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Hydrology and Water Quality Inventory

Introduction

The San Diego River Park Plan proposes enhancements to the River's natural hydrologic processes. These improvements will also fulfill other recreational, cultural, and wildlife objectives. Changes to River processes have created poor water quality, low habitat diversity, increased erosion, flow restrictions, flooding issues, and excessive invasive vegetative growth. Improvements to flow and water quality would begin to address these problems while also providing a valuable recreational resource.

San Diego Historical Society

History of the San Diego River

The San Diego River has been dramatically altered by human activity. Historically, the San Diego River flowed uninhibited from its headwaters in the Cleveland National Forest within California to its delta at the Pacific Ocean. River flows varied throughout the year and from year to year. In wet years, the river had strong year-round flows, while in dry years, flows disappeared completely during the summer months. Major flooding occurred infrequently but when it did occur the river was so powerful that it could change courses and terminate at either San Diego Bay or present day Mission Bay Park. The source of water was limited to precipitation inputs within the watershed. Unrestricted river flows transported sediments from the river's headwaters to the Pacific Ocean where the sediments helped replenish San Diego's beaches. Unimpeded flows in extreme wet weather events could exceed 100,000 cubic feet per second (cfs).

Beginning in the early 1800s and continuing to present day, humans have attempted to control the river's flows by constructing dams or levees, and by channeling the river. The Mission Dam, constructed in 1816 in what is now the Mission Trails Regional Park, was the river's first dam constructed and was used by Spanish missionaries. Two additional dams, the El Capitan and the San Vicente, were built in the mid-1900s to facilitate increased water supply for the growing San Diego population. The region also began importing water from outside sources including the Colorado River and the Sacramento River/San Joaquin River Delta. These dams decreased the San Diego River's flows by storing water that would have normally flowed into the river. However, major floods still occurred despite the decreased river flows. Thus, to control flooding, the U.S. Army Corps of Engineers channelized numerous sections of the river, concentrating primarily on the sections in the City of San Diego. Channelizing the river consisted of straightening the river to remove meanders and paving/armoring the riverbanks so that water could flow downstream faster.

Despite the efforts to control flooding, it still occurs in San Diego because the quantity of water in the river has increased over time. Impermeable surfaces, nonpoint source runoff, the channelized river, and imported water are primary contributors to this increase. Impermeable surfaces such as roads, parking lots, and houses prevent rainwater from infiltrating into the ground, causing large quantities of water to runoff directly into the river via stormwater collection systems.

San Diego Historical Society

The City of San Diego imports approximately 90% of its water supply. This water enters the river through residential and commercial runoff, from irrigation, from treated effluent of a sewage treatment facility in Santee, and during flooding events from reservoir overflow. The imported water is suspected to be a significant water source to the river and that it is the major cause of year-round flow in the lower San Diego River reaches.

The San Diego River's water quality, like its flows, has been affected by a number of factors, including dams, increases in impermeable surfaces, and increases in imported water use by the growing population of San Diego. The El Capitan and San Vicente dams have caused increased riverbank erosion by capturing sediments that were historically carried to the delta and the ocean. Urban runoff transport a host of pollutants to the river; Among these pollutants are oils and grease, gasoline, bacteria, trash, nutrients, sediments, and pesticides from impermeable surfaces into the San Diego River. The detrimental effects of urban runoff on the San Diego River's water quality have been observed and documented in a number of studies (Anchor 2003). The lower San Diego River has been designated as water quality limited for phosphorus, dissolved oxygen, fecal coliform, and total dissolved solids. Furthermore, evaluations of water quality based on surveys of a stream's biological organisms (biological assessments) performed from 1997 to 2001, indicate that the lower San Diego River exhibited degraded biological and physical integrity (RWQCB 2003, Anchor 2003).

Key River Processes

The quantity and velocity of a river's waters can affect the river channel itself, the availability of nutrients to the biota, and the aquatic habitat diversity. River flows can alter the physical river channel by transporting or depositing sediments downstream, and by eroding the riverbanks. Sediments transported to habitats downstream can provide additional nutrients to the biota in these habitats. The size of sediments transported correlates to water velocity with larger-sized particles typically being transported only during storm events, when flows are likely to be highest. Pulse flows (high flows occurring during storm events) are particularly important since they can transport particulate nutrients and larger-sized sediments while flushing the riverbeds of fine sediments. Fine sediments can degrade aquatic ecosystems by covering a river's gravel bottom, and thereby preventing fish and numerous invertebrates from feeding or reproducing.

Transport of a variety of sediment sizes is important in creating a diverse aquatic ecosystem with both riffle and pool habitats. Riffle habitats are areas "of shallow, turbulent water passing through or over stones or gravel of a fairly uniform size" (Horne and Goldman 1994). Small invertebrates and fish eggs can obtain the oxygen they need in riffle habitats on the river bed while being protected from predators. Relatively slower flows, a substrate mixture of stones and fine-grain sediments, and an accumulation of decaying terrestrial debris characterize pool habitats (Horne and Goldman 1994). Different environmental conditions allow different biota to exist in pool habitats than those existing in riffle habitats.

Dense vegetation in the river channel can fragment or degrade river habitats, slow river flows, and cause increased sediment deposition or flooding in those areas. Types of vegetation that could negatively affect the river's ecosystem or water quality include plants floating on the water's surface or terrestrial plants that are growing in shallow areas of the river channel. Floating plants, such as ludwigra [need to verify name and spelling of this with Jones & Jones] in particular, can disrupt the aquatic foodweb by causing excessive shading. Large quantities of shading can prevent growth of flora (ex. algae or macrophytes) and remove a food source for many invertebrates (NRC 1992).

Channelizing rivers or restricting river meanders can also detrimentally affect aquatic and riparian habitats. Negative effects of channelizing rivers include removal of riparian vegetation and therefore habitat, loss of in-stream cover, altered riffle pool sequences, decreased stream sinuosity, altered substrate composition, increased bank erosion, increased suspended sediment and increased stream velocity. Restoration of river meanders can improve water quality by allowing more time for natural cleansing processes. River meanders can also decrease flooding and improve (and increase) aquatic and terrestrial habitats by increasing the stream corridor width.

Groundwater

The San Diego River is located within the service area of the San Diego County Water Authority (SDCWA), and associated with two groundwater basins: the Santee/El Monte Groundwater Basin and the Mission Valley Groundwater Basin. The focus here is the Mission Valley Basin, which is a shallow alluvial aquifer underlying an east-west trending valley that extends from the eastern terminus of Mission Gorge out to San Diego Bay in Coastal San Diego. The basin is bounded by the contacts of alluvium with the semi-permeable San Diego and Poway Formations and the impermeable Lindavista Formation. The southwestern boundary is the San Diego Bay.

The principle water bearing deposit is the Quaternary age alluvium consisting of medium to coarse-grained sand and gravel. This alluvium has an average thickness of about 80 feet and a maximum thickness of about 100 feet. The Mission Valley Basin is among some of the more productive of the aquifers lying within the jurisdictional boundaries of SDCWA. The average well production is about 1,000 gallons per minute and the average specific yield is about 15 percent. The San Diego Formation is found within this basin and is generally less than 100 feet thick east of the Rose Canyon fault system. West of the Rose Canyon fault, the San Diego Formation becomes thicker, reaching a maximum thickness of about 1,000 feet. The primary source of recharge for this basin is infiltration of stream flow from the San Diego River.

The California Department of Water Resources estimated storage capacity of the basin to be on the order of 42,000 acre-feet in 1975. San Diego County Water Authority estimated a total storage capacity of about 40,000 acre-feet 1997, indicating a gradual decline in storage capability over time. SDCWA estimated that water was pumped from the basin at the rate of about 500 acre-feet per year in 1997. Impairments to the Mission Valley Groundwater Basin include magnesium and sulfate from domestic use. Chloride and total dissolved solids concentrations are high for domestic and irrigation use. Seawater intrusion is suspected (California Department of Water Resources 2004).

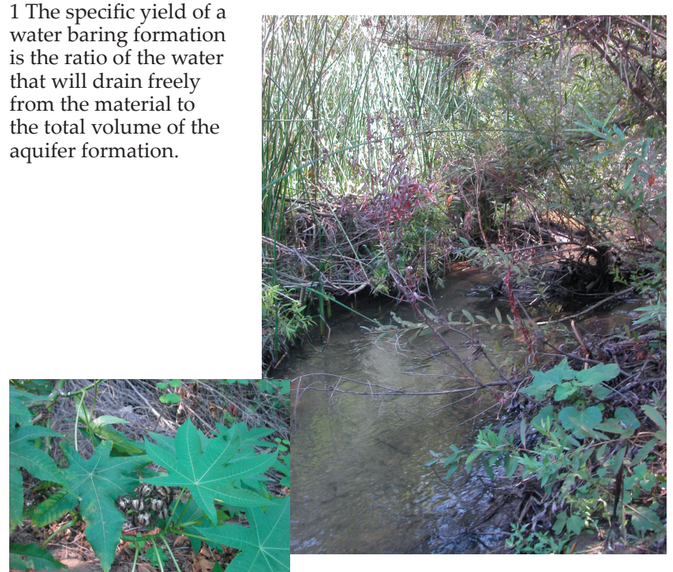
The proposed actions in the SDRP will likely have not impact to groundwater resources. Likewise, none of the proposed actions are reliant upon groundwater resources for implementation.

References

SDCWA. 1997. Groundwater Report- Executive Summary. Available: http://www.sdcwa.org/manage/groundwater-exec-summary.html. Accessed by: Garrick Jones. Last Updated: 1997.

California Department of Water Resources. 2004. California's Groundwater Bulletin 118. Mission Valley Groundwater Basin. Available: http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/basins/9-14_Mission_Valley.pdf. Last Updated: February 27, 2004.

(Footnotes)
1 The specific yield of a water baring formation is the ratio of the water that will drain freely from the material to the total volume of the aquifer formation.



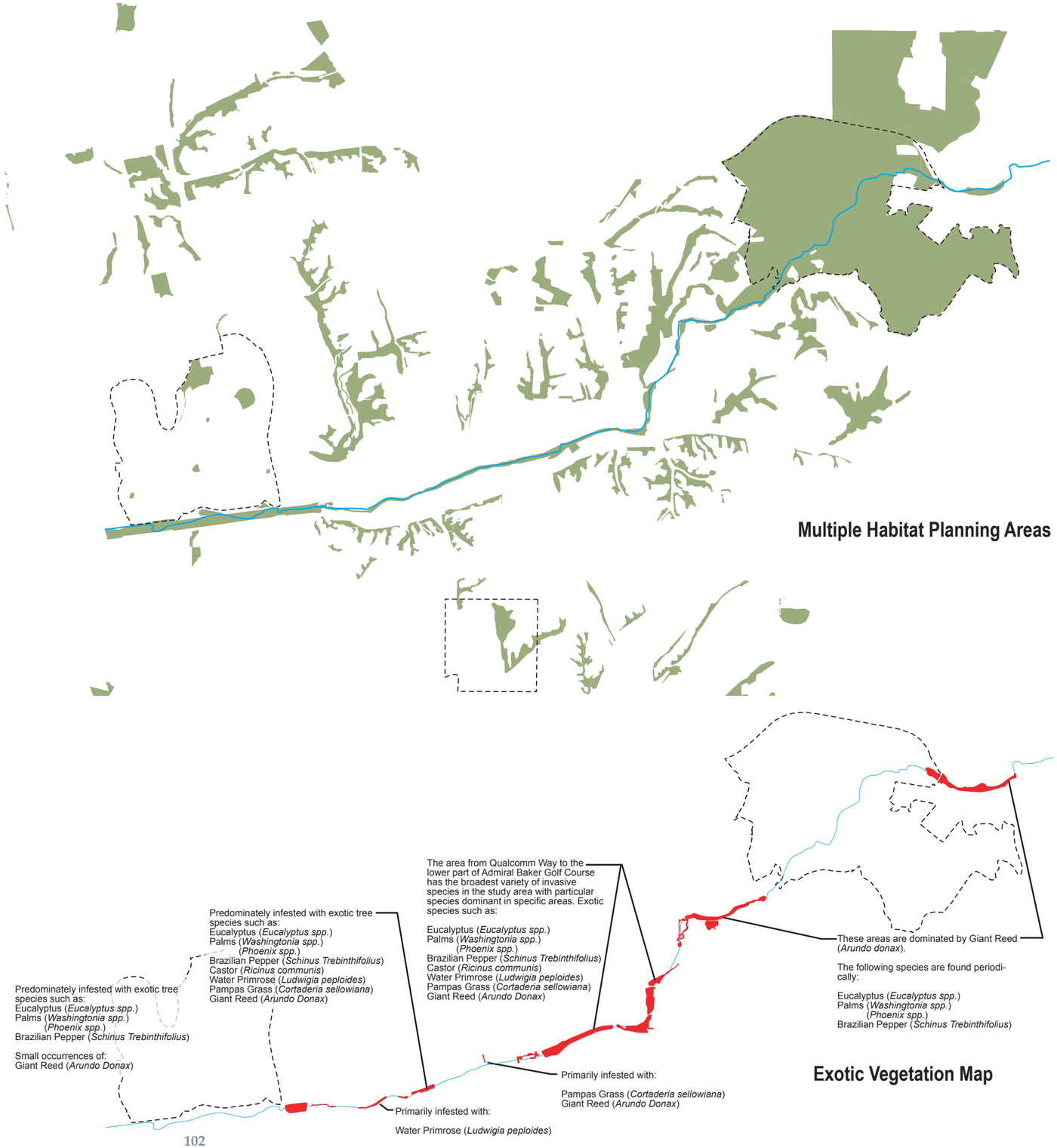
Habitat and Wildlife Inventory

Ecosystem Characterization

The warm, dry summers and cool, wet winters of the southern California climate supported the evolution of a dynamic ecosystem. Alternating from one extreme to the other, from summer and fall wildfires to winter downpours and floods, climatic events required the vegetation and wildlife of the region to adapt so that fire and flood became integral components of the regions' ecosystems. The large-scale transformation of these ecological processes—through fire suppression, alteration of watershed hydrology, reduction and fragmentation of habitat driven by population growth and associated development in the San Diego River watershed—has resulted in conditions for plants and wildlife that are significantly different than those to which they had adapted. Conditions today are different than those that were present just fifty years ago. Changes in sediment transport, water volume and water quality discussed in the San Diego River Park Conceptual Plan and detailed in the Water Resource Analysis affect the structure and distribution of vegetation and wildlife. Loss of habitat and fragmentation due to development can reduce populations of plants and animals and prevent genetic dispersal resulting in localized extirpations and degraded habitat.

Fire Disturbance

With the large-scale destruction of 2003, fire has reasserted its prominence in the public eye and its influence on the ecology of the San Diego River watershed. The Cedar fire burned 95% of the upper watershed and 74% of the entire watershed. Within the study area the Cedar fire burned most if not all of the native chaparral and coastal sage scrub (CSS) northeast of the river within Mission Trails Regional Park. The riparian vegetation corridor associated with the river served as a firebreak, keeping the fire out of the southeastern half of the park. Fire is a key process for maintaining the overall health of the CSS and Chaparral plant communities, promoting new growth and in the case of small fires, improving the diversity of seral (dry) stages within the plant community. Fire suppression prolonged the inevitability and possibly exacerbated the intensity of the fire by allowing fuels to accumulate. Fire suppression results in conditions where large contiguous stands of mature vegetation are contrasted with watersheds bare of vegetation due to recent burns. The vegetation affected by the fire is expected to recover fully, but short-term impacts include: the loss of a large area of adjacent upland vegetation, the reduction of adjacent habitat and cover, soil erosion and river siltation, and potential colonization by exotic plant species. Long-term effects include: potential stand heterogeneity of the plant community (under fire suppression) with a corresponding reduction in biodiversity.



Multiple Habitat Planning Areas

Exotic Vegetation Map

Flood Disturbance

Due to the dry summers and wet winters typical of the mediterranean climate of Southern California, most rivers are low-flowing or intermittent for the majority of the year, but subject to sudden, large flood flows during the wet season. Prior to significant alteration and hydrologic changes, the San Diego River fit this pattern. Prior to damming, average flow at the Santee gage station of 25 cubic feet per second (cfs) contrasted with peak measured flood flows of 70,200 cfs; post-dam flood levels only approach 9,590 cfs. Dam building, channelization, and gravel mining alter river dynamics so the river no longer functions as the primary disturbance agent in the riparian corridor. Flooding, erosion, deposition, and shifting of the riverbed uprooted vegetation in one place while at the same time creating new land for plants to colonize. The result was a diverse mosaic of riparian vegetation, some areas supporting a mature riparian forest and other areas colonized with pioneer species. Flooding does occur, but significant erosion, deposition, and shifting of the riverbed no longer occur. As described in the Hydrology section of this report, return flows in developed areas have changed the river from ephemeral to perennial, with water flowing consistently throughout the year. Due to these changes, the riparian vegetation supported by the river tends to maintain a homogenous character of a shrub understory, with a mature overstory canopy where human disturbance does not occur. These changes to river hydrology and dynamics will also cause populations of species that prefer the modified hydrologic conditions to increase to the detriment of those species that are better adapted to the historic conditions.

Plant Communities

The condition of native vegetation and associated plant communities within the study area falls into three general categories. In the first category are relatively healthy native plant communities in undisturbed areas. The second category consists of developed or disturbed areas with native vegetation, showing some reduction in species diversity. These areas also include exotic invasive species. The third category covers urban or developed areas, which do not host any functioning native plant communities; some natives may be present as landscape elements only. Within the San Diego River Natural Resources Management Plan Study Area, the healthy native plant communities are generally coincident with the areas identified for preservation under the City's MSCP Subarea Plan (see habitat conservation). These areas include: Mission Trails Regional Park, sections of the San Diego River riparian corridor west of Mission Trails Regional Park, tributary canyons to Mission Valley, and sections of the Mission Valley side slopes.

Disturbed areas are identified on the invasive vegetation map; these areas generally correspond to locations where intense activity through land use or management occurs within or immediately adjacent to the channel. These areas include: current and historic resource extraction at Superior Mine, abandoned gravel pits adjacent to Admiral Baker Golf Course and downstream to I-5, River Run Golf Course, Admiral Baker Golf Course, Carleton Oaks Golf Course, and sections of the floodway zone through Mission Valley. Areas classified as urban/developed on the vegetation map are the dominant category of "plant community" in the study area. These areas typically consist of a combination of hardscape elements and irrigated landscaping.

Development encroaches on the river for much of its length, with the only significant area of contiguous quality habitat being Mission Trails Regional Park. Below Mission Trails, the only areas that still support native plant communities and continue to function as habitat are lands that were historically unbuildable, such as the immediate river floodway, the steep side slopes of Mission Valley, and the steep side canyons. The valley floor, the historic floodplain and estuary, and the mesa tops are all developed, no longer functioning as habitat and effectively isolating most of the remaining patches of functional native habitat.

Exotic Invasive Vegetation

Exotic vegetation was mapped and inventoried in 2002 as part of the San Diego River Invasive Exotic Weed Eradication Master Plan. A map based on this plan is included in this report, identifying areas of heavy infestation. Invasive species include Eucalyptus (Eucalyptus .spp), Mexican Fan Palm (Washingtonia robusta), Canary Island Palm (Phoenix canariensis), Brazilian Pepper (Schinus trebinthifolius), Castor (Ricinus communis), Water Primrose (Ludwigia peploides), Pampas Grass (Cortaderia sellowiana), Giant Reed (Arundo donax) and Tamarisk (Tamarix aphylia). Three species of particular concern in the San Diego River Natural Resources Management Plan area are Pampas Grass, Giant Reed, and Tamarisk. These aggressive colonization habits of these species have a significant impact on habitat quality. In the case of Giant Reed and Tamarisk, colonization, coupled with their prodigious water uptake, allows them to change soil moisture and water table levels to conditions that favor them at the expense of native riparian species.

The plant communities identified within the limits of study area—one half mile to either side of the river—are listed below. The descriptions follow the format used by SANGIS, which used the Holland 1995 classification for this dataset. This classification has a broad range of descriptions, including categories that are not plant communities in the traditional sense, but more as a cover or use designation. These categories include: beach, subtidal, extensive agriculture, shallow bay, urban/developed. An in-depth description of these communities can be found in the San Diego River Natural Resources Management Plan.

Plant communities within the study area

Beach
Chaparral
Cismontane Alkali Marsh*
Coastal and Valley Freshwater Marsh*
Dense Coast Live Oak Woodland
Diegan Coastal Sage Scrub*
Disturbed Habitat*
Disturbed Wetland*
Estuarine
Eucalyptus Woodland*
Extensive Agriculture
Freshwater*
Intensive Agriculture
Non-Native Grassland*
Non-Vegetated channel/Floodway/Lakeshore Fringe*
Riparian and Bottomland Habitat
Saltpan/Mudflats
Shallow Bay
Southern Coast Live Oak Riparian Forest
Southern Coastal Salt Marsh
Southern Cottonwood-willow Riparian Forest*
Southern Foredunes
Southern Riparian Forest
Southern Riparian Scrub*
Southern Sycamore-alder Riparian Woodland
Subtidal
Urban/Developed*
Valley Needlegrass Grassland
Valley and Foothill Grassland

* Denotes communities that are also in the San Diego River Natural Resources Management Plan

Wildlife

Shrinking habitat area and reduced habitat diversity limit the number of species within the Study area. Those species which are present are ones that can rely entirely on natural habitat to meet their needs, and the generalists who meet their needs through a combination of native habitat and resources available in developed areas.

In the upper reaches of the project, the size, quality and connectivity of habitat areas is adequate to support a full complement of wildlife species, including large predators. The Mountain lion (Felis concolor) and the Bobcat (Lynx rufus) are large predators typically associated with the chaparral and coastal sage scrub habitat types that dominate Mission Trail Regional Park.

Habitat in the lower reaches is not adequate to support large predators. For this reason, the lower reaches have an ecosystem with a modified food web that almost completely excludes the top predators. In these

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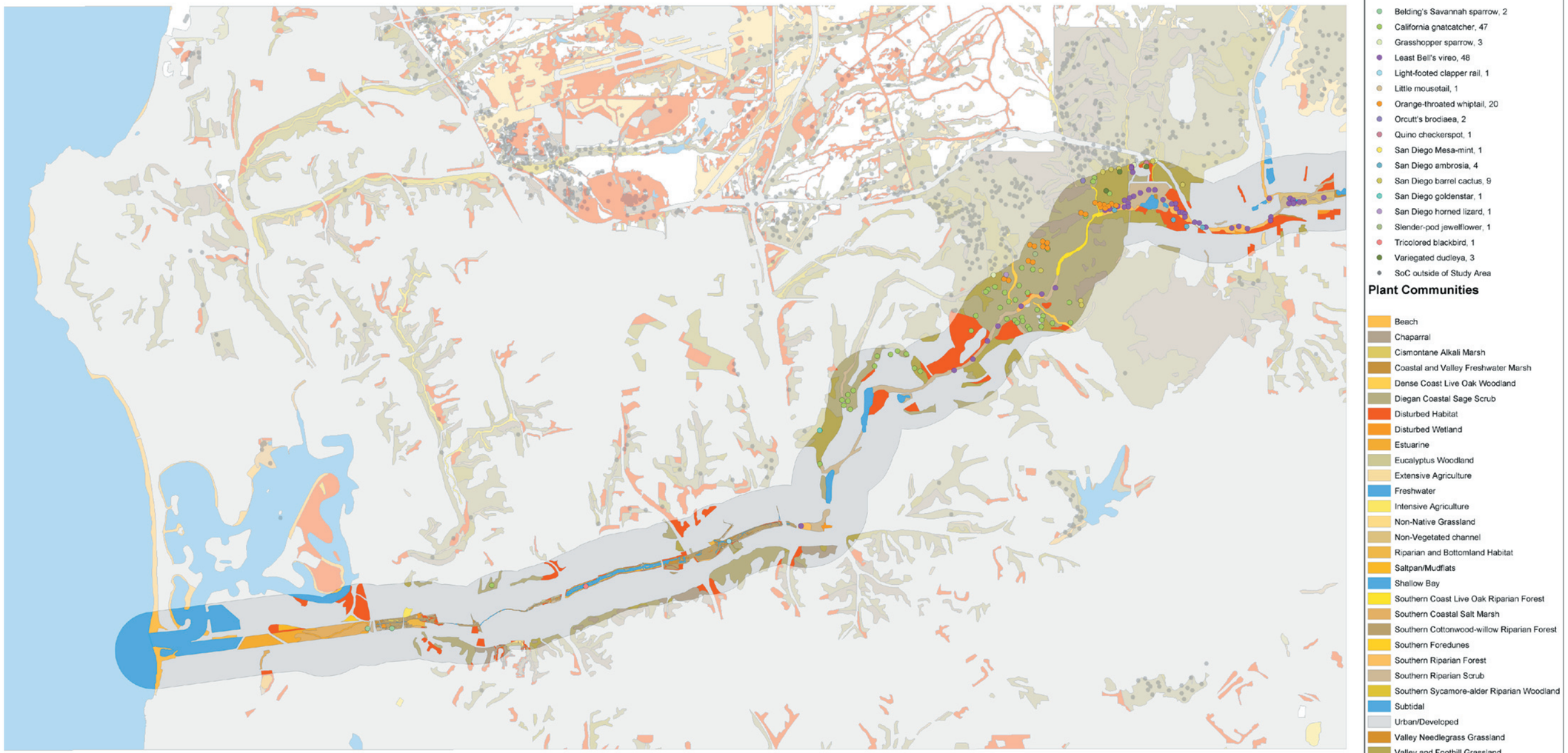


Species Of Concern

areas, mesopredator populations (middle predators) such as Coyote (Canis latrans) or Raccoon (Procyon lotor) have expanded to fill the void left by the absence of top predators. This modified population profile is a desirable condition for this section of the study area because of the proximity of development and attendant concerns of safety.

Within the areas that cannot accommodate the needs of large predators, there still are smaller animals that have specific habitat needs and are sensitive to changes to their environment. Some of these sensitive species are covered by the San Diego MSCP Subarea Plan, which provides guidelines for their protection. These species are listed in the following section. Other sensitive species not covered by the San Diego Multiple Species Conservation Program Subarea Plan are listed in the San Diego River Natural Resource Management Plan. Detailed inventories of all wildlife species have been prepared as part of various Natural Resource Management Plans completed for sections of the study area. These include the Mission Bay Natural Resource Management Plan, the San Diego River Natural Resource Management Plan, and the First San Diego River Improvement Project (FSDRIP) Natural Resource Management Plan. The stretch of river covered in these plans extends from the Pacific Ocean to Mission Trails Regional Park, excluding the Riverwalk Golf Course.

Habitat Conservation - Multiple Species Conservation Program

The State of California passed the California Natural Communities Conservation Planning (NCCP) Act in 1992 to facilitate an ecosystem-based approach to preserving and protecting the state's remaining natural habitats and biodiversity. Plans are developed at the regional, subregional, and subarea level to meet the conservation goals of the NCCP Act. The United States Fish and Wildlife Service and the California Department of Fish and Game are the two natural resource agencies charged with reviewing plans to ensure compliance with the NCCP Act. The San Diego County Multiple Species Conservation Program Final Plan is one of eleven subregional plans within the Coastal Sage Scrub Region. Within this subregion, the City of San Diego is one of twelve subareas, and has developed an approved Subarea Plan. Approval of the plan conserves resources at the regional level while allowing the city to issue permits for incidental take of habitat at the local level. To ensure the conservation of resources, the City of San Diego Subarea Plan provides both general and specific guidelines, policies, and directives to minimize impacts to species and habitats. The City has also included clear guidelines for permitting of environmentally sensitive lands in their Land Development Code Biology Guidelines.

The San Diego County Multiple Species Conservation Program Final Plan identifies Mission Trail Regional Park and the East Elliott area as one of sixteen biological core areas and the San Diego River riparian corridor west of Mission Trails Regional Park as a linkage between them. The Mission Valley side slopes and the tributary canyons are identified in the City of San Diego Multiple Species Conservation Program Subarea Plan as urban habitat areas, which in the study area are not included as part of any of the major planned areas in the Multiple Species Conservation Program Subarea Plan. The majority of urban habitat areas consist of canyons with native habitats in relative proximity to other Multiple Species Conservation Program areas providing habitat. These areas contribute in some form to the multiple habitat planning areas (MHPA), either by providing habitat for native species to continue to reproduce and find new territories, or by providing necessary shelter and forage for migrating species (mostly birds). These areas contain a mix of habitats including coastal sage scrub, grasslands, riparian/wetlands, chaparral, and oak woodland. The lands are managed pursuant to existing Natural Resource Management Plans, Landscape Maintenance Districts, as conditions of permit approval, or are currently not managed. The areas also contribute to the public's experience of nature and the local native environment.

The list below catalogues plant and animal species with specific guidelines in the Multiple Species Conservation Program Subarea Plan identified as occurring or likely to occur in the study area. Species were identified through SANGIS data and the San Diego River Natural Resource Management Plan.

Belding's Savannah sparrow	Passerculas sandwichensis beldingi
California gnatcatcher	Polioptila californica
California Least Tern	Sterna antillarum browni
Cooper's hawk	Accipiter cooperi
Grasshopper sparrow	Ammodramus savannarum
Least Bell's vireo	Vireo bellii pusillus
Light-footed clapper rail	Rallus longirostris levipes
Little mousetail	Myosurus minimus ssp. apus
Orange-throated whiptail	Cnemidophorushyperythrus beldingi
Orcutt's brodiaea	Brodiaea orcuttii
Quino checkerspot	Euphydryas editha quino
San Diego Mesa-mint	Pogogyne abramsii
San Diego ambrosia	Ambrosia pumila
San Diego barrel cactus	Ferocactus viridescens
San Diego goldenstar	Muilla clevelandii
San Diego horned lizard	Phrynosomacoronatum blainvillei
Slender-pod jewelflower	Caulanthus stenocarpus
Southwestern pond turtle	Clemmys marmorata pallida
Southwestern willow flycatcher	Empidonax extimus traillii
Tricolored blackbird	Agelaius tricolor
Variegated dudleya	Dudleya variegate
White-faced ibis	Plegadis chihi

Bibliography

California Department of Fish and Game. 2003. Review of Regional Habitat Linkage Monitoring Locations. Conservation Biology Institute. http://www.consbio.org/cbi/pubs/reports.htm

California Department of Fish and Game. Natural Community Conservation Planning Program. http://www.dfg.ca.gov/nccp/

CalPIF (California Partners in Flight). 2003. Version 2. The coastal scrub and chaparral bird conservation plan: a strategy for protecting and managing coastal scrub and chaparral habitats and associated birds in California (J. Lovio, lead author). Point Reyes Bird Observatory. http://www.prbo.org/calpif/plans.html

City of San Diego. 2001. First San Diego River Improvement Project Natural Resource Management Plan. September. 2001.

City of San Diego. 2001. Land Development Code, Biology Guidelines; San Diego Municipal Code. May. 2001.

City of San Diego. 1995. Multiple Species Conservation Program Subarea Plan. (Draft) August. 1995.

City of San Diego. 2003. San Diego River Natural Resource Conservation Plan. (Draft) November. 2003.

Conservation Biology Institute. 2002. The Effects of Watershed Urbanization on Stream Hydrologic Characteristics and Riparian Vegetation of Los Peñasquitos Creek, California. Conservation Biology Institute. Encinitas, CA. July, 2002.

County of San Diego. 1998. Multiple Species Conservation Program Final MSCP Plan. August. 1998.

Fischer, R. A., and Fischenich, J.C. (2000). "Design recommendations for riparian corridors and vegetated buffer strips," *EMRRP Technical Notes Collection* (ERDC TN EMRRP-SR-24), U.S. Army Engineer Research and Development Center, Vicksburg, MS. www.wes.army.mil/el/emrrp

Fish and Wildlife Service. 1998. Draft recovery plan for the least Bell's vireo. U.S. Fish and Wildlife Service, Portland, OR. 139 pp.

Forman, Richard. and Godron, Michel. 1986. Landscape Ecology. John Wiley and Sons. New York. 1986.

MCAS Miramar 2000. Integrated Natural Resources Management Plan for Marine Corps Air Station Miramar.

Minnich, Richard A. 2001. An Integrated Model of Two Fire Regimes. Conservation Biology, **15**: 1549-1553.

Natural Resource Conservation Service. Riparian Buffer Zone; NRCS Planning & Design Manual. http://www.nrcs.usda.gov/

RHJV (RIPARIAN HABITAT JOINT VENTURE). 2000. Version 1.0. The riparian bird conservation plan: a strategy for reversing the decline of riparian associated birds in California. California Partners in Flight. http://www.prbo.org/CPIF/Riparian/Riparian.html

Schoenherr, Allan A. 1992. *A Natural History of California.* Berkeley: University of California Press.

Recreation Inventory

Active Recreation

Recreation Introduction

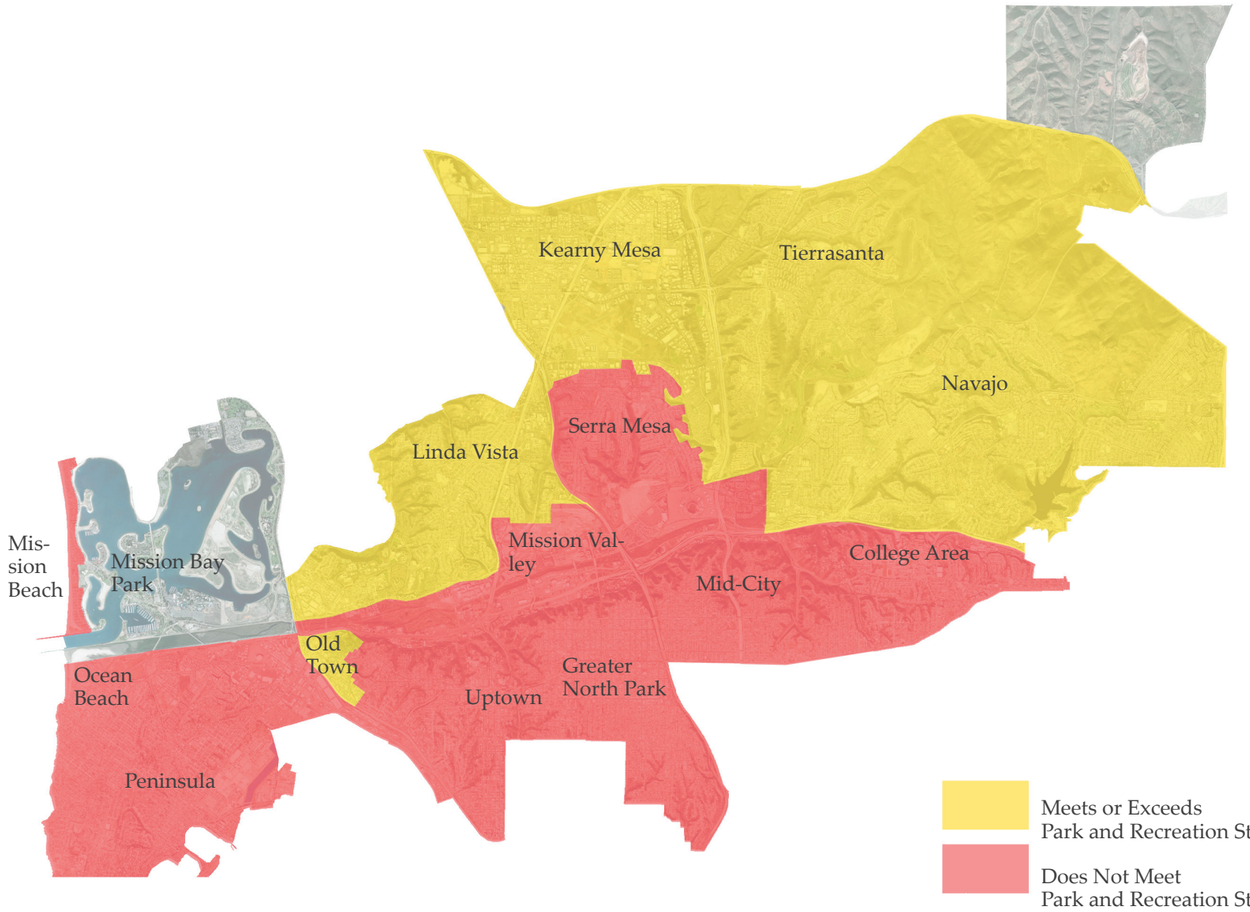
A major objective of the study is to identify recreation opportunities in the river corridor. This section focuses on Active Programmed Recreation—defined as sports facilities, fields and parks—for which the City has identified standards for its Communities, as well as major circulation trails. Passive recreation, such as nature study, hiking trails, interpretation of cultural sites and other activities related to specific resources are discussed separately in those resource sections. In addition, the River Valley has many private facilities that offer commercial recreation and the relationship of those facilities to the San Diego River Park is discussed. Enjoyment and appreciation of the river as a recreational activity setting should be an integral part of all activities and land uses in the River Valley.

Active Recreation Goals

Although the study area for the San Diego River Park is a 1/2 mile corridor on each side of the River, existing facilities and recreation needs were examined within the seventeen adjacent community planning areas of the City of San Diego. Recommendations for new open space and recreational facilities are focused within corridor. Open, developable land for new park land is very limited throughout theses seventeen communities and many of them are at a deficit for park area, according to Park and Recreation Department calculations. The river corridor is in concept an appropriate place to provide additional recreation for many reasons:

- Advance the valley as a "common"
- It is central and accessible to many neighborhoods from streets and transit
- The river and recreation can be linked with communities
- Residential population is growing in the River Valley and adjacent communities
- Recreation open space can reinforce natural open space and habitat
- The river valley can be a beautiful setting for recreation
- Some open land remains in the valley
- Recreation land can provide flood overflow areas

An overall goal is to balance active recreation with conservation and habitat. Riparian habitats, particularly in California, have been diminished over time due to human development. In proposing recreation for the communities along the river corridor, new recreation facilities are planned where the need exists, where it is accessible to the community and in locations which do not require displacement of existing development. The proposed east-west multi-use trail, as well as lateral bike and pedestrian paths, can link neighborhoods to new



parks and regional recreation facilities.
Other site planning criteria for new recreation sites takes into account new environmental planning with hydrological improvements, habitat creation and vegetation buffers. In addition, new construction materials for recreation facilities would take a design cue from the riparian character. In summary, general goals for active recreation planning include the following:

- Define criteria for locating active recreation relative to other objectives.
- Identify potential locations for all recreation that is identified in Community Plans.
- Identify additional recreation opportunities that may meet needs currently unsatisfied in Community Plans, or other regional need.
- Complement and reinforce resource-related opportunities such as nature study and enjoyment of the river and its cultural and geographic significance.
- Provide a program for recreational uses for each location or use area that is proposed.
- Identify design issues and criteria for proposed recreation areas.

Analysis of Recreation within Community Plan Areas

The City of San Diego "Progress Guide and General Plan" provides population-based acreage goals of 2.8 acres per 1,000 citizens, and the Land Development Code sets a standard of 2.8 acres of parkland per 1,000 populations. "Community parks", "neighborhood parks" or "mini-parks" are included in the population-based acreage in each community planning area. Community parks are ideally 20 acres, but can be reduced to 13 acres if located adjacent to a school with a joint-use agreement. Community parks serve a 1-1/2 mile radius area and contain facilities such as ball fields, playgrounds, hard-courts, gymnasiums, swimming pools and recreation center buildings. Neighborhood parks are ideally 10 acres, although the size can be as small as 5 acres if located adjacent to a joint-use school facility. Neighborhood parks serve a ½ mile radius area. Neighborhood parks have smaller play fields, children's' play areas, multi-purpose courts and passive park space such as picnic facilities. Mini-parks, defined under San Diego Council policy (Policy #700-34, 1990) as Vest Pocket parks, are small parks designed to provide park facilities in areas "which substantially do not meet General Plan standards". An additional requirement from the General Plan is that one city swimming pool shall be provided per each 50,000 residents. Each city swimming pool serves an area within a 1-1/2 to 2 miles radius.

Using population data from the San Diego Association of Governments (SANDAG), the Park and Recreation Department has determined what the minimum park acreage goals should be within each community. Planning area park acreage needs are developed using 2002 census data and SANDAG population projections for 2020. Using these calculations, the Park and Recreation Department has determined that most urbanized communities are park-deficient and that the average park deficit will continue to increase with a growing population.

Because most of the communities along the river corridor have little available land for new recreation facilities, Park and Recreation could conceivably develop a policy to aggregate recreation from several communities and locate a convenient regional recreation facility in the river valley.

Most of the Mission Valley community is within the San Diego River Park study. Significant portions of the following communities are within the study area: Navajo, Tierrasanta, Linda Vista, Mission Bay Park, Ocean Beach, Midway/Pacific Highway and Old San Diego. The study area lies within smaller portions of the communities of Mission Beach, Peninsula, Uptown, Greater North Park, Normal Heights/Mid City, Kensington, Serra Mesa, Kearny Mesa, College Area and East Elliot. To the east, the study area meets the City of Santee. One reason for the deficit of recreation land within these communities is that recreation requirements have been satisfied with private open space within new developments, particularly in Mission Valley. This has yielded recreation amenities such as tennis courts, gyms, pools and meeting rooms for those residents, but these facilities are not available to the public or counted as part of existing recreation. This policy has changed and Mission Valley Community Plan update, which is currently underway bases active recreation needs on public facilities.

Mission Valley, Navajo, Tierra Santa community plans have specific recommendations for recreation within the river corridor study area. Some other community plans have general recommendations for trail connections, view areas over the valley, or open spaces that may be linked.

Community parks that service areas within 1/2 mile of the river:

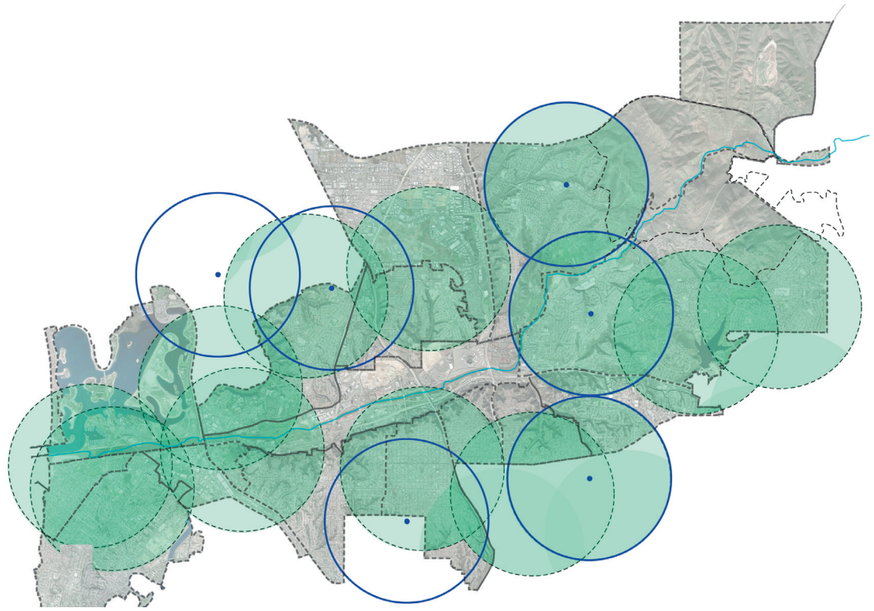
- Ocean Beach Athletic Facility (Robb Field)
- Cleator Community Park
- Presidio Community Park (a regional passive park, without typical community park facilities)
- Allied Gardens Community Park (with swimming pool)
- Tierrasanta Community Park (Its service area of 1-1/2 mile does not extend to the river corridor study area, but its swimming pool service area of 2 miles does)
- Mission Valley YMCA (although a private facility, the pool is considered a public facility as part of an agreement in which the facility is located on public land)

Neighborhood parks that service areas within the river corridor study area:

- Collier Park
- Dusty Rhodes Park
- Mission Heights Park
- Mission Hills Park
- Old Trolley Barn Park
- Grantville Park
- Roadrunner Park
- Rancho Mission Canyon Park
- West Hills Park, Santee

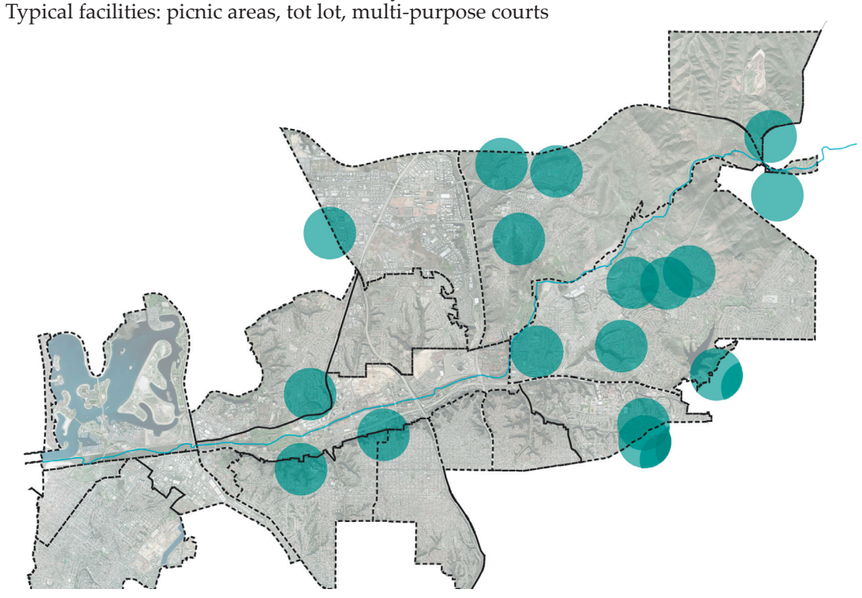
Other Existing Public Recreation Facilities

The public can use recreation fields and some other facilities of selected public schools where the City has a "joint-use agreement" in place with the school district. To avoid conflict with school programs, public access is generally limited to school hours, yet the acreage within the joint-use facilities are included into the park and recreation inventory.



Active Recreation Facilities-Neighborhood Parks

- 3,500 - 5,000 residents within 1/2 mile radius
- 10 acres, reduced to 5 if next to elementary school site
- Typical facilities: picnic areas, tot lot, multi-purpose courts



Active Recreation Facilities-Community Parks

- 8,000 - 25,000 residents within 1 1/2 mile radius
- 20 acres, reduced to 13 if next to junior high school site
- Typical facilities: much the same as neighborhood park, with ball fields and recreation center building

Regional parks, such as Mission Bay Park and Balboa Park, are not counted in population-based park inventory. City property defined as "Open Space" are areas generally free from development or developed with low intensity uses that respect natural environmental characteristics. Open space is also not included in the population-based park inventory. Open Space is used for purposes such as:

- Preservation of natural and cultural resources
- Passive outdoor recreation
- Public health and safety
- Control of urban form
- Scenic and visual enjoyment

The City has over 35,000 acres of City-owned open space, consisting of major open space regional parks, urban canyons and slopes. For instance, significant acreage is under the jurisdiction of the Park and Recreation Department in the Mission Valley north-facing valley slopes.

In addition, the state and federal governments own significant land areas within the river valley and the river corridor study area that can be considered open space, or in some cases recreational area. These include the following:

- Caltrans rights-of-way (State, freeway and interchange landscape areas)
- Admiral Baker Golf Course and Park (Federal, Navy golf course, swimming pool, picnic are, community building, gym)
- Army Corps of Engineers (Federal, river and tributary channels, floodways and structures)

Regional or Area-wide need

Although recreation need is currently evaluated within individual communities, the unmet opportunities adjacent to the river produces an overall need for active recreation land of more than 200 acres (even considering proposals within the community plans for new recreation facilities). Using other regional parks as examples—Mission Bay Park, Mission Trails Regional Park and Balboa Park—could a major sports park at Qualcomm or a resource based park in Grantville be justified based on regional opportunities not identified within individual community plans?

Private Recreation or Recreation Related Facilities

The River valley currently offers a wide array of commercial and retail attractions and recreation that can contribute to and benefit from the San Diego River Park. Like the downtown and beach areas of San Diego, many of these facilities are part of the tourist environment of the City, but are heavily used by residents as well. The obvious example is Sea World, but even the shopping malls in the valley are often used as a recreational resource for family outings, and the more integrated these facilities become with the River, the more residents and visitors will identify with the river as a significant resource for the region.

These facilities should be linked with trails and integrated with the landscape character of the River. They include:

Recreation

- Golf Courses: Carlton Oaks, River Run, Admiral Baker, Old Town
- Sea World
- Sports Arena
- Qualcomm Stadium and practice fields
- Point Loma and Mission Valley YMCA's
- Numerous health clubs
- Hotels, resorts and spas
- Private residential recreation areas
- USD athletics and recreation
- San Diego Mission School recreation
- Admiral Baker community park area
- Private school sports facilities

Attractions with recreational qualities

- Sea World
- Old Town
- Serra Museum
- San Diego Mission and School
- Mission Valley Library
- Mission Bay Concessions
- Hotels, resorts
- Sports Arena
- Qualcomm Stadium
- Fashion Valley Mall/Cinemas
- Mission Valley Mall/Cinemas
- USD facilities
- Restaurants and Clubs

Circulation Trails

Trails analyzed in this section include those which provide access from communities to the river corridor as well as the east to west multipurpose trail, which provides access along the river corridor.

Circulation Trail Goals

- Continuous east to west trail from the ocean to Santee and on through the county
- Create lateral links for bicycles and pedestrians to all communities, transit, recreation, interpretive, public and private facilities adjacent to the river corridor
- Provide trails for horses in the eastern part of the corridor
- Provide staging areas and conveniences such as bicycle parking, rest areas and overlooks to encourage use of the trails
- Locate trails where they provide convenient access and an enjoyable setting
- Locate trails where they conflict least with habitat and river hydrology

Existing Circulation Trails

Describe the status of the trail system and define types of trails/ Provide examples of priorities and types of projects underway as well as issues for implementation

An east to west multipurpose trail system is partially established in the corridor and fairly convenient bicycle access is possible from adjacent communities and between sections of off-street trail. However, pedestrian access from communities is extremely limited, the east to west trail is interrupted by awkward street crossings and many of the missing pieces of the trail system use on-street bicycle connections that are dangerous.

Existing Circulation Trails consist of a multi-use-trail for bicycles and pedestrians in the central part of Mission Valley (completed as part of the FISDRIP), multi-use trails on the levees in the estuary, trails in existing parks (Mission Bay, Dusty Rhoades, Mission Trails) as well as on-street bikeways and sidewalks. Equestrian uses are allowed in Mission Trails Regional Park on some designated trails, but horses are not envisioned for the San Diego River multi-purpose trail.

The "multi-use trail" at FSDRIP is a 10-12 ft. wide paved path on both sides of the river. A criterion for the river path is that it be a bike-pedestrian shared path parallel to the river. Per a CalTrans Highway Design Manual (Feb. 1, 2001) recommendation, the shared recreation path is not intended as a high-speed transportation facility for bicycles. Where space allows, we are proposing that a pedestrian-only trail be on a separate path on the opposite side of the river.

City of San Diego

"Multi-use trail" is a term already used in City of San Diego community plan documents to describe a Class I bikeway that is shared with pedestrians. City of San Diego "Transit and Bike Route" plans define the width of the multi-use trail as 8' to 12' with a 2' shoulder on each side. The Transportation Department of the City of San Diego defines the multi-use trail as generally 10' wide with 2' shoulders and paved to meet ADA standards with concrete, asphalt, "resin pavement" or other similar surface.

Cal Trans

Class I Bikeways are defined by Cal Trans as bike paths on their own rights-of-way for the exclusive use of bicycles and pedestrians. Cal Trans also defines the Class I Bikeway as providing a recreational opportunity or a high-speed commute route. Therefore, the "multi-use trail" designation should clarify our intended use for the trail. Cal Trans does not specify shoulder surfaces.

San Diego Master Bike Plan

The San Diego Master Bike Plan calls its existing and proposed dedicated bike paths "Class I Bikeways". The section of the "Class I Bikeway" shown in the San Diego Master Bike Plan shows a soft shoulder.

<Insert multi-use trail vignette sketch and cross-section here.>

Passive Recreation and Hiking Trails

Passive recreation refers to enjoyment of the outdoors and the natural and cultural resources of the river valley—as opposed to activities that require sports fields and facilities. This category includes interpretation and education concerning the resources as well as simply walking and hiking for exercise.

Passive Recreation Goals

- Focus on the River
- Trails
- Opportunities in all communities
- Museums and interpretive areas
- Awareness of the river with habitat and character improvements
- Combine with active recreation facilities, as well as other land uses
- Take advantage of different kinds of experiences
- Interpret the 20th century development history of the valley
- Integrate existing facilities such as Old Town, Sea World, Junipero Serra, Mission Trails

Describe the status of passive recreation opportunities and examples of projects underway as well as examples of opportunities.

Historic and Cultural Resources Inventory

Geologic History

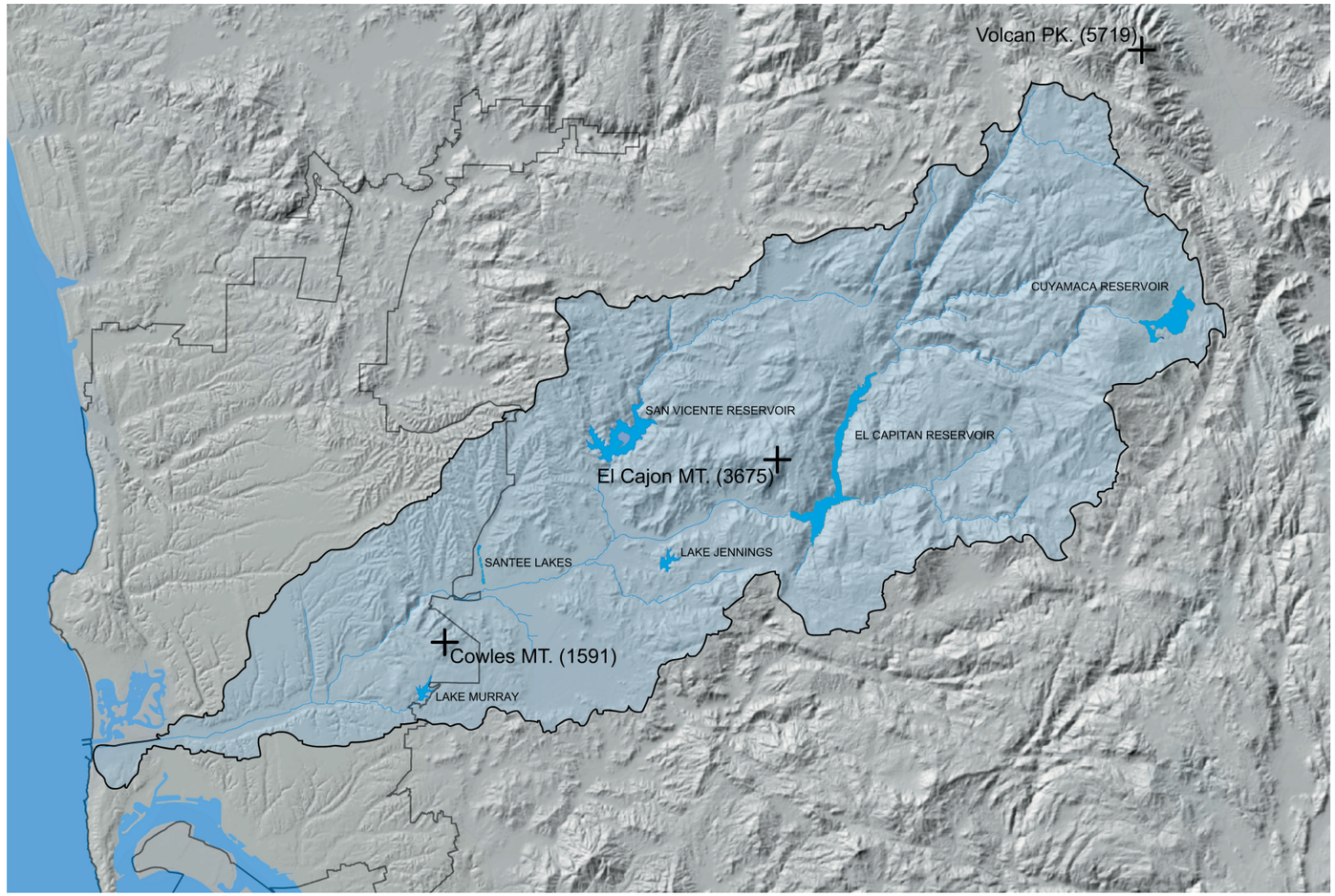
Rivers have been fundamental to the shaping of the earth's surface since vapor first coalesced into raindrops and fell to earth nearly four billion years ago. Since then, by collecting into ever larger and more powerful channels from rivulets to gullies to streams and rivers, water has carved the surface of the earth and redistributed materials through erosion and sedimentation. The geologic terrains aggregated over the past one and a half billion years, drifting layer by layer into the North American plate creating the land mass that now constitutes California. The Sierras continue to rise more rapidly than they erode; the evidence of this land mass's relatively young age is seen and felt in the earthquakes occurring along many faults that outline the edges of what were once separate land masses. The erosion of the California landscape is more visibly evident than in many places. The combination of its young geology and pattern of rain fall results in a pattern of erosion that is often abrupt and eventful.

As the earth evolved, the erosion fundamental process was influenced by two critical events. The first event was the development of vascular plants. Early vegetation existed in swamps and other lowlands, and the adaptation to higher and drier conditions likely occurred in riparian (river related) environments. The subsequent rapid - in geologic terms - expansion of plants across the surface of the earth dramatically changed the environment by stabilizing much of the earth's surface, fundamentally impacting the erosional processes and the behavior of stream flow itself. The plant species that made up the riparian vegetation of a stream corridor affected the basic structure and patterns of the stream flow, and as the vegetation evolved or otherwise changed over time, the pattern of the stream itself was changed.

The second critical event was the arrival on earth of an animal species with the ability to think, manipulate and fundamentally change his environment. Water access and rich floodplain soils often drew early peoples to river valleys, and the earliest humans migrated into southern California at least ten thousand years ago. The Kumeyaay settled in the San Diego River watershed at about this time, although their impact on the behavior of the river was minimal. Only with the late eighteenth century arrival of Europeans, with the ingenuity and desire to control water on a larger scale, did the character of natural stream flow begin to change dramatically.

The effect of these two fundamental events is clearly manifested in the historic changes to the San Diego River. Once an ephemeral waterway, often dry in the summer and occasionally flooding, the San Diego River carved through the granitic tilted fault block of California's Peninsular Range and the coastal terraces spilling onto the coastal plain. As these terraces uplifted and tilted, the River carved the Gorge in what is now Mission Trails Regional Park, leaving the promontories now known as Cowles Mountain and Fortuna Mountain. Ongoing stream erosion subsequently created Mission Valley and its tributary canyons through the softer material of the Linda Vista Formation and Poway Group conglomerates. Seasonal flooding would often flush nearly all vegetation from the floodplain and deposit nutrient-rich sediments as it spilled onto the flatter terrain of the valley. These deposits created a rich alluvial plain and built the coastal beaches with sand and minerals carried down from the mountains.

San Diego River Watershed



Human History

The earliest occupants of the valley changed the river little. The riparian zone provided habitat for food sources and vegetation from which dwellings, clothing and baskets were made. The valley also served as a transportation corridor between the uplands and the ocean.

With the arrival of the Spanish in the late eighteenth century, pressure on the valley landscape began to increase. The first mission and presidio were built on a hillside above the Kumeyaay village of Cosoy near Old Town and was reestablished near Nipaguay shortly thereafter.

The expanding mission and conversion of Kumeyaay people to Christianity led to an increasing population in the valley. The Spanish introduced agriculture and cattle to the valley and built the first dam above the gorge in 1792. The Mission Flume was constructed with the dam to bring water to crops and livestock at Mission San Diego de Alcala down valley.

As California gained statehood and the city and county of San Diego were established in 1850, change began to occur more rapidly. The Derby Dike was constructed by the Army Corps of Engineers, effectively isolating the San Diego River from half of its natural delta and estuary to San Diego Bay, and diverting the flow permanently to False Bay, now known as Mission Bay. Population of the valley began to grow significantly and along with it the demand for a reliable water supply. By the end of the 19th century numerous dams had been constructed throughout San Diego County, including the El Capitan and San Vicente on the San Diego River. These dams isolated the lower San Diego River watershed from its headwaters and upper reaches, drastically changing the hydrologic pattern of the river and its seasonally diverse flows. The sand and gravel industry developed within the valley to meet demand for the construction of roads, dams, jetties and railroads.

Today the river as it flows through the City of San Diego is a remnant of its past significance. As the City went through extensive growth following World War II, development began to move from the mesas and into the river valley itself. Until the 1950's the valley was still primarily agricultural land and served as place for relief from the burgeoning urban environment. Within two decades the valley was dramatically altered as the ranches, dairy farms and truck farms were replaced by highways, shopping centers, parking lots and offices. Sand and gravel mining already in the valley increased operations to meet the demands of the expanding development. Through this evolution, the river became treated not as a focus within the valley but rather an engineering and flood problem to be solved. Development has typically turned its back on the river, lining the stream corridor within loading docks, parking lots and roadway embankments. Land use laws have allowed development to occur within the floodplain, forcing the river into an increasingly channelized condition, reducing meander, groundwater recharge, sediment transport and water filtration. Uncontrolled urban runoff has further diminished the water quality of the river. These changes have effected the natural riparian habitat that once flourished in the valley, both in diminishing not only its extent, but its overall quality disrupting connection to the upland environment of the valley walls. Through this process much of the evidence of the river's historic value to the region has been lost. Kumeyaay rancheria sites have been developed as golf courses, the Mission flume disrupted and damaged, and other sites are threatened by development and damage from vandalism.

Prehistoric Land Use

The San Diego River valley was first settled about 7,000 to 2,000 years ago. Known as part of the La Jolla Complex, these people used the coast and the marshes of the San Diego River extensively, as hunting grounds and as sources for materials for shelter, tools and clothing. The valley is also believed to have served as a significant movement corridor between the coast and the mountains.

During the Late Prehistoric (Kumeyaay [Tiapi] Period, from circa 2,000 years ago to the Spanish era, at least three Rancherias existed along the river in what is now the City of San Diego, along with outlying camps and special use areas.

Opportunities and recommendations

Sense of Place at Mission San Diego de Alcalá and the Presidio (Nipaguay and Kosoi)
Rock Art sites (Mission Trails Regional Park)
Bedrock Milling sites within Mission Trails Regional Park
CowIes Mountain was a solstice and equinox observatory

Kumeyaay (tipai) Place Names Along the San Diego River

'Ewiiykaakap	Goes around (the rocks)
'Amotaretuwen	El Cajon
Sinyaweche	Descending woman-the hills as seen from the river along Mission Gorge
Nipaguay	Raanheria name for the San Diego Mission area
Kosoi	Rancheria name for the are from the foot of
Presidio	Hill on both sides of the river
Qujar	A placername for the area in general from the mission to the sea.
Paulpa	Ocean Beach area
Qapai	Ocean Beach to Point Loma area. Used to go to sea in canoe fi'om there

Opportunities and Recommendations

Use early place names to name places, and include in maps, graphics, and signage.

Historic Land Use

Spanish Period

First mission was developed on Presidio Hill in 1769 as part of the first Alta California presidio and settlement. Early leaders included Rivera y Moncada and Father Junipero Serra. In 1774, Mission San Diego de Alcalá moved near to the current site (but not exactly where it is today) overlooking the San Diego River valley at confluence with Alvarado Creek. During this period Mission San Diego de Alcalá was lead by Father Junipero Serra and Father Luis Jayme. To support the burgeoning population of both immigrating Spaniards and Natives converted to Christianity necessitated improvements to the efficiency of agricultural production and of obtaining an adequate and reliable water supply. To achieve the Mission Dam and Flume system were constructed during the period from 1813 to 1816. Additional water ditches (la zanjas) were built in Grantville and to supply Old Town during this period.

Mexican Period

Land Grants and Vaqueros (1821-1846)
- Pio Pico

Pueblo of San Diego (now Old Town)
- Juan Bandini
- Pio Pico
- Arguellos
- Estudillos

American Period

Derby Dike to divert the river (1855)
- George Derby
- Manuel Cota and Indian laborers

Farming and Ranching in the Valley
- Early Farms and Ranches
  - Sandrock Family
  - John Murphy (I 860-1870)
  - George and Jennie CoMes (1877)
  - Milton and Jennie (Cowles) Santee (1890)
- Japanese Track Farms

Dairy Industry
- Serano Allen Family (1885-1957)
- Ferraris
- Others

Sand and Mining Operations
- Fenton
- Hazard

Commercial and Retail
- Meat Packing Plants (Cudahay and others) in the Morena District
- Development of Highway 80 as east/west Corridor
- Motels associated with Highway 80
  - Town & Country Hotel (I959)
  - Le Baron Hotel (1967)
- Development of Mission VaIIey Center (circa 1958)
- Development of Fashion Valley
- Office Development

Recreational
- Early Use for Fishing and Swimming
- Duck Clubs and Hunting
- Horse Tracks
- Westgate Ball Park
- Golf Courses
- Hiking and Day Trips (Mission Dam, Spring Canyon)
- San Diego Jack Murphy Stadium (1967)

Opportunities and recommendations

Interpret recent historic uses and activities, emphasizing value of the river and its impetus to development within the valley. Graphics and maps could show previous land use with signage and interpretation linked to trails and hiking.

Transportation

El Camino Real
Railroad (AT&SF)
Highway 80
Highway 395 (163) [1949]
Early Bridges Across the River
Pike (Mission Bay) Airport
1-805 Bridge Structure (i972)

Recent History Place Names

(They tell a lot about the land and the people)

Older Place names

Sandrock Road (Texas Street)
Duckville
Cudahy Slough
BIood Alley (101)
Sixth Street Extension
Gravilla
Overlook
False (Mission) Bay
Fanita Ranch

Current Placenames

CowIes (kohls) Mountain (Black Mountain)
Dog Spring
Spring Canyon
GrantvilIe
Gravilla
Murphy Canyon
Murray Canyon
Alvarado Canyon
Adobe Falls
Mission Valley

Utilities Inventory

Utilities (Edits to be completed at a later date)

Existing utilities within the planning area present both constraints and opportunities. The constraints are primarily near-term issues, recognizing the need to plan proposed improvements around existing facilities, and to protect vital infrastructure. In the longer view, planning should guide the placement of utility corridors instead of the other way around. Opportunities will exist in the future for replacing aging facilities. At that time, replacement utilities should be sited in locations that are compatible with the Master Plan.

Major utilities include:

Sanitary Sewers

A trunk sewer and an interceptor sewer traverse the entire length of the planning area, aligned generally along the floor of the river valley. The location of these sanitary sewer systems relative to the actual river bed varies. In some places the sewer is in the riverbed. In other places, the sewer is in or near the bank of the river. In still others, the sewer is far removed from the river. In addition to the major sewer lines described below, numerous outfall sewers tie into the system, some of them beneath the river bed.

At the easterly City limits there are two sanitary sewer two pipes flowing to the west – the East Mission Gorge Interceptor (EMGI), a 42-inch diameter concrete pipe and the Mission Gorge Trunk Sewer (MGTS), a 48-inch diameter steel pipe. These two pipes are aligned between Mission Gorge road and the river. The EMGI follows the alignment of the Father Junipero Serra Trail and Mission Gorge Road. The MGTS is located in the valley floor, sometimes in and sometimes out of the river bed. The diameter of the MGTS in this reach varies from 36 inches to 42 inches. In the Grantville area the two pipes come together, becoming the North Mission Valley Interceptor (NMVI). The NMVI crosses the river at San Diego Mission Road and continues flowing west through Mission Valley, located along the north bank of the river. The NMVI is a concrete pipe, varying in diameter between 78 inches and 96 inches.

Also in Mission Valley, the South Mission Valley Trunk Sewer (SMVTS) flows westerly, south of the river. This pipe is generally aligned along Camino Del Rio North and Hotel Circle North, then along the river bank, through the baseball fields, then under Morena Boulevard and Interstate 5.

Both the NMVI and the SMVTS flow to the North Metro Interceptor Sewer (NMIS) which carries sewage south to the treatment plant in Point Loma. Near the San Diego River, the NMIS consists of two pipe systems. The easterly branch is a 108-inch diameter concrete pipe beneath Moreno Boulevard and Taylor Street. The westerly branch is a 96-inch diameter concrete pipe running along the west edge of Interstate 5, then south beneath Rosecrans Street. The westerly branch is fed by two sewer pipes crossing the river just west of Interstate 5. One pipe, an extension of the East Mission Bay Trunk Sewer, is 60 inches in diameter. The other is 72-inches in diameter. These two pipes join together south of Interstate 5, becoming to the westerly branch of the NMIS.

West of Interstate 5, a 14-inch diameter sludge line is located along the north bank of the river channel. This pipe crosses the river at Sunset Cliffs Boulevard.

The San Diego Aqueduct
The third and fourth pipelines of the 2nd San Diego Aqueduct cross the river within Mission Trails Regional Park north of Jackson Drive.

Water Transmission Pipelines
A number of water pipelines exist within the river valley. Of particular concern are those transmission facilities that cross the river including:

1. The Montgomery Pipeline, a 36-inch pipeline that crosses the river near the southerly end of the Admiral Baker Golf Course.
2. The Alvarado 2nd Pipeline, a 48-inch steel cylinder pipe that crosses the river east of Interstate 15.
3. A 16-inch iron pipe that crosses the river east of the stadium.
4. The Kearny Mesa Pipeline, a 36-inch steel cylinder pipe that crosses the river east of Interstate 805.
5. A 16-inch diameter asbestos cement pipe beneath Fashion Valley road.
6. A 16-inch diameter cast iron pipe that crosses the river at Morena Boulevard.
7. The Pacific Beach Pipeline, a 20-inch diameter pipe that crosses the river under West Mission Bay Drive.

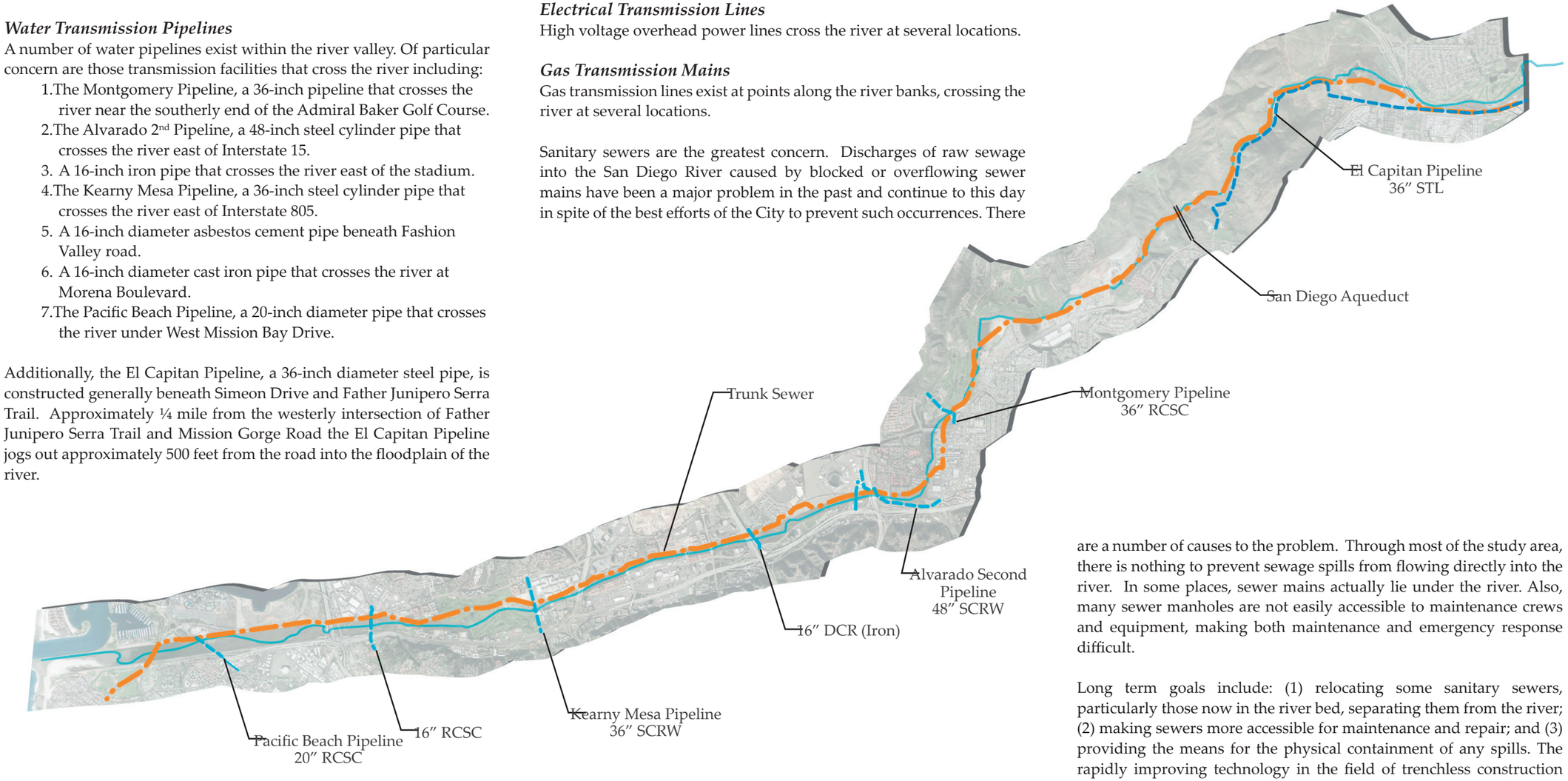
Additionally, the El Capitan Pipeline, a 36-inch diameter steel pipe, is constructed generally beneath Simeon Drive and Father Junipero Serra Trail. Approximately ¼ mile from the westerly intersection of Father Junipero Serra Trail and Mission Gorge Road the El Capitan Pipeline jogs out approximately 500 feet from the road into the floodplain of the river.

Fuel lines
Fuel lines cross the river east of the stadium and at Pacific Highway.

Electrical Transmission Lines
High voltage overhead power lines cross the river at several locations.

Gas Transmission Mains
Gas transmission lines exist at points along the river banks, crossing the river at several locations.

Sanitary sewers are the greatest concern. Discharges of raw sewage into the San Diego River caused by blocked or overflowing sewer mains have been a major problem in the past and continue to this day in spite of the best efforts of the City to prevent such occurrences. There are a number of causes to the problem. Through most of the study area, there is nothing to prevent sewage spills from flowing directly into the river. In some places, sewer mains actually lie under the river. Also, many sewer manholes are not easily accessible to maintenance crews and equipment, making both maintenance and emergency response difficult.



Long term goals include: (1) relocating some sanitary sewers, particularly those now in the river bed, separating them from the river; (2) making sewers more accessible for maintenance and repair; and (3) providing the means for the physical containment of any spills. The rapidly improving technology in the field of trenchless construction and tunneling should help make these goals attainable.

Most other utilities with the exception of the major high voltage electrical transmission lines and the aqueduct can be relocated as necessary to accommodate improvements as described in this Master Plan.

Transportation Inventory

Approach

This appendix examines a multi-modal view of the San Diego River Park's potential circulation issues; the inventory studies vehicular, pedestrian, bicycle and transit circulation. The Master Plan effort made use of previous studies that have been conducted in areas along or adjacent to the River corridor. It is particularly important to note that the San Diego River Park corridor and study area is influenced by circulation patterns that are not fully contained within the Master Planning Area, such as Interstates 5,8, 805 and 15, SR163, and Friars Road.

Corridor Description

The San Diego River Corridor is characterized by frequent interstate highway crossings and by several major roads running roughly parallel to the river corridor. I-5, SR-163, I-805 and I-15 alkl traverse the river within a 6-mile segment. A large number of arterial roadways also cross the river; these roadways include Sunset Cliffs Boulevard, West Mission Bay Drive, Morena Road, Fashion Valley Road, Mission Center Road, Camino Del Este, Qualcomm Way, Ward Road, San Diego Mission Road and Friars Road.

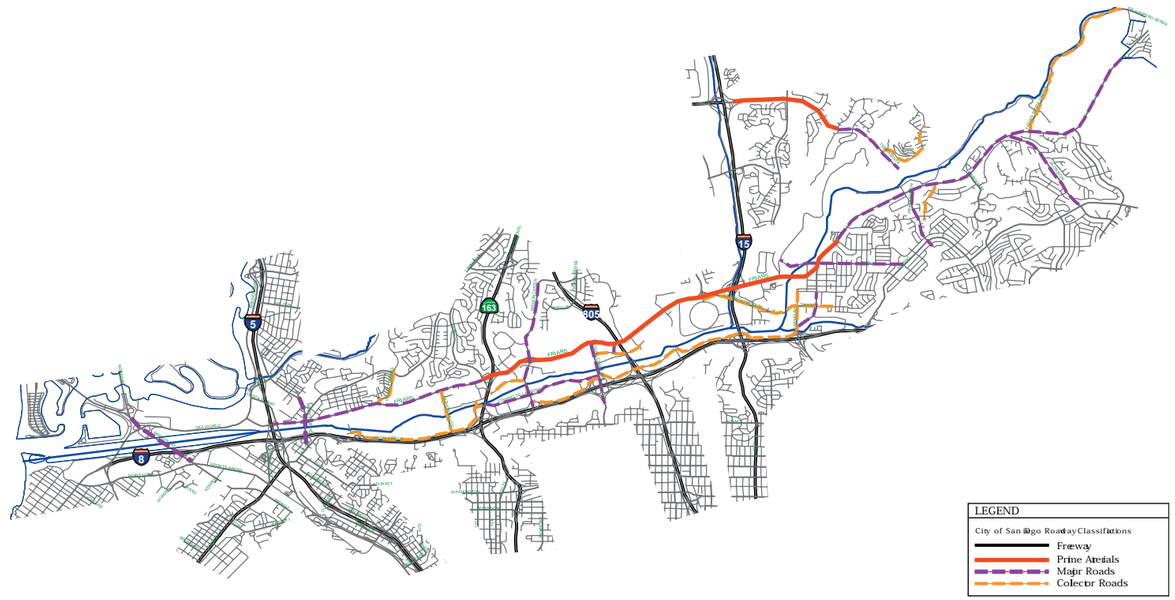
Friars Road runs roughly parallel to and north of the river before it links with Mission Gorge Road to the south of the river. Direct roadway access to the river is somewhat limited, with indirect or local road access being typical for most of the river corridor. The main exception is the access to Dog Beach and nearer the ocean.

Vehicular Circulation

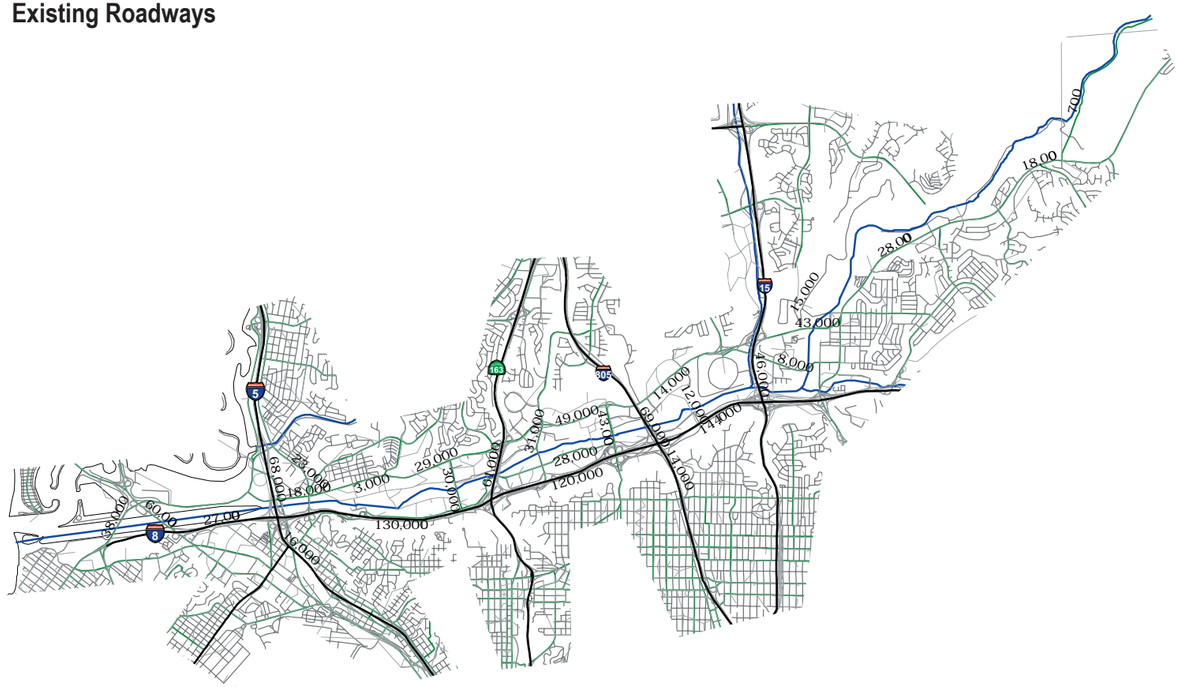
Roadway segments in the area generally operate at their optimal capacities, with the exception of Sports Arena Boulevard between I-8 and Midway Drive and Rosecrans/Camino Del Rio West between Midway and I-8/I-5 interchange. These segments and adjacent intersections are highly congested during peak hours.

The most significant circulation observation is the peak period congestion on road segments at or near the freeway interchanges. Congestion is particularly evident in the Mission Valley community on SR-163 I-805 on both sides of the river, including parts of Friars Road, Hotel Circle, Camino Del Rio and Rancho Mission Road.

I-8 and many of its interchanges also exhibit substantial congestion during peak hours; congestion extents to adjacent surface streets as they try to serve the east-west traffic unable to use I-8. Given the proximity of freeways to the river corridor, many users' prime access to the river and its amenities would be via these roadways, making river access extremely difficult during peak traffic periods.



Existing Roadways



Roadway Volume

Planned Roadway Improvements

SANDAG's Regional Transportation Plan for 2030 directs improvements to many freeways and major roads that cross or are in the immediate vicinity of the river. These plans include:

- **I-5**
  An additional 2 general traffic lanes and 2 HOV (High Occupancy Lanes) by 2020.
- **I-805**
  Add 4 Managed Lanes (lanes on which the number of vehicles using the facility be limited, and/or where the direction of the lanes can be changed, e.g. HOV lanes or toll roads) by 2030
- **SR-52**
  Add 2 general traffic lanes and 1 Managed Lane by 2030
- **Friars Road**
  Arterial modifications from Morena Boulevard to Fashion Valley Road

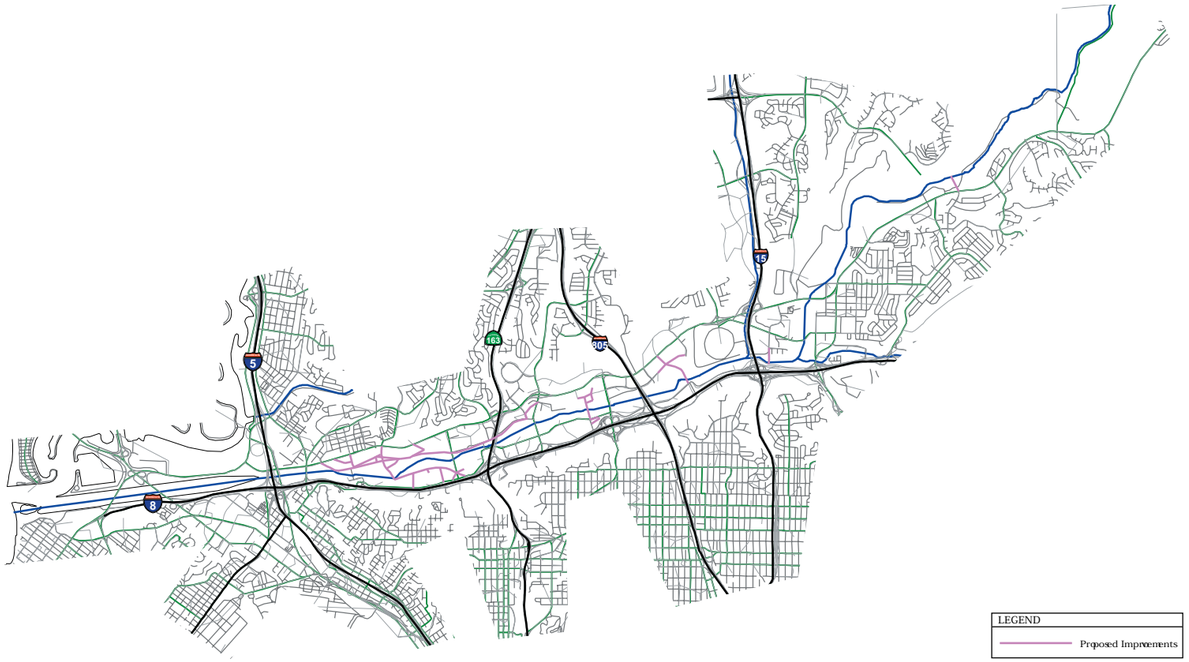
It should be noted that some other future road improvements are contested, subject to availability of funding or both. Proposals experiencing these constraints include:

- Via Las Cumbres which would connect Friars Road and Hotel Circle North near the Taylor/I-8 interchange
- Milley Way river crossing between I-805 and I-15
- Tierrasanta Boulevard connecting to Princess View
- Jackson Drive extending to the north

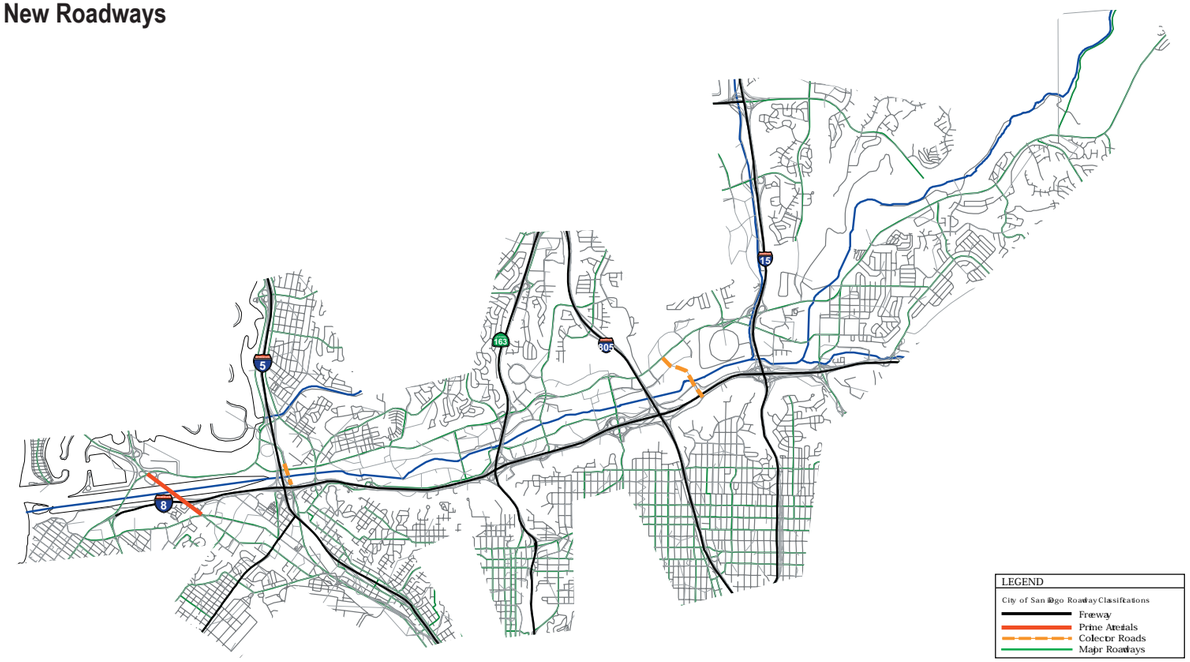
Pedestrian and Bicycle Circulation

Pedestrian access and facilities in the immediate vicinity of the river fall into two categories:

- Access via sidewalks adjacent to roads for vehicular access.
- Trails and dedicated facilities for pedestrians, cyclists and other non-motorized travel



New Roadways



Roadway Class Changes

Bikeways

Several types of bicycle facilities are provided in the study area. These facilities include:

- Class I (Bike Path or Trail)
  Completely separate right-of-way for the exclusive use of non-motorized travel.

- Class II (Bike Lane)
  Lane painted on the pavement for one-way, bicycle-only travel. Crossings by pedestrians and motorists permitted.

- Class III (Bike Route)
  Designated solely by signs or other such markings; shared with motorists and pedestrians.

A Class II Bike Lane is provided along Friars Road and Mission Gorge Road. A Class III Bike Route exists along a portion of Sea World Drive. A Class I Bike Path/Trail is also designated along Friars Road (from near Fashion Valley Road) and Sea World Drive, crossing the river at Sunset Cliffs Boulevard and continuing to the Ocean. Another Class I Bike Lane is in Mission Trails Regional Park, adjacent to the River for approximately 1.5 miles.

Transit Circulation

Several transit lines service the river corridor, connecting the river with most major destinations within San Diego. Options include bus service, trolley, and commuter rail.

The San Diego Trolley stops at many stations along the river corridor, including transit centers at Old Town, Morena/Linda Vista and Fashion Valley. The Old Town Transit Center offers convenient access to the San Diego Trolley, the Coaster and ten bus routes. The Metropolitan Transit Development Board (MTDB) provides the trolley service.

Both local routes and express routes run throughout the study area. Mission Valley is the community within the study area with the highest amount of bus service. The Metropolitan Transit Development Board (MTDB) provides the bus service.

The North County Transit District (NCTD) provides the Coaster service that links communities and travelers from Oceanside to San Diego, with additional stops in Carlsbad (2), Encinitas, Solana Beach, Sorrento Valley and Old Town.

Amtrak provides the regional Pacific Surfliner Route rail service from San Diego to San Luis Obispo. In the San Diego region, there are stations at San Diego (Santa Fe), Old Town (on weekends), Solana Beach and Oceanside.

Specific Recommendations Matrix with Benefits

The following pages outline the multiple benefits of each recommended action described in the Specific Reach Recommendations section. The benefits are organized into four general categories: Hydrology, Ecology, Recreation and Culture/Eduaction.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**EDUCATION**	
E1S	Remove lowered portion of jetty wall. Investigate feasibility of connection with appropriate engineering study. Barrier- Although not consistent with Mission Bay Master Plan, it has the potential to better integrate the bay and river hydrologically	Removal would expand estuary limits and reduce the impact of the channelization of the river, and may benefit the beaches by increasing sediment deposition from the river and may increase circulation in Bay. Potential concerns include the potential increase in sediment in the Mission Bay Channel and may effect water quality in the Bay.	if implemented, this action would support the goals of the MSCP by establishing habitat links between coastal lagoons and inland areas as a component related to the potential to connect the river and the Bay in the long term (Refer to E8L). Combined result brings increased estuarine function and value to Mission Bay.		Potential to be a component of a river delta pattern more consistent with historic, pre-development condition.	Suggested for feasibility study purposes only. Collaborate with appropriate community and special interest groups to initiate a feasibility study to explore the benefits and impacts of removing the jetty through hydrologic modeling and other methods. Potential to develop study through a joint science program related to the San Diego River.
E2S	Create San Diego River Park Trailhead and Waystation at Dog Beach. Maintain Dog Beach as an off-leash recreational destination and community asset	Increase awareness of estuarine hydrologic function through interpretation.	Interpretation of habitat value, use and function for shorebirds and other wildlife will increase awareness of estuarine function and wildlife habitat and balance the impact of the dog park.	Provide a gateway and introduction to the SDRP. Provide a starting point and staging for users of the San Diego River Park multi-use trail. Cultivate awareness of the San Diego River, The San Diego River Park, estuarine ecology, the river's history, and the San Diego River Park multi-use trail.	Introduce and interpret the historic activities of Native Americans on the beach and estuary, the significance of river and valley to the origins of San Diego and as a transportation corridor to the uplands,	Collaborate with appropriate community and special interest groups to install signage, interpretive kiosks and furnishings in vicinity to provide information about estuarine function, wildlife habitat and trail system. Throughout the San Diego River Park signage, kiosks, and furnishings should be unified by a continuity of materials and graphics while also reflecting the adjacent environment and neighborhoods. Link Trailhead and Waystation to existing bike lanes, bike routes, and trails in Ocean Beach, Point Loma, and Mission Beach.
E3S	Coordinate with Mission Bay to support marsh restoration that is underway.		Restoring marsh will expand estuarine wildlife habitat.		Interpret unique habits, sensitivities and characteristics of estuary function, wildlife habitat and seasonal nesting requirements for sensitive species.	Collaborate with Mission Bay Park to install signage in vicinity to provide information about estuary function and wildlife habitat.
E4S	Create San Diego River Park Trailhead and Waystation and historic and natural interpretation zone at Robb Field.			Opportunities for staging and access to the San Diego River Park multi-use trail. Provide interpretation that cultivates awareness of the San Diego River for recreational users of Robb Field.	Interpret Native American use of beach, creation of Derby Dike, historic river delta pattern, estuary and natural hydrologic condition, and San Diego River Park Trail.	Collaborate with appropriate community and special interest groups to install signage, interpretive kiosks and furnishings in vicinity to provide information. Coordinate with Community Plans in future to integrate park and river trail. Unify interpretive signage, furnishings, and construction with other San Diego River Park projects Maintain Robb Field as multi-use recreational complex, and expand in future as community recreation needs increase.
E5S	Explore potential to improve and expand connection of the Famosa Slough with the San Diego River estuary. Investigate feasibility of augmenting the connection with appropriate engineering study. Potential conflict with Famosa Slough Master Plan.	Improving connection will increase extent of functioning tidal marsh area. The study may reveal that an increased tidal exchange in the Slough may create a more desirable result than existing conditions.	Improving connection will expand estuarian habitat and promote fish, bird and terrestrial habitat connections.	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Collaborate with Mission Bay and Friends of Famosa Slough to initiate feasibility study to explore benefits and impacts of replace existing culvert with larger structure and to improve trail connectivity between the San Diego River Park Trail and Famosa Slough. Consider linking existing Famosa Slough trail with the existing Class I Bike Path. Increase passive park areas into new river alignment and/or new link with Famosa Slough.
E6S	Create estuary overlooks along the San Diego River Park Trail, separated from trail system and at estuary surface level.		Creating overlooks will increase awareness of estuarine function, wildlife habitat and value.	Opportunity to experience the unique expanse of space of the estuary and for quiet relief from active trail and noise of highways.	Interpret hydrologic function of estuary and estuarian plant and animal species. Introduce physiography of Mission Bay as part of the San Diego River delta.	Collaborate with Mission Bay to develop, design, and select specific locations for interpretive overlooks on both the north and south sides of the San Diego River estuary. Sites for consideration: Famosa Slough, Mission Point, historic confluence of Tecolote Creek and the San Diego River, estuary restoration projects, and Sports Arena (Bay to Bay Bridge). Sites for consideration: Linda Vista Village and YMCA in the Lower Valley Reach.

RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Short Term	**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
E7S Develop temporary multi-use programs for under-utilized lands that are proposed for other future uses.		Potential to establish native plant nurseries as a temporary land use to support restoration efforts in the corridor and to supplement habitat. May also serve as a site to conduct phyto-remediation research.	Temporary recreation events could be held in underutilized open spaces. This site could also be considered for use as an active recreation park with viewpoints, markers, overlooks and a naturalized buffer along estuary edge. Link to Class I Bike Paths to the east and west.		Collaborate with appropriate community and special interest groups to explore opportunities to fully utilize land for ecologic, educational and recreational uses.
E8S Explore potential to create a new park with a connection to the river and neighborhood as the Sports Arena redevelops. If possible, expand river into this area similar to Famosa Slough.					As the Sports Arena redevelopment plans move forward, seek opportunities to engage with the process to integrate those plans with the San Diego River Park by creating trail connections, installing interpretive kiosks, and potentially a Community Park.
E9S Improve trail and open space connection between Tecolote Canyon and Mission Bay.					Collaborate with appropriate community and special interest groups to explore potential to relocate Fiesta Island dike with a bridge located north of Tecolote Creek. Explore potential to reconstruct I-5 and railroad crossings over Tecolote Creek with larger bridges or culverts that can accommodate pedestrian movement. Explore potential to acquire parcels such as the tennis courts and trailer park area or implement conservation easements to allow for grade separated trail and habitat connection between canyon and bay. Consider Class I Bike Path in riparian channel, and link to proposed (Plan Report City of San Diego Bicycle Master Plan) Class I Bike Path adjacent to Coaster right-of-way.
10S Create connection between the San Diego River Park and the San Diego Bay.					Implement Class 2 and Class 3 Bikeways along Rosecrans Street and Taylor Streets as proposed by the Plan Report City of San Diego Bicycle Master Plan
E11S Continue San Diego River Park multi-use trail east of the I-5					Coordinate with Community Plan, North Bay Redevelopment Plan and San Diego Bicycle Master Plan. Reference Plan Report City of San Diego Bicycle Master Plan and Mission Valley Bikeway Feasibility Study. Path alignment proposed by this report differs from those alignments at west edge of Sefton Park.
E12S Establish Green Gateway at interchange of I-5 / I-8.		Re-vegetate rights-of-way and open space adjacent to freeways and major roadways with appropriate native vegetation. Visually these gateways will counterbalance the overwhelming presence of the existing highway infrastructure. Functionally these gateways will provide additional habitat and connectivity between the riparian corridor and the adjacent upland areas.			Initiate dialogue with Caltrans, City of San Diego Streets and Community Plans to explore the methods for implementing native plant palette in rights-of-ways. Where appropriate, identify existing undeveloped parcels contiguous with rights-of-way and explore potential to acquire or establish open space easements to expand connectivity of Green Gateways.

RECOMMENDATION		BENEFITS				IMPLEMENTATION STRATEGY
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
13S	Create a Waystation, Trail Connection and naturalized open space between Old Town / Presidio Park and the river corridor.		Utilize existing public lands to support the Green Gateway concept. Explore opportunities with Caltrans to expand support of River Park goals.	Waystation and open space will provide a recreational link between Old Town and the San Diego River Park. Waystation staging area will provide access to the San Diego River Park multi-use trail and public transportation. Links Old Town/ Presidio Park with Mission Valley Preserve and Mission Bay Park. Waystation will serve as a portal to coastal communities along the San Diego River Park.	Potential to interpret historic value of the river valley to establishing Old Town and the Presidio as well as its historic flood activities.	Initiate dialogue with Transportation Department to create shuttle links from trolley at Old Town/ Linda Vista and Ocean Beach/ Sea World/ Mission Beach. Prepare detail design study for waystation, trail connections, bicycle staging, and exploration of shuttle links.
14S	Connect Morena Blvd. Bikeway and San Diego River Park multi-use trail.			Connecting the bikeway and multi-use trail will provide a safe and simple bicycle connection to the San Diego River Park from neighbors north and south.		Coordinate with San Diego Bicycle Master Plan. Study feasibility of connecting (future) Morena Blvd... bridge Bikeway (per Plan Report City of San Diego Bicycle Master Plan) and proposed San Diego River Park multi-use trail at south edge of Morena Blvd. bridge. The Bikeway is at street level; the multi-use trail is down in the river valley.
15S	Support and build upon access and interpretation zone at Mission Valley Preserve.			Access to the Mission Valley Preserve from the San Diego River Park multi-use trail provides an opportunity for interpretation and increases awareness.	Interpret historic Old Town, Presidio and Rancheria of Cosoy, as well as estuary function and physiography of coastal plain and terraces .	As San Diego River Park Trail is implemented, develop trailhead with signage, interpretive kiosks and furnishings.
16S	Create connection between the San Diego River Park and adjacent neighborhoods to the north.			Improving the connections from Bay Park, Linda Vista, and San Diego University will increase recreational use of the San Diego River Park.		Coordinate with San Diego Bicycle Master Plan and develop detail study to confirm specific alignment. Coordinate with Mission Valley Community Plan to include in update as amendment. Implement Bikeway along Morean Blvd... to Taylor Street as proposed by the Plan Report City of San Diego Bicycle Master Plan. Improve connection of existing Class I Bike Path (from East Mission Bay Drive to Fashion Valley Road) to Morena Blvd. and to Linda Vista Trolley Station.
17S	Mission Bay Park Interface					Coordinate with appropriate community groups for the Mission Bay Park Master Plan and South Shores General Development Plan to ensure appropriate park and river interaction.
18S	Maintain Dog Beach as an off-leash recreational destination and community asset.					Support appropriate community and special interest groups to manage Dog Beach and integrate it with the San Diego River Park.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Long Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
E1L	As Sea World may evolve in the future, encourage redevelopment that engages San Diego River Park and estuary and creates trail connection to San Diego River Park Trail.		Potentially expand estuarian habitat.	Connect San Diego River Park Trail to provide access to Sea World, linking tourist attractions and hotels along the river corridor.		Collaborate with Sea World to engage in re-development process to create awareness of the goals of the San Diego River Park. Encourage better connections and access, use of native vegetation, education about the river, and integration of Sea World as one of the linked ameneties of the San Diego River Park.
E2L	Explore potential to realign and terrace river edge.	Reducing channelization encourages additional stream meander, increase extent of functioning tidal marsh area, improving water quality and increasing flood capacity.	Expands estuarian habitat and diversifies range of habitat based on additional topography.	Realign bike path along North side of channel and create pedestrian trail.		Collaborate with appropriate community and special interest groups to initiate feasibility study to modify the river channel embankment.
E3L	Explore potential to expand estuary boundaries.	Reducing channelization encourages additional stream meander, increase extent of functioning tidal marsh area, improving water quality and increasing flood capacity.	Expands estuarian habitat and diversifies range of habitat based on additional topography.	Realign bike path along North side of channel and create pedestrian trail.		Collaborate with Mission Bay Park to initiate feasibility study to modify the river channel embankment and expand estuary environment.
E4L	Explore potential to collaborate with creating greenway connection with San Diego Bay.		Potentially create some expanded habitat connections by building upon Green Gateway, aggregating public lands and rights-of-way. Refer to Lateral Connections in General Notes.	Create multi-use path and open space link to San Diego Bay and bike paths to south.		Collaborate with North Bay Redevelopment as it evolves.
E5L	Create connection to Sports Arena.					Collaborate with North Bay Redevelopment. Plan to locate and plan potential pedestrian bridge over I-8 and other joint porjects
E6L	Coordinate with Mission Bay Master Plan to consider modifications to Mission Bay and Tecolote Treatment Wetlands Plan.	Existing study indicates that removing dike to Fiesta island does not adequately improve flows in Mission Bay to eliminate stagnant water.	Collaborate with Mission Bay Master Plan to explore opportunities to increase estuarine habitat in Mission Bay near the River.			Collaborate with appropriate community and special interest groups to extend feasibility study to explore the potential to create estuarine link between Mission Bay and the River. Such a study should consider potential to explore replacing dike to Fiesta Island with a bridge to improve flows in Mission Bay.
E7L	Investigate potential for locating a River and Estuary Interpretive Center that supports the Mission Bay Park Master Plan inerpretive program.		Promote awareness and experience of natural function and form of Mission Bay as part of river delta, function of estuary and relationship to Tecolote Canyon.			Initiate dialogue with appropriate community and special interest groups to explore potential to consider another location for the Nature Center or to develop an additional Interpretive Center associated with the river and estuary.
E8L	Collaborate with Mission Bay and Land Fill Study to explore the potential to expand estuary by connecting the San Diego River with Mission Bay.	Increases extent of functioning tidal marsh area and could allow river flow into Mission Bay, potentially increasing water movement within the Bay.	Restore estuarine function and value to Mission Bay.		Potential to reestablish Mission Bay as part of the San Diego River delta pattern.	Collaborate with Mission Bay to initiate feasibility study to create an estuarine link between Mission Bay and the San Diego River. Extensive study and modeling will be required to fully understand the impact of linking the River and the Bay on flows and water quality. Engage the Mission Bay Landfill Study in the process. Could be explored through a joint science coalition.
E9L	As Robb Field is improved in the future, create a landscape that relates to estuary and river edge.		Reinforce river character and expand native riparian and upland landscapes.			Coordinate with Community Plans and Park and Recreation Department plans for future improvements.
E10L	Broaden river channel and meander throughout Mission Valley Preserve.	Increases potential river meander, improving water quality and reducing flooding impact.	Expand estuarian and riparian habitat and diversify fish, bird and terrestrial habitat connections to Mission Bay. Old burn site; Residue is hazardous in Mission Valley Preserve.	Old burn site; Residue is hazardous in Mission Valley Preserve.	Potential to interpret historic patterns of river delta and development of landfill.	Collaborate with Mission Bay Master Plan. Opportunity to partner with determining disposition of landfill and expand potential benefit and purpose.
E11L	Create major San Diego River Park access node at Linda Vista and integrate with potential Green Gateway at I-5 and Friar's Road.					Coordinate with Community Plans to identify sites and land owners to explore potential acquisition or to establish easements for access and interpretive trail head locations.
E12L	Create new multi-use trail on north side of river.			Connect trolley stations. Connect along Linda Vista Road and Morena to Tecolote. Trial connection Tecolate could be through estuary or along old PCH.		Coordinate with San Diego Bicycle Master Plan.

RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Long Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
L1S	Separate stream from ponds and increase stream meanders.	Improve stream dynamic, water quality, groundwater recharge and reduce flooding.	Expand aquatic, riparian and upland habitats. Create upland habitat areas within floodway. Refer to general notes regarding naturalizing floodplain areas.		Interpret natural stream processes.	Coordinate Sefton Fields, YMCA, and Metropolitan Transit Development Board to explore potential to aggregate land for multiple use open space and create joint open space for expanding river corridor. Initiate specific study to develop design concept.
L2S	Explore potential to develop Neighborhood Park. Engage River Walk Golf Course land owner in discussion to explore options to extend trail along trolley corridor, to modify river edges in golf course in the short term, and to modify proposed development plan in the long term.		Redesign trail for compatibility with river or relocate. Create upland habitat areas within floodplain. Refer to General Notes on naturalizing floodplain areas. Coordinate ball fields in potential park to better relate to the river and habitat.	Potential to partner with YMCA to relate recreational and educational events to the river. Creating a Neighborhood Park at YMCA and Sefton Fields will increase Mission Valley's compliance with park standards established by the city's General Plan.		Engage land owner to discuss potential for land acquisition or easement for trail connection. Current use is parking / storage. Possible archaelogic value to the site. Coordinate with San Diego Bicycle Master Plan and Riverwalk GC owner. Engage bicycle master planners in process to explore potential revised alignment through Riverwalk GC. Initiate dialogue to explore long term intent and potential of land to accommodate park and/or trails. Coordinate with Mission Valley Community plan to include alignment and buffer in plan update as amendment.
L3S	Explore potential to acquire under-developed land site.			Potential to coordinate with link to Old Town with additional pedestrian trail on south side of Sefton Park.		Engage land owner to discuss potential for land acquisition or easement for trail connection. Current use is parking / storage.Possible archaelogic value to the site.
L4S	As stadium redevelops, engage developers to integrate open space connections between San Diego River Park and canyons.					Coordinate with City of San Diego and stadium developers to create a plan that engages the river and adjacent canyons. Coordinate with Mission Valley Community Plan to include an update as an amendment.
L5S	Create historic interpretation zone adjacent to trail.			Linking the multi-use trail and interpretative zone will enhance the recreational experience	Interpret Rancheria of Cosoy, agriculture in valley, El Camino Real and valley as movement corridor.	Engage land owner to discuss potential for land acquisition or easement for trail connection and interpretive waystation. Integrate with trail implementation project.
L6S	Not used					
L7S	Not used					
L8S	Create open space and trail connection upland communities.		Trail connections to side canyons with native vegetation will benefit upland habitat and wildlife movement between open spaces.	Improve pedestrian access between upland neighborhoods and river corridor.		Coordinate with San Diego Bicycle Master Plan and Mission Valley Community Plan to identify specific route alignment.
L9S	Establish Green Gateway at interchange of I-8 and SR163.		Improve visual and wildlife habitat continuity across the valley. Refer to general notes regarding Green Gateways.			Initiate dialogue with Caltrans, City of San Diego Streets and Mission Valley Community Plan to explore the methods for implementing native plant palette in rights-of-ways and undeveloped easements.
L10S	Connect existing Class I Bike Paths to the east and west of Highway 163.			Connecting the San Diego River Park multi-use trail (Class I Bike Path) below Highway 163 strengthens the contiguousness of the multi-trail and improves the recreation experience in the San Diego River Park.		Implement Class I Bike Path below Highway 163 north of the river as proposed by the Plan Report City of San Diego Bicycle Master Plan.
L11S						
L12S	Explore potential to connect FSDRIP bike trails across intersections with grade separated crossings.			Improve continuity of bike path. Eliminate necessity for pedestrians and bicycles to move to traffic signal to cross street at Mission Center Road and Camino del Este. Existing crossings are awkward and hazardous. Improved crossings are important to improve continuity of multi-use trail.		Follows proposed alignment pf Class 1 Bikeway in accordance with San Diego Bicycle Master Plan. Initiate dialogue with Bicycle Master Planners and City of San Diego Streets.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Long Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
L13S	Improve open space connection between Murray Creek and river valley by daylighting Murray Creek within existing right-of-way. Daylight Murray Canyon drainage and create wetland and natural filtration zone.	Improve water quality in river by treating stormwater runoff from Murray Canyon and adjacent development in vegetated swales.	Potential to expand upon Green Gateways and connect wildlife habitat .	Potential to create interpretive waystation and trail connection between river corridor and upland neighborhoods.		Initiate dialogue with Caltrans and land owners to explore means of effecting development in progress and integrating creek cor-ridor into future evolution of existing development.
L14S	Create trail connection from Mission City Trolley Station to Qualcomm Way.			Integrate bicycle trails and trolley system.		Coordinate with San Diego Bicycle Master Plan and Mission Valley Community Plan to identify specific route alignment.
L15S	Utilize existing underpass as a means of connecting to neighborhoods and canyon north of Friar's Road.					Support City of San Diego and property owners in effort to improve underpass entrances. Provide lighting and potential better pedestrian connections to the underpass.
L16S	Mission City Parkway Bridge Mitigation Site. Integrate new riparian and sage scrub habitat restoration with San Diego River Park and trail.					Coordinate with public entities and community groups.
17S	Establish Green Gateway at interchange of I-8 and I-805 and at interchanges of I-805 and Friars Road.		Improve visual and wildlife habitat continuity across the valley. Refer to general notes regarding Green Gateways.			Initiate dialogue with Caltrans, City of San Di-ego Streets and Mission Valley Community Plan to explore the methods for implementing native plant palette in rights-of-ways and undeveloped easements.
18S						
19S	Explore potential to acquire some or all of undeveloped land.	Acquistion or easement would create adequate space to increase river channel width and create meanders.	Opportunity to expand aquatic, riparian and create upland habitat areas within floodway. Refer to general notes regarding naturalizing floodplain areas.	Potential to include undeveloped land as part of river park through acquisition or open space dedication.		Engage land owners in dialogue to explore potential to acquire land or to create open space easements. Coordinate with Mission Valley Community Plan to include in update as amendment.
20S	Improve trail experience. Add trail (class 1) in conjunction with Qualcomm redevelopment.			Create waystation near library and stadium. Create views and access to river and trail, linking trolley, stadium and library.		Coordinate with San Diego Bicycle Master Plan.
21S	River Garden site. This undeveloped land parcel adjacent to river corridor has great potential to be incorporated into San Diego River Park.					
22S	Potential Heritage Farm Site, creating historic agriculture interpretive site and community garden and create connections to surrounding areas.		Potential to include native plant nursery with farm / garden.	Link with multi-use trail on south side of river.	Interpret valley agriculture history at community garden. Include interpretive center to enhance ecological and cultural awareness.	Collaborate with San Diego River Park Founda-tion to support Heritage Farm project and with San Diego Bicycle Master Plan to integrate trail connectivity.
23S	not used					
24S	not used					

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RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Short Term	**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
25S Create bike path connection to San Diego River Park Trail from Bachman Place, Camino de la Reina and Avenida del Rio.			Provide a safe bike crossing to San Diego River Trail alignment from Balboa Park, Hillcrest and Mission Hills.		Coordinate with San Diego Bicycle Master Plan and develop specific study to confirm route alignment.
26S As stadium redevelops, engage with developer and planner to develop a community park and additional naturalized open space with the San Diego River Park.			Mission Valley Community Plan objective is to create a 20 acre Community park with active recreation. Incorporate naturalized park area between trolley and river. Consider structural turf-system as dual use of overflow parking and active play fields).		Coordinate with City of San Diego and stadium developers to create a plan that engages the river and adjacent canyons. This is a key site in the Lower Valley Recommendations, refer to the preceding pages for additional detail and potential planning alternatives. Coordinate with Mission Valley Community Plan to include an update as an amendment.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Long Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
L1L	Engage land owners to encourage future redevelopment of Riverwalk GC to address river.		Expands wildlife habitat and improves habitat connectivity.	Shared habitat and trail connection between Presidio and river park, linking tourist and recreation amenities with hotels.	Create views to river and access from development.	Initiate dialogue with land owners to encourage modifications to current plan to include 300' habitat buffer for river, river meander, native vegetation and San Diego River Park Trail corridor.
L2L	Connect to Presidio Park via Taylor Street bridge over I-8.		Expands wildlife habitat and improves habitat connectivity.	Shared habitat and trail connection between Presidio and river park, linking tourist and recreation amenities with hotels.		Initiate dialogue with Caltrans to explore potential to improve pedestrian component of the Taylor Street bridge to better accomodate pedestrians and bicyclists.
L3L	Improve trail connections between river corridor and canyons.			Connect existing pedestrian trail in canyon through City of San Diego Open Space with river corridor. Seek easement at the Mission Valley end of trail and explore potential trailheads/ staging areas feasible at both ends.		Coordinate with San Diego Bicycle Master Plan to incorporate trail linkages.
L3L	Improve Mission City Parkway over crossing to connect river corridor and upland open space					Initiate dialogue with Caltrn to explore potential to imprve Mission City Parkway bridge over I-8 to connect people to uplands.
L5L	Create open space and trail connections to uplands via an improved Texas Street.					Coordinate with City of San Diego and the San Diego Bicycle Master Plan to improve Texas Street and create a dedicated bicycle trail with a naturalized open space corridor.
L6L	Remove flow restrictions as part of a new vision for FSDRIP.	Reestablish stream flow to restore sediment transfer potential of river system, improving water quality and ground water recharge through increased stream meanders.	Riparian habitat is increased by increasing channel width. By improving all at-grade crossings in Mission Valley with bridges to allow for grade separated trail and habitat connections along the river corridor and to canyons and tributaries.			Initiate feasibility study, Refer to L9L.
L7L	Create trail and open space connection to Balboa Park.		Expand native plantings to expand upland habitat connection from river valley to Balboa Park.	Create multi-use trail connection between river park and Balboa Park to enhance and encourage use of bicycle and pedestrian transportation. Create bicycle link to Balboa Park along 163 or via Buchanan Canyon.		Coordinate with San Diego Bicycle Master Plan and Caltrans to identify potential trail alignment. Initiate feasibility study to identify specific trail alignment.
L8L	Engage landowners to explore potential to create urban park oriented to the river on both sides of river.		Balance impacts of urban edge by doubling the width of the habitat corridor on the opposite side of the river.	Union Tribune site could offer opportunity to expand river park corridor.		Initiate dialogue with land owners and developers to explore potential to orient development to the river and create a quasi-public urban park edge to the river associated with retail uses.
L9L	In the long term, explore the potential and methods needed to recreate the FSDRIP area as a component of a functional river environment.	Reestablish stream flow to restore sediment transfer potential of river system, improving water quality and ground water recharge through increased stream meanders.	Riparian habitat is increased by increasing channel width. By improving all at-grade crossings in Mission Valley with bridges to allow for grade separated trail and habitat connections along the river corridor and to canyons and tributaries.		Reestablish a river pattern that is closer to the historic river environment.	Initiate feasibility study to explore alternative scenarios to FSDRIP that improve the river environment and separate stream flow from ponds and improves wildlife habitat and trail experience.
L11L	Implement bike path as part of the San Diego River Park Trail.		Combine trail with expanded native vegetation to improve habitat connectivity throughout the valley.	Realign Class I Bike Path to follow meander of stream. Link to existing trolley stop. Potential neighborhood park site adjacent to river and trolley stop.		Coordinate with San Diego Bicycle Master Plan to identify specific alignment and implementation priority.
L12L	Relate and connect open space in development plans with the river corridor.					Initiate dialogue with land owners and developers to integrate design process with the San Diego River Park.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
C1S	Create San Diego River Park Trail along north edge of river.					Coordinate with San Diego Bicycle Master Plan, Grantville re-development study and Mission Valley Community Plan to study potential an to identify specific route alignment of potential multi-use trail on north side of the river.
C2S	Improve open space and trail connection with Alvarado Canyon.			Creates visual and physical connection from river corridor to Alvarado Canyon and Adobe Falls, Kensington and University, Create multi-use bridge near Mission.		Coordinate with San Diego Bicycle Master Plan and Mission Valley Community Plan to study potential an to identify specific route alignment of potential multi-use trail on south side of Alvarado Creek. Coordinate with public agencies to explore potential to aggregate public lands under a single management.
C3S	Augment ponds by removing barriers between sections. A larger deep water body is better than a number of smaller, divided segments. If possible, divert low flow of river around the ponds.			Potential to improve the open space and trail connection to the Grantville Redevelopment Area.		Coordinate with Granteville re-development study and Mission Valley Community Plan to identify potential for open space easements or land aquisition to increase open space on east edge of ponds.
C4S	Coordinate with proposed Grantville redevelopment to create improved open space at the bend in the river.	Future benefit when implemented in long term.	Future benefit when implemented in long term.	Creates potential active / passive recreation site at confluence with connection to San Diego River Park Trail. Park program could include picnicking, bicycle staging area, interpretive element and parking.	Potential to interpret confluence of Alvardo Creek and the San Diego River.	Initiate dialogue now with Grantville Redevelopment Study to identify potential land for park use through acquisition or open space easements.
C5S	Develop city owned property as wetlands habitat preserve. Potential for CalTrans property to be developed for habitat and areas for the San Diego River Park Trail.					Integrate Caltrans property as part of riparian open space.
C6S	Create San Diego River Park Trail along east edge of river.					Coordinate with San Diego Bicycle Master Plan, Grantville re-development study and Mission Valley Community Plan to study potential an to identify specific route alignment of potential multi-use trail on east side of the river if land can be acquired. Identify location for pedestrian bridges crossing the river and creating connection to Mission San Diego de Alacala. If land cannot be acquired study alternative alignment on west side of river.
U1S	Coordinate with proposed Grantville redevelopment to preserve additional open space along river and at confluence with Alvarado Creek.	Future benefit when implemented in long term.	Future benefit when implemented in long term.			Initiate dialogue now with Grantville Redevelopment Study to identify potential land for habitat, trail and recreation through acquisition or open space easements. Coordinate with Navajo Community Plan.
U2S	Engage Navy planners to explore potential to create habitat and continuous multi-use trail near river.	Future benefit when implemented in long term.	Future benefit when implemented in long term.			Coordinate with Navajo Community Plan.
U3S	Remove exotic vegetation and plant native species.					Coordinate with land owners to develop vegetation management program along the river and on developed property. Exotics to be removed include Giant Reed (Arrundo) Pampas Grass, Eucalyptus, Brazilian Pepper, Castor and Water Primrose.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
U4S	Collaborate with redevelopment of Superior Mine to create interpretation zone of valley history, mining operations, and future redevelopment where appropriate at edge of active operation.				Interpret Mission Dam Flume, milling sites and history of extraction industry.	Initiate dialogue with Superior Mine land owners and planners to explore potential to create interpretive kiosk in the short term.
U5S	Engage land owner and ongoing planning effort to explore potential to acquire land as improved open space.		Increases open space, visual and wildlife habitat connections with canyons and Allied Gardens neighborhood.			Initiate dialogue with Superior Mine land owners and planners to explore potential to acquire land or establish open space easements to create a significant open space and/or park somewhere within the undeveloped land in addition to a 500' habitat corridor, broaden the river channel with potential to create meander, and a continuous multi-use trail.
U6S	Engage land owner to develop plan remove exotic vegetation, optimize and restore quality of riparian corridor.		Removing exotic species and plant native vegetation improves habitat quality and connectivity. Extends habitat connection west from Mission Trails Regional Park.			Coordinate with land owners to develop vegetation management program along the river and on developed property.

RECOMMENDATION		BENEFITS					IMPLEMENTATION STRATEGY
Long Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**		
C1L	Implement open space identified through Grantville Redevelopment Plans to improve habitat and recreation.	Increased open space could create adequate space to accommodate a broader river channel, increased river meander separate from pond.	Increased open space could create a functional wildlife habitat corridor through this constrained section of the river valley between Friar's Road and I-5.	Existing condition is very constrained, and San Diego River Trail may require terracing to continue through the confluence reach without acquistion of additional land area.			Explore potential to acquire land or establish open space easements to create adequate space to continue San Diego River Park and Trail. If land is acquired, initiate specific development plan for the San Diego River Park and Trail.
C2L	Create trail connection to Mission San Diego De Alcala and interpretive zone and to Rancho Mission Road to Friar's Road.			Connect to Mission, pedestrian only on North and West side.	Interpret Mission and importance of river to its location along the San Diego River Park Trail.		Coordinate with the San Diego Bicycle Master Plan and Community Plans to identify specific alignment and establish easement. Explore opportunities with willing land owners to establish public access.
C3L	Implement trail and open space plans						Prepare specific plan for design of trail alignment and natural open space as land or easement is acquired
U1L	Implement potential Grantville Redevelopment Plan to improve trail and habitat connection to Alvarado Canyon.	Potential to improve water quality through expanded native vegetation filtration.	Potential to improve wildlife connectivity through expanded open space..	Potential to connect Alvarado Canyon, Adobe Falls and University to river corridor. Consider new trolley stop near confluence of Alvarado and the river with shared parking with Urban Village Redevelopment.			Prepare specific plan for design of trail alignment, natural open space and daylighting Alvarado Creek
U2L	Continue to collaborate with Navy planners to integrate Admiral Baker Golf Course with the river to create expanded riparian corridor and habitat and trail connections.	Improve stream condition of Alvarado Creek confluence to increase channel width and potential meander to improve water quality and ground water recharge.	Explore opportunity to improve ecological compatibility of golf course with river and create habitat connections with canyons. If course were to redevelop, consider "links" approach with natural vegetation between tees, landing sites and holes.	Create waystation. with access to river corridor and bus node at Mission Gorge Road at Admiral Baker Park.			Initiate dialogue with land owners on both sides of river to establish easements or acquire land to create trail and habitat continuity. Coordinate with Navajo Community Plan.
U3L	Improve open space and trail connection to East Murphy Canyon north of Admiral Baker Golf Course.		Refer to General Notes regarding Lateral Connections.	Consider new neighborhood park with redevelopment, providing active and passive recreation in open space parks in canyons and hillsides. Consider ecologically oriented resource park as component of the San Diego River Park in the floodplain. Any park provided fro military housing would be recommended. Connection could follow Santo Road alignment or east end of golf course.			Continue dialogue with Navy planners and Superior Mine land owners and planners to identify potential locations.
U4L	Engage land owners in process to separate stream flow from ponds as land is redeveloped.	Increase channel width and meander to improve water quality, sediment transport, flood control capacity and ground water recharge, Explore potential to use pond water to create pulse flows in river.	Expand riparian habitat.				Continue dialogue with Navy planners and Superior Mine land owners and planners to identify potential locations.
U5L	As Superior Mine redevelops, implement ground work that encouraged plan to focus on river corridor and to create riparian habitat and multi-use trail as component of redevelopment plan.		Refer to General Notes regarding Lateral Connections.	Creates continuity of San Diego River Park Trail.	Interpret extraction industry, reclamation and restoration, the history of the river and valley, and the efforts of the San Diego River Park Foundation.		Continue dialogue with Superior Mine land owners and planners to integrate the San Diego River Park and Trail with proposed development.
U6L	If land is acquired, develop improved open space with views and access to ponds as habitat and recreation areas.	Increased open space could create adequate space to accommodate a broader river channel, increased river meander separate from ponds.	Expanded open space increases wildlife habitat and habitat connectivity.	Potential for natural open space and passive recreation park somewhere within this area.			Continue dialogue with Superior Mine land owners and planners to integrate the San Diego River Park and Trail with proposed development.
U7L	Connect soft trail with Tierrasanta neighborhood and potential new park.			Trail connection will create access to the River Park from Terrasanta.			Coordinate with Navajo Community Plan and Tierrasanta residents as potential park sites are identified.
U8L	Connect to proposed recreation and open space outside river corridor.		Expanded open space increases wildlife habitat and habitat connectivity.	Build connectivity with other open space areas. Natural areas proposed in the Navajo Community Plan should consider compatibility with natural topography and native vegetation. Potential uses include, hiking, biking and non-vehicular camping.	Potential to interpret canyon topography and inter-relationships of canyons and the San Diego River. Introduce river to upland communities.		Coordinate with Navajo Community Plan to connect with proposed natural open space area.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
G1S	Support Mission Trail Regional Park effort to establish a continuous trail system.					Continue dialogue with Mission Trails Regional Park Master Plan and Citizens Advisory Committee.
G2S	Support Mission Trails Regional Park to create multi-use and soft surface trail connections to Father Junipero Serra Trail.		Design trails to contain bicyclists and pedestrians on designated trails to minimize impact on sensitive wildlife habitat	Ensure continuity of River Park trail system through Mission Trails Regional Park. Soft surface trail potential within the park. Explore potential to create paved trail in right-of-way of Mission Gorge road to connect to FJS Trail or create over or underpasses.		Continue dialogue with Mission Trails Regional Park Master Plan and San Diego Bicycle Master Plan to identify potential alignments within Park and along Mission Gorge Road.
G3S	Support existing habitat management practices within Mission Trails Regional Park.	Native vegetation improves filtration and water quality.	Ensure native habitat value along the River.			Continue dialogue with Mission Trails Regional Park Master Plan and Citizens Advisory Committee.
G4S	Support existing and proposed interpretation of the river and history of the park at Mission Trails Visitor and Interpretative Center				Build upon interpretation of significance of river to settlement of region.	" "
G5S	Support existing interpretation of the river and the history of valley at campground and Kumeyaay lakes.				Build upon interpretation of significance of river to settlement of region.	" "
G6S	Support the implementation of the Old Mission Dam Dredging Capital Improvement Project.					" "
G7S	Support the implementation of the Kumeyaay Lakes Dredging and Berm Restoration Capital Improvement Project.	Explore the potential to reintroduce sediment excavated above dam into the river system downstream to invigorate sediment transport process.			Provides for historic interpretation of the Dam, ensures structural integrity of historic dam, and could potentially provide source for sediment downstream if reintroduced into system.	" "
P1S	Create San Diego River Park Trail segment.			Provide continuous multi-use trail under SR-52 and through or adjacent to Carleton Oaks course that will connect to City of Santee trail system.		Initiate dialogue with golf course owners and City of San Diego to identify potential trail alignment adjacent to golf course. Initiate dialogue with Caltrans and golf course owners to identify potential alignment and methods to create trail connection under SR-52 and West Hills Blvd..
P2S	Create historic interpretation zone.				Interpret significance of the River to historic settlement at confluence of San Diego River and Santee Lakes as gateway to City of San Diego segment of River Park.	Install signage, interpretive kiosks and furnishings.
P3S	Capitalize on existing tree galleries in golf course to create buffer along river and remove exotic vegetation from river corridor.	Native vegetation buffer between river channel and golf course will filter runoff and improve water quality.	Native vegetation will expand and improve riparian wildlife habitat and habitat connectivity. Removal of exotic species will also reduce seed source limiting dispersal into Mission Trails Regional Park.			Initiate dialogue with golf course owners and City of San Diego to explore potential to evolve golf course edge toward native plant species and to develop a vegetation management plan.
P4S	Create San Diego River Park Trailhead, as a gateway to San Diego at Carlton Oaks Golf Course. Coordinate with City of Santee to create habitat and trail connection to Santee Lakes and to Mast Park.				Provide continuous multi-use trail.	Initiate dialogue with City of Santee planners, golf course owners and City of San Diego to identify potential trail alignment, vegetation changes, and kiosk/trailhead location.

RECOMMENDATION		BENEFITS				IMPLEMENTATION STRATEGY
Long Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
G1L	Continue to support maintenance of the Old Mission Dam Dredging. This project may need to reoccur in the future on a regular basis.	If sediment can be reintroduced below dam some sediment transport can be reestablished.			Provides for historic interpretation of the Dam, ensures structural integrity of historic dam, and could potentially provide source for sediment downstream if reintroduced into system.	Explore the potential to develop a low impact approach to sediment removal that will allow small amounts of sediment to be reintroduced the river system downstream to invigorate sediment transport process.
G2L	Collaborate with Mission Trails Regional Park to create waystation at edge of Mission Trails Region Park with interpretive information.			In long term, creates opportunity for rest stop on trail at edge of Mission Trails Regional Park.	Interpret Mission Dam Flume, cultural history and natural habitat of Mission Trails Regional Park.	Install signage, interpretive kiosk and furnishings with implementation of San Diego River Park Trail segment through Superior Mine.
P1L	Explore potential to connect with new open space to north and east.	Preserving open space will maintain filtration of runoff and protect water quality.	Preserving open space will protect wildlife habitat and habitat connectivity.	Plan for active recreation facilities commensurate with new East Elliot development.		Monitor future action related to land acquisition and explore opportunities to create wildlife habitat and trail linkages.
P2L	If golf course use were to change in the future, entire site should be preserved for natural open space with a neighborhood scale park as a gateway to the San Diego River Park.	Creating natural open space will maintain filtration of runoff and protect water quality.	Creating natural open space will protect wildlife habitat and habitat connectivity.	Introduces River Park and creates strong interface with City of Santee		Monitor future action related to potential land use change.
P3L	Explore potential to realign some golf holes to eliminate dike, recreate stream meander and to incorporate multi-use trail.	Improves river hydrologic function and water quality.	Expands riparian habitat.	New multi-use trail is critical to continuity of River Park, potentially along south edge of new meandering and braided stream with connections to Santee, Navajo, Lake Murray.	Waystation - Upper river, reservoirs, topography, communities, Gateway to San Diego.	Initiate dialogue with City of San Diego and Carleton Oaks Golf Course to establish trail corridor.
P4L	Integrate secondary stream channel through golf course with main San Diego River channel and create buffer.	Natural buffer will improve water quality by filtering runoff from golf course.	Natural buffer will expand wildlife habitat and improve connectivity.			Initiate dialogue with Carleton Oaks Golf Course to identify methods to modify golf course to be more environmentally compatible with river corridor.

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Recommended Plant Species

Native Habitat Species

Re-vegetation / habitat areas

Rl riparian - lower mixed willow woodland (to marsh line)
Ru riparian - upper mixed willow woodland
C/css chaparral / coastal sage scrub upland

Trees - riparian

Platanus racemosa	California Sycamore	ru	deciduous tree
Populus fremontii	Fremont Poplar	ru	deciduous tree
Quercus agrifolia	Coast Live Oak	ru, c/css	evergreen tree
Salix gooddingii	Black Willow	rl	deciduous tree
Salix hindsiana	Sandbar Willow	rl	deciduous tree
Salix laevigata	Red Willow	rl	deciduous tree
Salix lasiolepis	Arroyo Willow	rl	deciduous tree
Sambucus mexicana	Desert Elderberry	ru	deciduous tree

Salix Lasiolepis
http://ic.ucsc.edu/~wxcheng/wewu/

Shrubs / groundcovers / grasses / vines

Artemisia douglasiana	Douglas Wormwood	ru, c/css,	woody perennial
Artemisia palmeri	Palmer's Sagewort	ru, c/css,	woody perennial
Artemisia californica	California Wormwood	c/css	drought-deciduous
Baccharis pilularis	Coyote Brush	c/css	evergreen shrub
Carex spissa	San Diego Sedge	ru	grass
Dudleya pulverulenta	Chalk Lettuce	c/css	succulent
Encelia californica	California Encelia	c/css	woody perennial
Eriogonum fasciculatum	Flat-top Buckwheat	c/css	shrub/perrenial
Eriophyllum confertiflorum	Yarrow	c/css	perennial
Heteromeles arbutifolia	Toyon	c/css	evergreen shrub
Isocoma menziesii	Goldenbush	c/css	evergreen shrub
Juncus mexicanus	Mexican Rush	rl	evergreen rush
Keckiella cordifolia	Heart-Leaved Penstemon	ru, c/css	perennial
Lonicera subspicata	San Diego Honeysuckle	c/css	evergreen vine
Malosma laurina	Laurel Sumac	c/css	evergreen shrub
Mimulus puniceus	Red Monkeyflower	c/css	woody perennial
Mirabilis californica	Wishbone Bush	c/css	evergreen shrub
Muhlenbergia rigens	Deer Weed	c/css	grass
Prunus ilicifolia	Holly-Leaf Cherry	c/css	evergreen tree
Rhamnus californica	Coffeeberry	c/css	evergreen shrub
Rhus integrifolia	Lemonade Berry	c/css	evergreen shrub
Ribes indecorum	White-Flowered Currant	c/css	deciduous shrub
Rosa californica	California Wild Rose	ru	deciduous shrub
Salvia mellifera	Black Sage	c/css	drought-deciduous
Sisyrinchium bellum	Blue-Eyed Grass	c/css	perennial
Typha spp.	Cattail	rl	marsh

Encelia californica
http://www.laspilitas.com/plants

Baccharis pilularis
http://www.coestatepark.com

Mimulus puniceus
http://www.sci.sdsu.edu/plants/sdpls/plants/Mimulus_aurantiacus.html

Viguiera lanata	Woolly-Leaf Sunflower	c/css	drought-deciduous
Vitis girdiana	Wild Grape	ru	deciduous vine
Yucca whipplei	Chaparral Yucca	c/css	succulent

Buffer Species

Br buffer - riparian
Bu buffer - upper riparian and chaparral transition

Trees

Platanus racemosa	California Sycamore	br	deciduous tree
Populus fremontii	Fremont Poplar	br	deciduous tree
Quercus agrifolia	Coast Live Oak	br, bu,	evergreen tree

Shrubs / groundcovers / grasses / vines

Artemisia californica 'montara ridge'	Dwarf California Wormwood	bu,	evergreen shrub
Artemisia californica	California Wormwood	bu	evergreen shrub
Baccharis 'centennial'	Centennial Baccharis	bu	evergreen shrub
Baccharis pilularis	Chaparral Broom	bu	evergreen shrub
Ceanothus griseus horizontalis	Carmel Creeper	bu	evergreen shrub

Mirabilis californica
http://www.santabarbarahikes.com/flowers

Rhus integrifolia
http://www.calflora.net/bloomingplants

Vitis girdiana
http://www.sbs.utexas.edu/deathvalley/plants/vitispag.htm

Ceanothus hybrids	Hybrid Ceanothus	bu	evergreen shrub
Dendromecon harfordii	Island Bush Poppy	bu	evergreen shrub
Dendromecon rigida	Bush Poppy	bu	evergreen shrub
Encelia californica	California Encelia	bu	deciduous shrub
Erigeron glaucus	Compact Beach Aster	bu	perennial
Eriogonum fasciculatum	Flat-top Buckwheat	bu	shrub/perennial
Eriogonum fasciculatum 'dana point'	Hybrid Dwarf Buckwheat	bu	evergreen shrub
Galvezia speciosa	Bush Island Snapdragon	bu	evergreen shrub
Heteromeles arbutifolia	Toyon	bu	evergreen shrub
Iris douglasiana	Pacific Coast Iris	br, bu,	perennial
Juncus patens	Rush	br	rush
Keckiella cordifolia	Heart-Leaved Penstemon	br, bu,	evergreen shrub
Lobelia laxiflora	Red Cardinal Flower	br, bu,	perennial
Lonicera subspicata	San Diego Honeysuckle	bu	evergreen vine
Malosma laurina	Laurel Sumac	bu	evergreen shrub
Mimulus puniceus	Red Monkeyflower	br, bu,	shrub/perennial
Mirabilis californica	Wishbone Bush	bu	evergreen shrub

Quercus agrifolia
http://www.coestatepark.com
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Muhlenbergia rigens	Deer Weed	bu	grass
Prunus ilicifolia	Holly-Leaf Cherry	bu	evergreen shrub
Prunus lyonii	Catalina Island Cherry	bu	evergreen shrub/tree
Rhamnus californica	Coffeeberry	bu	evergreen shrub
Rhus integrifolia	Lemonade Berry	bu	evergreen shrub
Ribes indecorum	White-Flowered Currant	br, bu,	deciduous shrub
Rosa californica	California Wild Rose	br	deciduous shrub
Salvia clevelandii 'allen chickering'	Allen Chickering Sage	bu	evergreen shrub
Salvia greggii 'salmon'	Salmon Autumn Sage	bu	evergreen shrub
Salvia greggii 'white'	White Autumn Sage	bu	evergreen shrub
Salvia leucophylla 'pt. Sal spreader'	Hybrid Purple Sage	bu	evergreen shrub
Salvia mellifera 'repens'	Prostrate Black Sage	bu	evergreen shrub
Salvia mellifera 'tera seca'	Tera Seca Sage	bu	evergreen shrub
Salvia 'winifred gilman'	Winifred Gilman Sage	bu	evergreen shrub
Sisyrinchium bellum	Blue-Eyed Grass	bu	perennial
Viguiera lanata	Woolly-Leaf Sunflower	bu	shrub/perennial
Vitis girdiana	Wild Grape	br, bu,	deciduous vine
Woodwardia fimbriata	Giant Chain Fern	br, bu,	fern

Dendromecon harfordii
http://www.theodorepayne.org

Urban Species

All plants are California-native or cultivated hybrids of natives, except those marked with asterisk (*).

Trees

Platanus racemosa	California Sycamore	deciduous tree
Populus fremontii	Fremont Poplar	deciduous tree
Quercus agrifolia	Coast Live Oak	evergreen tree

Shrubs / groundcovers / grasses / vines

Agave spp.*	Agave	succulent
Aloe spp*	Aloe	succulent
Anisodontea hybrids*	Cape Mallow	evergreen shrub
Arbutus unedo, arbutus u. 'Compacta'*	Strawberry Tree	evergreen shrub
Artemisia californica 'montara ridge'	Dwarf calif. Wormwood	evergreen shrub
Baccharis 'centennial'	Centennial Baccharis	evergreen shrub
Baccharis pilularis ssp.consainguinea	Chaparral Broom	evergreen shrub
Ceanothus griseus horizontalis	Carmel Creeper	evergreen shrub
Ceanothus hybrids	Hybrid Ceanothus	evergreen shrub
Cistus spp*	Rockrose	evergreen shrub
Dendromecon harfordii	Island Bush Poppy	evergreen shrub
Dendromecon rigida	Bush Poppy	evergreen shrub
Encelia californica	California Encelia	deciduous shrub
Erigeron glaucus (and hybrids)	Compact Beach Aster	perennial
Eriogonum fasciculatum 'dana point'	Hybrid Dwarf Buckwheat	evergreen shrub
Galvezia speciosa	Bush Island Snapdragon	evergreen shrub
Helictotrichon sempervirens*	Blue Oat Grass	grass
Heteromeles arbutifolia	Toyon	evergreen shrub
Iris douglasiana	Pacific Coast Iris	perennial
Juncus patens	Rush	rush

Salivia clevelandii 'allen chickering'
http://www.laspilitas.com

Lavandula spp*	Lavender	perennial
Lavatera bicolor*	Bush Mallow	evergreen shrub
Keckiella cordifolia	Heart-Leaved Penstemon	evergreen shrub
Lobelia laxiflora	Red Cardinal Flower	perennial
Malosma laurina	Laurel Sumac	evergreen shrub
Mirabilis californica	Wishbone Bush	evergreen shrub
Muhlenbergia lindhamaerii*	Deer Grass	grass
Muhlenbergia rigens	Deer Grass (native)	grass
Prunus ilicifolia	Holly-Leaf Cherry	evergreen shrub
Prunus lyonii	Catalina Island Cherry	evergreen shrub
Rhamnus californica 'eve case'	Coffeeberry	evergreen shrub
Rhus integrifolia	Lemonade Berry	evergreen shrub
Rosmarinus officianalis*	Rosemary	evergreen shrub
Salvia clevelandii 'allen chickering'	Allen Chickering Sage	evergreen shrub
Salvia greggii*	Autumn Sage	evergreen shrub
Salvia leucophylla 'pt. Sal spreader'	Hybrid Purple Sage	evergreen shrub
Salvia mellifera 'repens'	Prostrate Black Sage	evergreen shrub
Salvia mellifera 'tera seca'	Tera Seca Sage	evergreen shrub
Salvia 'winifred gilman'	Winifred Gilman Sage	evergreen shrub
Sisyrinchium bellum	Blue-Eyed Grass	perennial
Vitex agnus-castus*	Chaste Tree	deciduous shrub
Vitis girdiana	Wild Grape	deciduous vine
Westringia rosmariniformis*	Coast Rosemary	evergreen shrub
Woodwardia fimbriata	Giant Chain Fern	fern

Sisyrinchium bellum

http://www.laspilitas.com

Platanus racemosa

http://www.coestatepark.com

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