershed. The "planned build-out" of the region could increase the demand for water supply, fragment wildlife corridors and increase the intensity and frequency of flooding due to loss of permeable groundcover (Steinitz, et al., 1996). San Diego County is experiencing and is expected to continue its population growth. From 1990 to 2000, San Diego County's population grew from 2.4 million to 2.9 million (RWQCB, 1996). By 2015, it is anticipated that the county's population will increase to 3.6 million (RWQCB, 1996).

The construction of I-5 isolated and constricted the historic floodplain and old oxbow geomorphic features of the SMC watershed's drainages. Since the construction of I-5, the coastal valley of the drainage area has experienced the largest impact from human activities. The current threat to the SMC watershed is the development of the private property inholdings within the National Forest and on the fringes of the San Mateo drainage, agricultural, military, and recreational uses. During the 1930s and 1940s, farmland was leased from the Rancho Mission Viejo to grow lima beans and other crops. These crops were primarily dry-farmed and required no irrigation. However, during the 1940s, when the U.S. Marine Corps took over the southern section of Rancho Mission Viejo, farming practices changed. More water wells were installed and dry-farming was replaced by truck farming in order to produce a wider variety of vegetables. At present this area, known as the San Clemente Ranch, is leased to a single family. Corn, tomatoes, and cauliflower, dependant on the creek for irrigation, are grown on 500 acres adjacent to the lower creek. Additional developments within the SMC watershed include the Experian (formerly TRW) facility, several clay and silica mining facilities, ranching, and an old Ford Philco Plant along Cristianitos Creek.

Agricultural uses, in the upper watershed threaten to destroy vital wildlife movement corridors and endanger wildlife populations within the watershed. Stock ponds on private inholdings in the upper drainage are the main contributors of exotic fish and amphibians to the watershed. Furthermore, floods of greater magnitude carry away more sediment in highly erodible areas and deposit these sediments downstream, changing riparian conditions. Increases in downstream and lowland soil moisture could also increase the extent of exotic riparian vegetation, especially giant reed (Arundo donax) as greater floods scour existing riparian areas, leaving bare sediment available for colonization by opportunistic plant species. Fire suppression from urban development will also have an impact on current vegetative patterns, and thus on biodiversity. In general, drier upland vegetation that is not converted to urban uses will slowly grow into oak woodlands when fires are suppressed.

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Groundwater Depletion

Groundwater removal in the lower San Mateo Creek valley has increased steadily since the 1940s. The shift from dry-farming methods to raising more water-dependent vegetables has put an enormous strain on the region's aquifer.

Also, after 1942, the Marine Corps started pumping groundwater from the area for base use. Based on a yearly average from the years 1984 to 1989, approximately 2,105 acre-feet of groundwater were being removed from the lower valley aquifer. Of this total, 1,634 acre-feet is a net discharge from the aquifer and is lost through evapotranspiration and other consumptive uses. Camp Pendleton currently pumps approximately 2,500 acre-feet per year of groundwater from the San Mateo, San Onofre, and Las Flores alluvial aquifers (SDCWA, 1997). Withdrawn groundwater serves as the source of potable and irrigation supply for the northern portion of Camp Pendleton (SDCWA, 1997).

The concentrated pumping near the creek has lowered the water table below the creek channel and has dried up reaches of the creek that in the past had flow part of the year. Reduced stream flow in San Mateo Creek also hinders or eliminates steelhead migrations. Excessive pumping can also trap adult and smolt steelhead in upstream pools by eliminating the flows necessary for the fish to return to the sea.

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Exotic Species

Stock ponds on private inholdings in the upper drainage are the main contributors of exotic fish and amphibians to the watershed. Bullfrogs (Rana catesbiana) are common in the upstream section of the lagoon and along the creek itself. These amphibians prey upon the frog larvae of the arroyo toads (Bufo californicus) as well as steelhead fish eggs and juveniles, both of which have been found within San Mateo Creek.

The green sunfish (Lepomis cyanellis) is also found throughout the watershed. This introduced fish is a pioneer species that is well adapted to harsh environments and is capable of physically disrupting areas where native fish have been reduced or depleted. Sunfish can survive in very small pools during the summer and will out-compete young steelhead for benthic food.

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Erosion and Military Activities

A portion of the SMC watershed lies within Camp Pendleton's military training impact zone. Military activities within the lower San Mateo Creek valley watershed also contribute to erosion and sedimentation. Live ammunition used during training causes numerous accidental brush fires. These fires remove trees and scrub vegetation, which increases erosion along the creek banks and contributes to sedimentation in the creek bed. For example, in the summer 1989, a fire started by live ammunition burned a large section of the middle drainage area. In 1990, soil and silt from the burned area were deposited in pools and along stream banks. Silt from the burned out area also filled in a large pool located within Devil Canyon. Increased sediments could potentially effect the arroyo toads (Bufo californicus) as well as steelhead fish eggs and juveniles. Military vehicles traveling along the creek bed and the adjacent hills also contribute to the erosion problem. These vehicles compress soils, reducing the ability of the soil to absorb rainfall. Consequently, these conditions accelerate runoff and contribute to higher flows entering the creek, leading to greater erosion.

Currently, Camp Pendleton leases over 500 acres in the lower watershed for agricultural uses. The rapid lowering of groundwater due to increased pumping for crops has resulted in the loss of riparian vegetation in the lower valley of San Mateo Creek and increased the erosion of the creek bank. Exposed agricultural soils combined with increased runoff

have greatly reduced the depth of the historic stream channel, impeding steelhead migration.

Toll Road

The Transportation Corridor Agencies (TCA), which built the San Joaquin Hills and Eastern Toll Roads in Orange County, is planning to extend the Foothill-South toll road 16 miles, from Rancho Santa Margarita to Camp Pendleton. The proposed road would require the construction of an overpass over lower San Mateo Creek. Environmentalists fear that the toll road will cause extraordinary environmental damage and fragment some of southern California's last, most scenic open space. There is also some concern that construction of an overpass would disrupt the flow and quality of sediments from the upper watershed to Trestles Beach, a famous surf break extremely dependant upon the sediment flow. The highway would also be a source of contaminated runoff, contributing to further degradation of the creek and surf zone.

Historically, San Mateo Creek had a more clearly defined channel with lush riparian vegetation covering its banks. In recent years, erosion and sedimentation have formed the creek into a somewhat barren, braided channel. Based on historic air photos from 1953 to the present, the width of the main and flood channel has increased while the size and amount of riparian vegetation have decreased.

Camp Pendleton is the only facility on the west coast where amphibious assault maneuvers can be practiced by marines. It is anticipated that training activities on the base will be expanded and intensified as units relocate from decommissioned bases to Camp Pendleton (Steinitz et al., 1996).

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Watershed Restoration and Management

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Steelhead Trout Fishery

Historically, streams from San Luis Obispo County to Baja California supported more than 60,000 steelhead trout. However, urbanization and development has destroyed most steelhead habitat. Estimates of steelhead trout populations were limited to approximately 500 fish occurring within only four drainages: the Santa Ynez River, Ventura River, Santa Clara River and Malibu Creek and amount to less than 500 fish. Malibu Creek was considered the southern-most habitat of the endangered southern steelhead. However, in 1999, a local southern California resident caught a fish in the lower reach of San Mateo Creek that he believed to be a southern steelhead trout. The California Department of Fish and Game (CDFG) began conducting surveys of the San Mateo Creek and eventually concluded that the creek does support a small remnant population of this

ocean-migrating fish. The CDFG eventually submitted its findings to the National Marine Fisheries Service (NMFS). The U.S. Fish and Wildlife Service (USFWS) has published several monitoring reports related to the Camp Pendleton Marine Corps' fisheries (http://www.ccfwo.r1.fws.gov/camppendleton.html). These findings may require NMFS to extend the critical habitat designation for the southern steelhead to cover San Mateo Creek. If the creek is designated critical habitat, groundwater pumping by the Camp Pendleton Marine Base, may have to be modified to protect the fish (FOR, 1999).

During the last decade, pressure to restore San Mateo Creek has been mounting. In particular, many studies have looked at the feasibility of restoring the SMC watershed into a viable southern Steelhead fishery (Woefel, 1991). Recently, $800,000 was allocated from voter-approved, Proposition 12 funds for steelhead restoration on San Mateo and San Onofre Creeks. San Diego Trout, a charter member of the Southern California Steelhead Recovery Coalition, has devised a preliminary restoration plan and a watershed stakeholders group, which includes private citizens, conservation organizations and government agencies, is in the process of forming. The goal of the organization is to create a viable population of southern steelhead within the SMC watershed.

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San Onofre State Park

In the 1970's, the California Department of Parks and Recreation entered in a lease agreement with Camp Pendleton. The San Onofre State Park (the Park) is located within San Diego County right along the Orange County boundary was established to preserve the unique natural resources of San Mateo Creek and includes 2,000 acres of critical habitat for 7 endangered species (PCL, 2001). The park ranks as the 10th most popular of the more than 260 unit California State Park system with over 1.5 million visitors annually. Part of the draw is the San Mateo Campground and its 160 campsites, which sit along the banks of the San Mateo Creek. The campsite attracts over 70,000 campers a year (PCL, 2001). The park protects the last 3 miles of the San Mateo Creek and encompasses the world-famous Trestles surf breaks and associated beaches located near the mouth of the San Mateo Creek.

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