Appendices

Appendices

a. Existing Conditions
b. Hydrology and Water Quality Inventory
c. Habitat and Wildlife Inventory
d. Recreation Inventory
e. Historic and Cultural Resources Inventory
f. Utilities Inventory
g. Transportation Inventory
h. Recommendation Benefit Matrices
i. Recommended Plant Species
j. Glossary
k. References

Existing Conditions

Introduction

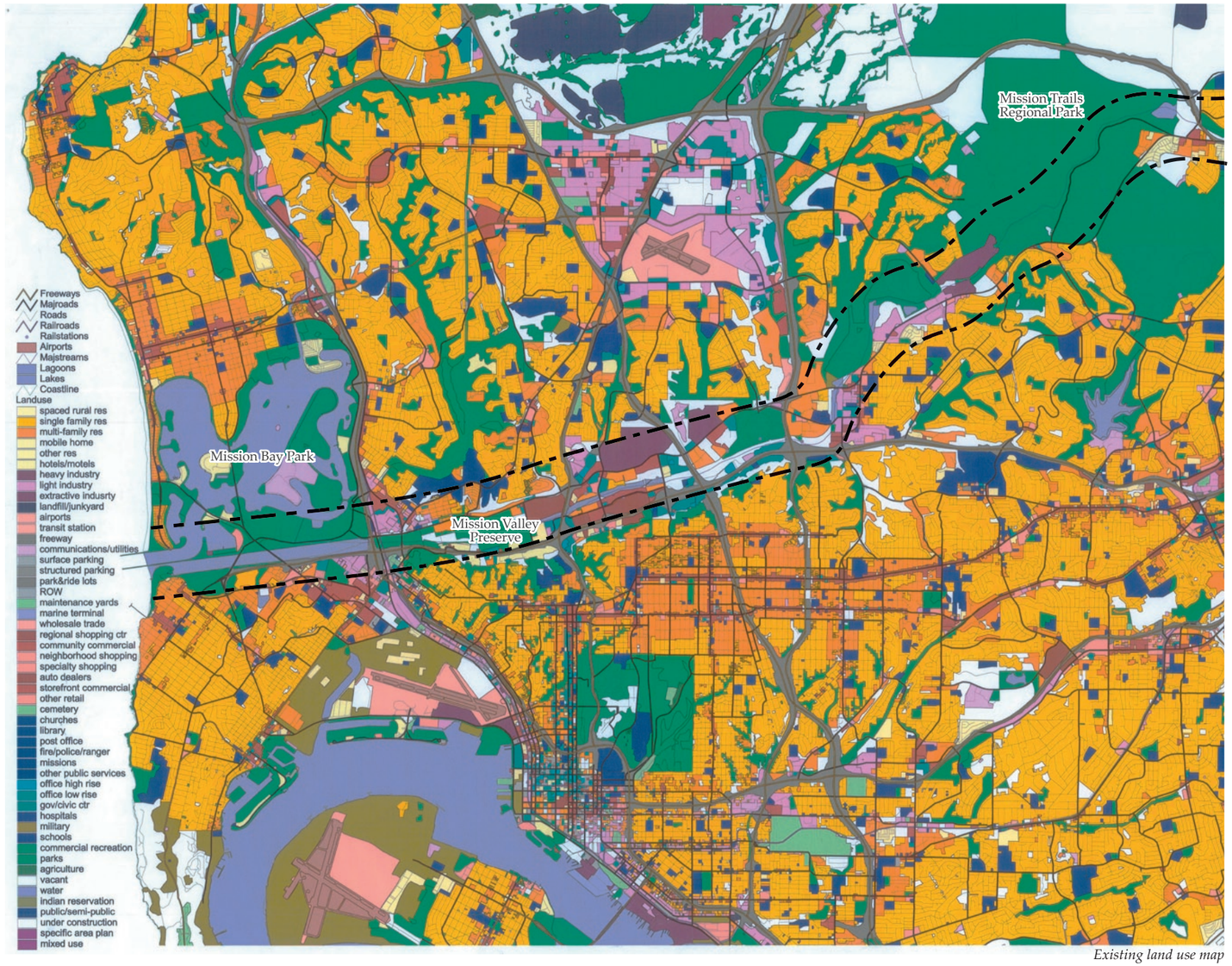
The San Diego River within the boundaries of the City of San Diego exists as a series of diverse habitats, bookended by two major parks, Mission Bay Park and Mission Trails Regional Park. Between these two large open spaces, the river has been impacted and severely altered by mining, flood control and increasing development pressure. These impacts have compromised the integrity of the River and the wildlife habitat it supports.

Land Use

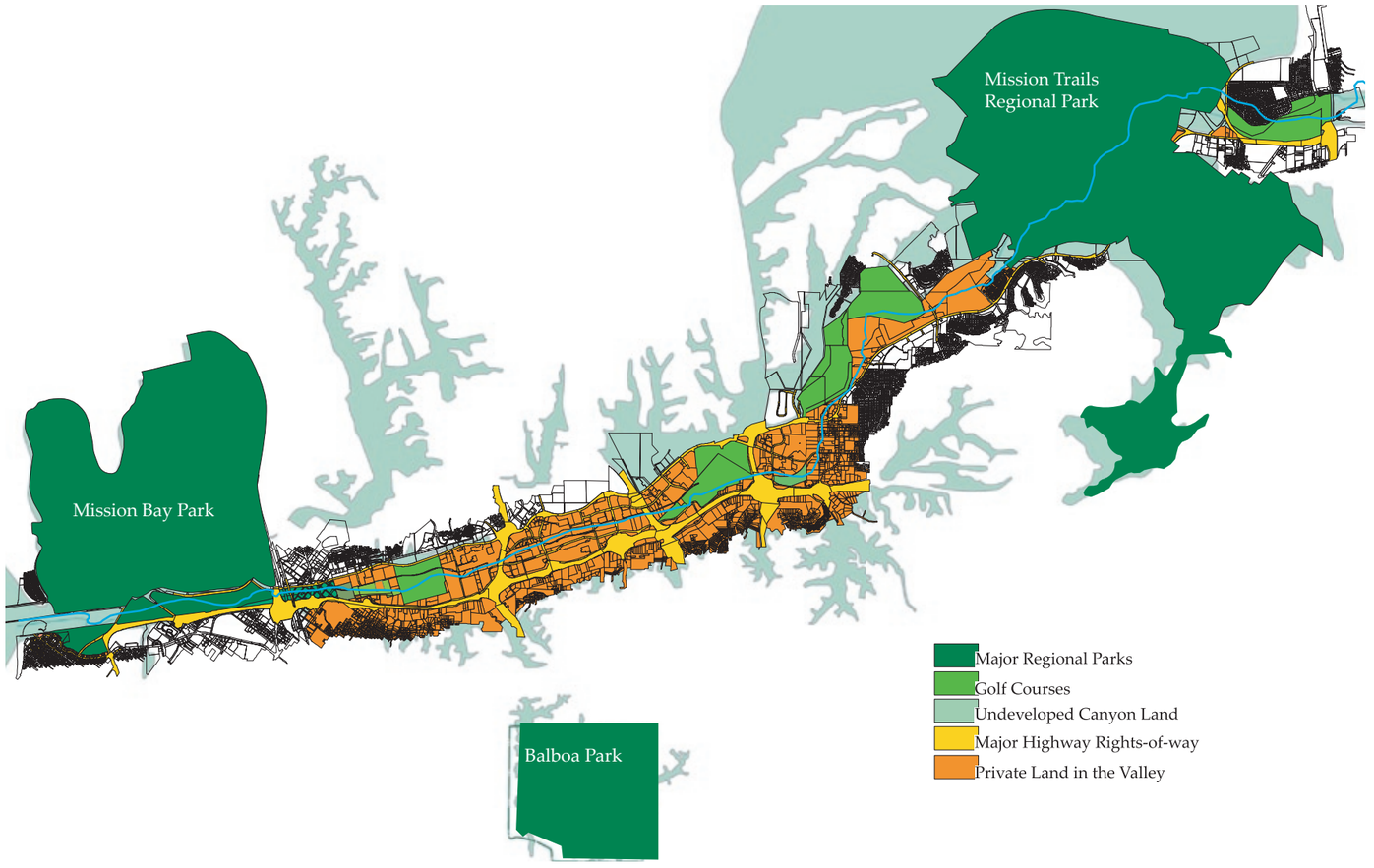
Constrained by private development, utility rights-of-way and industrial uses, the San Diego River has been impacted by channelization, levees and dams, resulting in intermittent flooding of the private development that have been constructed within the floodplain. The study area land use includes significant areas of open space in the major parks and preserves, but the areas within Mission Valley are primarily in commercial and transportation uses.

Safety and Security

Today, many sections of the river corridor are perceived as unsafe. Dense stands of arrundo and other vegetation limit visibility and movement. A significant population of homeless people exists in the river corridor from Ocean Beach to the Santee city limits, with concentrated pockets throughout Mission Valley, particularly where vegetation is most dense. The presence of the homeless adds to the perception of the river in the valley as a threatening environment. The San Diego Police Department has been focusing on the crime problem since October 2004. The department is currently considering the possibility of calculating crime statistics for the San Diego River Park Corridor to determine the impact of their focussed efforts. A dramatic decrease in property crimes is anticipated as a result of their current operation.



Existing land use map



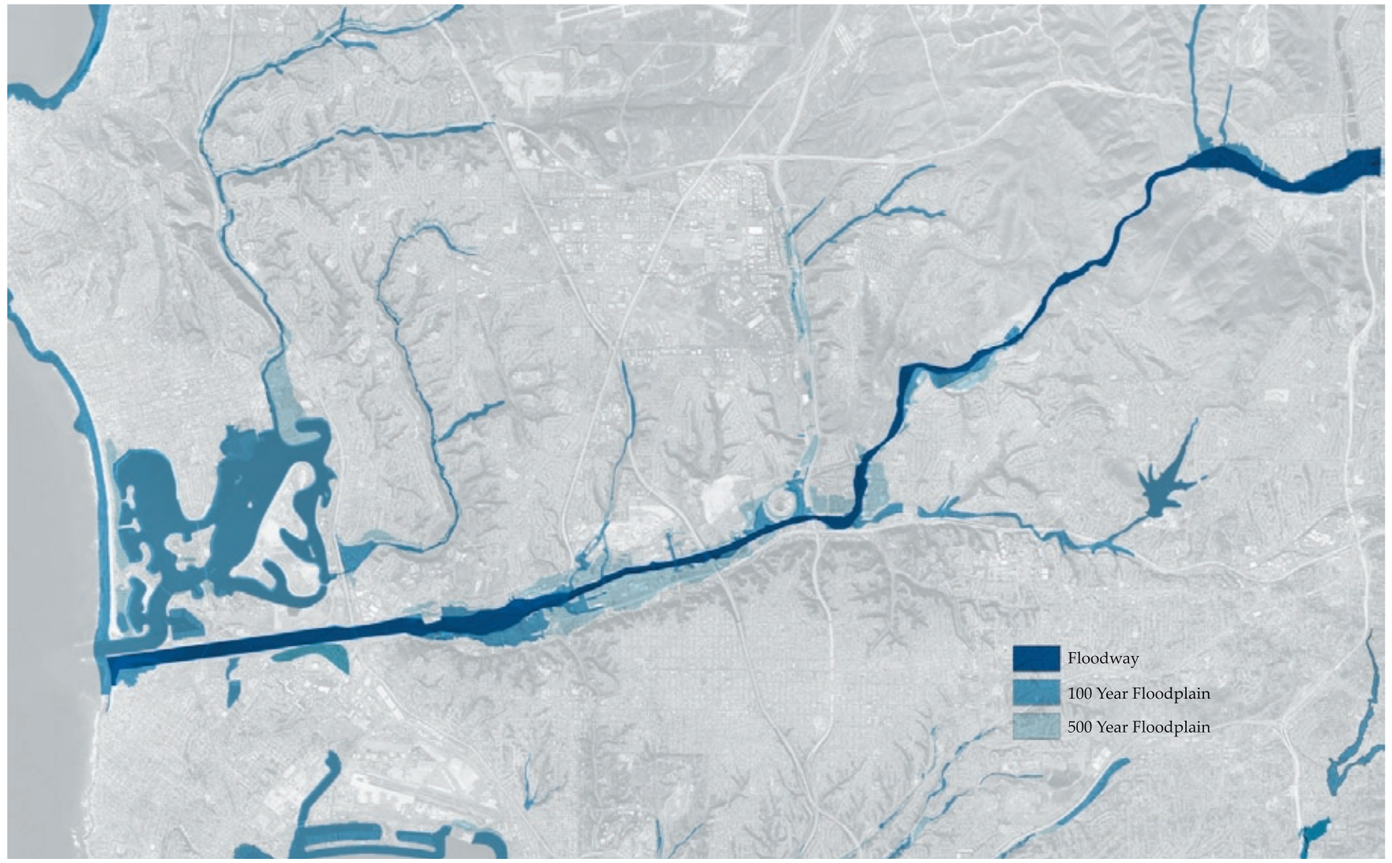
Existing land ownership

Land Ownership

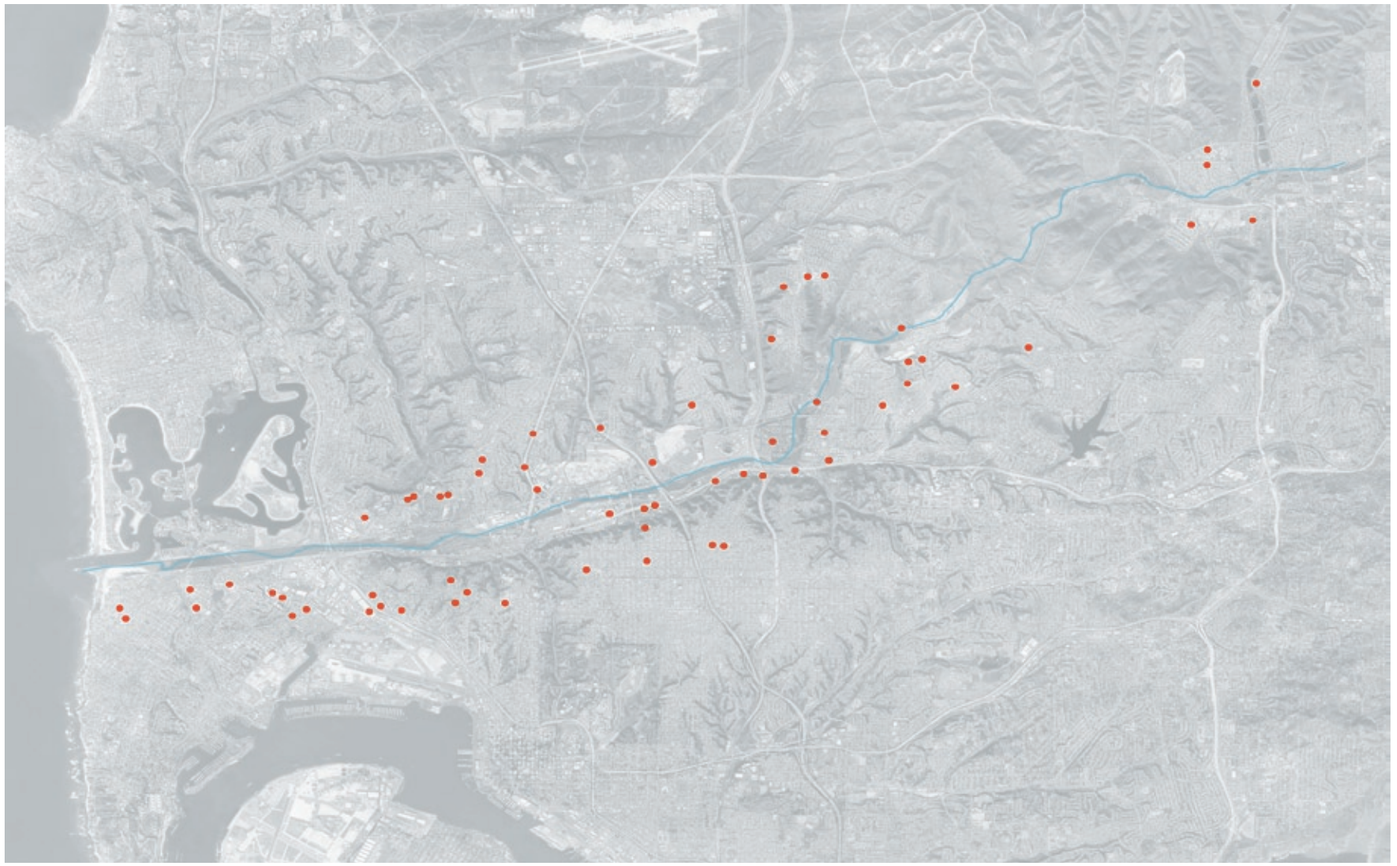
Significant segments of the study area include publicly owned land, including Mission trails Regional Park, Qualcomm Stadium, mission Valley Preserve, Southern Wildlife Refuge and Mission Bay Park. Significant land area is also publicly held roadway rights-of-way, or in ownership by transportation entities, including Caltrans. Within Mission Valley, much of the river corridor itself is within private ownership. Within Mission Valley commercial activities abut directly adjacent to the river floodway.

Floodway / Floodplain

Historically the floodplain included the entire valley floor, the whole Mission Valley floor, the entire Mission Bay and what is now Ocean Beach, extending to San Diego Bay. The remarkably narrow floodway today is the result of numerous manipulations of both streamflow and the channel.



Existing floodway and floodplain



Existing schools within 1 mile from river

Schools and Universities.

Over fifty-six universities, high schools, middle schools and elementary schools are located within a mile of the river. The river presents an extraordinary educational opportunity to these institutions, and the faculty and students attending these schools are a wonderful resource for programs to protect and improve the rivers health.

Hydrology and Water Quality Inventory

Introduction

The San Diego River Park Plan proposes enhancements to the natural hydrologic processes of the river. 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.

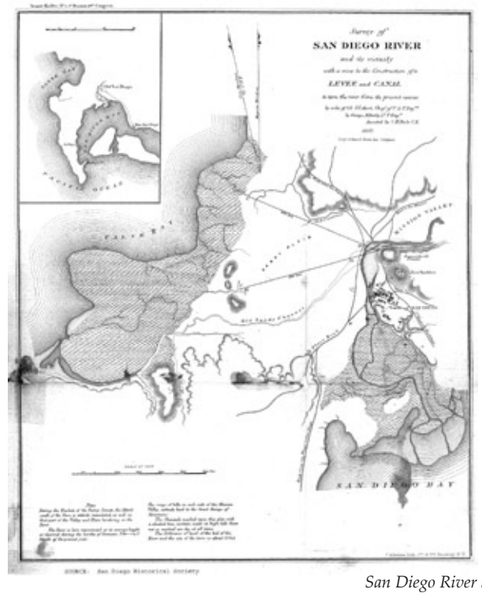
Mission Valley Agriculture in 1916
Source: San Diego Historical Society

History of the San Diego River

The San Diego River has been dramatically altered by human activity. Historically, the river flowed unimpeded 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; 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. Old Mission Dam, located in what is now the Mission Trails Regional Park, was completed in 1816. It was the first dam on the river and was used by Spanish missionaries. The dam at Lake Cuyamuca was built in the 1880's, and 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. Water was pumped from the San Diego River at Palm Canyon in present day Presdio Park up to on e of the earliest reservoirs in San Diego in what is now Mission Hills. Water was also diverted via flume from Lake Cuyamuca to the growing community of San Diego. Such projects were critical to inhabiting this desert environment. 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



San Diego River survey 1853

1916 Flood at old Town San Diego
Source: San Diego Historical Society

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 buildings prevent rainwater from infiltrating into the ground, causing large quantities of water to run-off directly into the river via stormwater collection systems.

The City of San Diego imports approximately 90% of its water supply. This water enters the river from residential and commercial runoff, irrigation run-off, 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 is the major cause of year-round flow in the lower San Diego River reaches.

The water quality of the San Diego River, 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 transports a host of pollutants to the river, including oils and grease, gasoline, bacteria, trash, nutrients, sediments, and pesticides. The detrimental effects of urban runoff on the water quality of the San Diego River 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 Water Primrose 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).

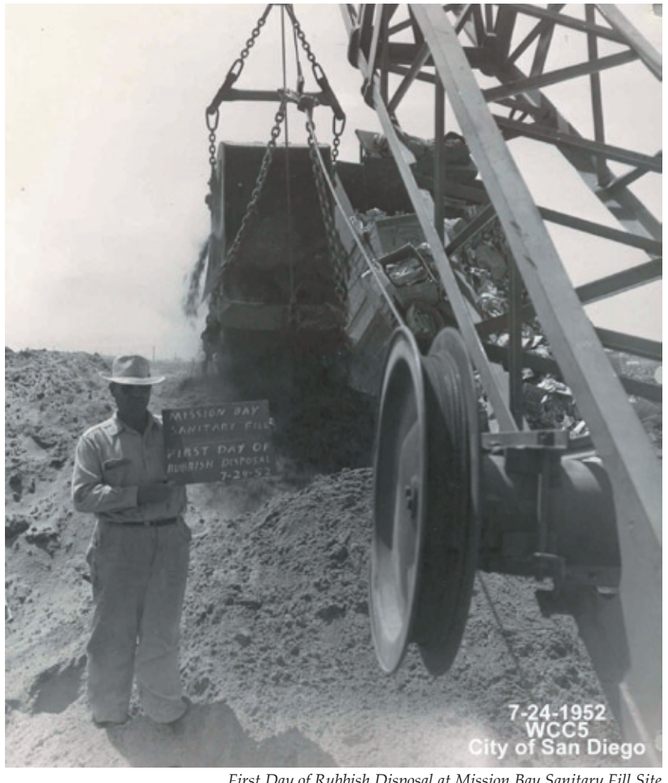
Channelizing rivers or restricting river meanders can also detrimentally affect aquatic and riparian habitats. Negative effects of channelizing rivers include removal of riparian vegetation and therefore habitat, loss of in-stream cover, altered riffle pool sequences, decreased stream sinuosity, altered 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. When necessary artificial structures or other aeration devices should be considered for improving water quality

Water Quality and Land Use

Water quality is directly linked to land uses within the watershed and especially adjacent to the stream channel. Land use practices in the San Diego River watershed and Mission Valley in particular have had profound and adverse impacts on the health of the river. Urban development has converted natural vegetated groundcover to impervious surface materials such as roads, roofs, and parking lots. The natural vegetated surfaces slowed the rate of run-off, and increased absorption into the ground creating an effective filtration and purification process. When this natural system is eliminated by paving the ground surface pollutants are more likely to flow directly into surface water systems. As development increases, the sources of pollution increase as well, bringing proportionately higher levels of vehicle emissions, car maintenance wastes, municipal sewage, pesticides, hazardous wastes, pet wastes and trash that can be washed directly into the river.

The San Diego River has been degraded by pollution from a variety of surface sources and is threatened by at least two subsurface sources, including the landfill between the river and Mission Bay and a bezene plume northeast of Qualcomm Stadium. The landfill is currently being studied and a Site Assessment is available at the City of San Diego Environmental Services Department.

Pre-Sanitary Fill Site
Source: 7-17-52 WCC2 City of San Diego



First Day of Rubbish Disposal at Mission Bay Sanitary Fill Site
Source: 7-24-52 WCC3 City of San Diego

MTBE Isocentration Contours
Source: Levine Fricke - Mission Valley Terminal
Project No. 002-10143-02
MTBE Isoconcentration Map and Well Section (A-A') Augist 2003
Figure No. 9

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 Linda Vista Formation. The southwestern boundary is the San Diego Bay.

The principal 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 of the San Diego River Park will likely have no negative impact to groundwater resources. Increasing the length of the river by increasing meander and broadening the riparian channel may lead to increased groundwater recharge. None of the proposed actions are reliant upon groundwater resources for implementation. However further study of groundwater quality and quantity, its effects on habitat and wildlife and the potential for groundwater recharge are warranted.

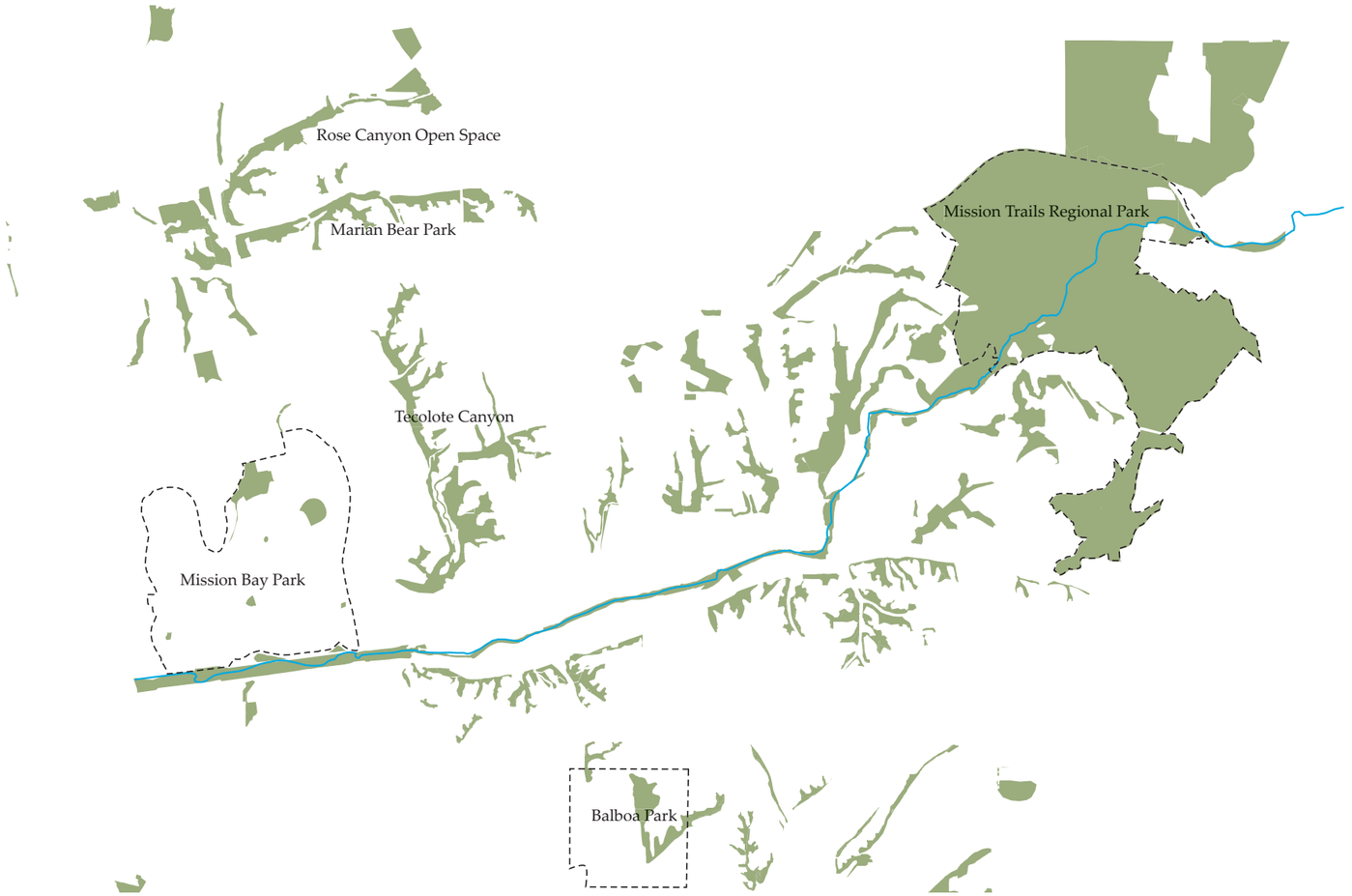
Habitat and Wildlife Inventory

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 ecosystems in the region. 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 Hydrology and Water Quality Inventory 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.

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 fits this pattern. Prior to damming, average flow at the Santee gauge 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 uproot 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 and Water Quality Inventory in 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.



Multiple Habitat Planning Areas

Fire Disturbance

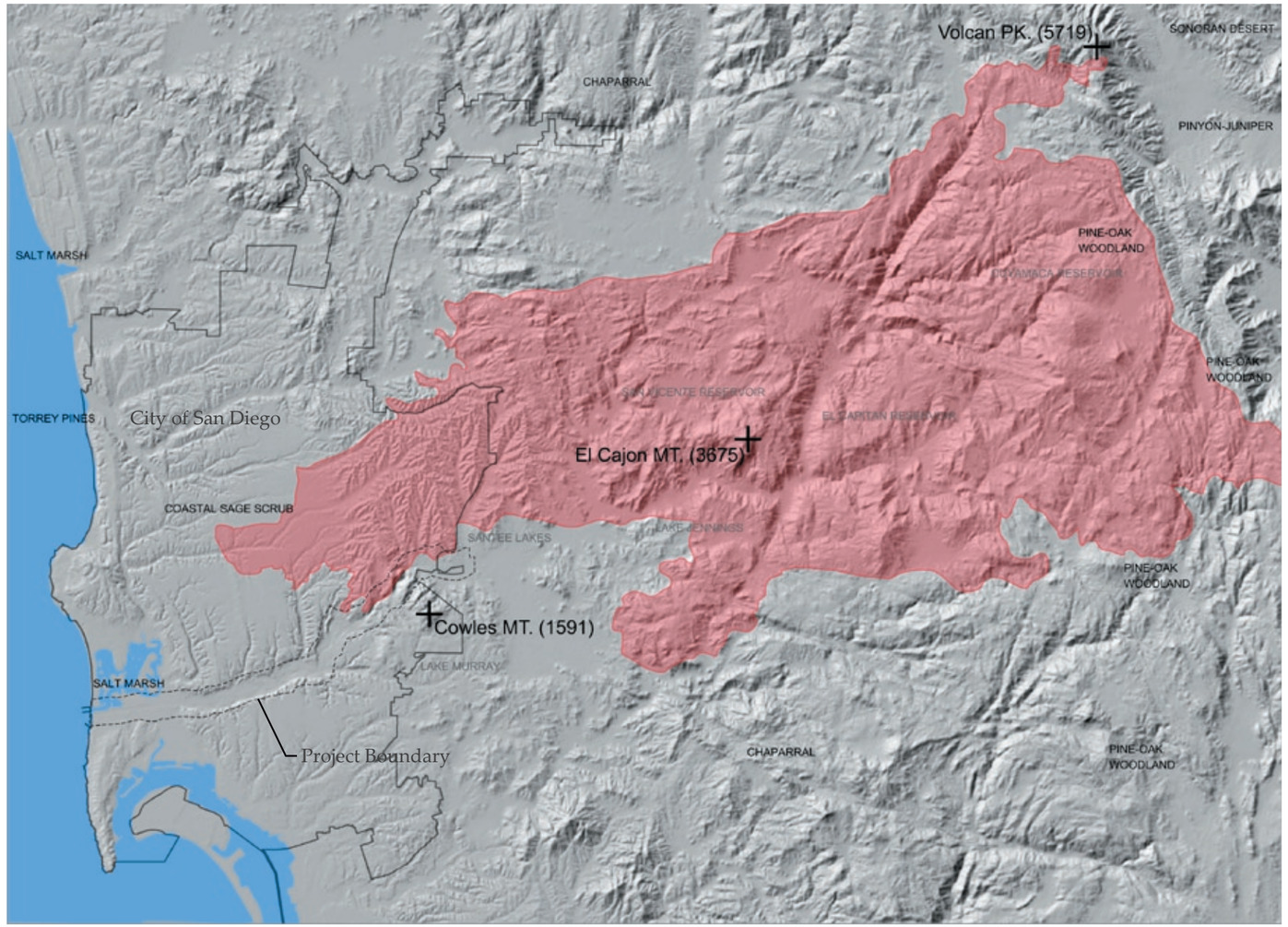
With the large-scale destruction of 2003, fire has reasserted its prominence in the public eye and its influence on the ecology of the San Diego River watershed. The Cedar fire burned 95% of the upper watershed and 74% of the entire watershed. Within the study area the Cedar fire burned most if not all of the native chaparral and coastal sage scrub (CSS) northeast of the river within Mission Trails Regional Park. The wind eased as the fire reached the riparian corridor of the river, limiting damage to the riparian vegetation and beyond to the southeastern part 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 (successional) 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.

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 Multiple Species Conservation Program (MSCP) Subarea Plan (see habitat conservation). These areas include: Mission Trails Regional Park (MTRP), sections of the San Diego River riparian corridor west of MTRP, tributary canyons to Mission Valley, and sections of the Mission Valley side slopes.

Disturbed areas are identified on the species of concern 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, Riverwalk 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 species of concern map on page 125 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 MTRP, 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.



Cedar Fire Disturbance Area

Exotic Invasive Vegetation

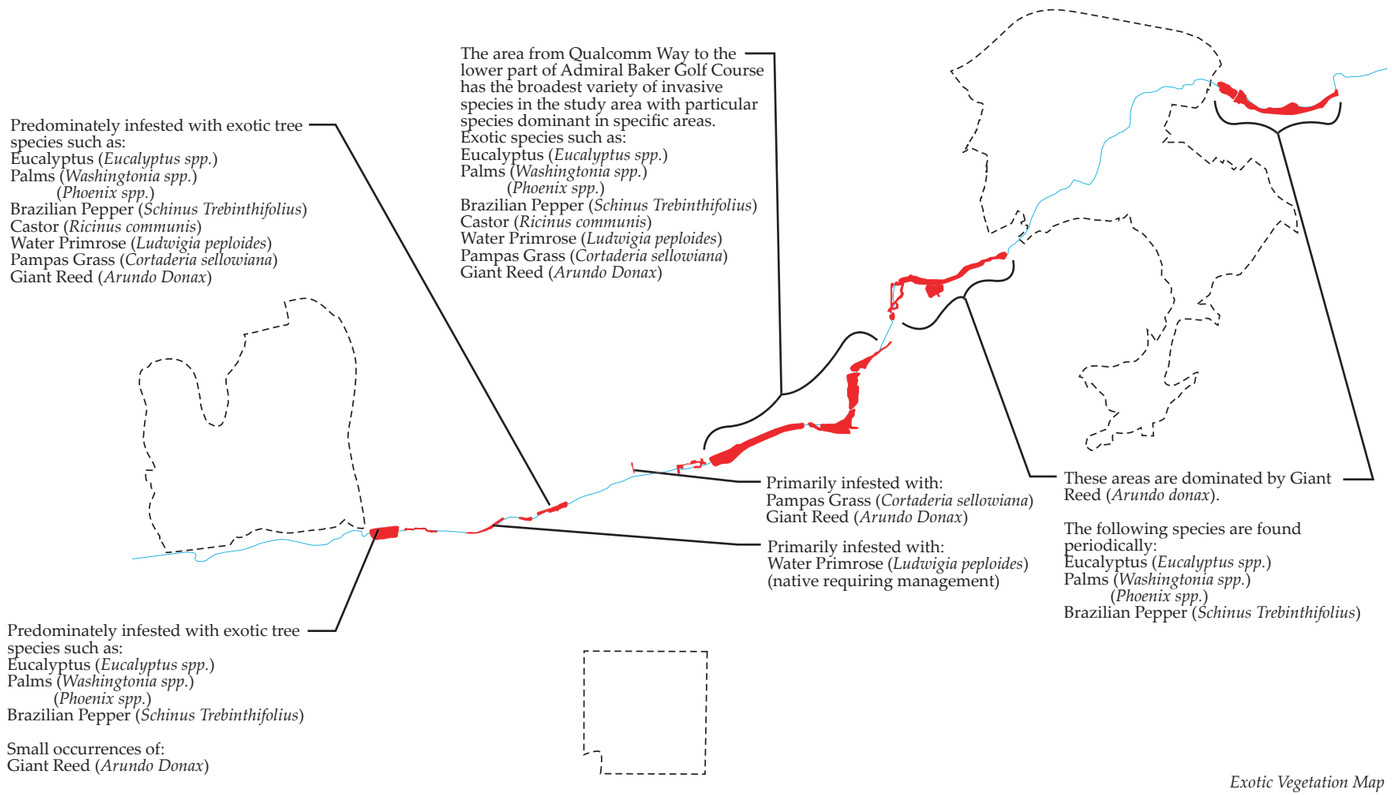
Exotic vegetation was mapped and inventoried in 2002 as part of the San Diego River Invasive Exotic Weed Eradication Master Plan. The map included in this report is based on this plan, identifying areas of heavy infestation. Invasive species include Eucalyptus (Eucalyptus spp), Mexican Fan Palm (Washingtonia robusta), Canary Island Palm (Phoenix canariensis), Brazilian Pepper (Schinus terebinthifolius), Castor (Ricinus communis), Pampas Grass (Cortaderia sellowiana), Giant Reed (Arundo donax), Tamarisk (Tamarix aphylia) and the native Water Primrose (Ludwigia peploides). Three species of particular concern in the San Diego River Natural Resources Management Plan area are Pampas Grass, Giant Reed, and Tamarisk. The 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.

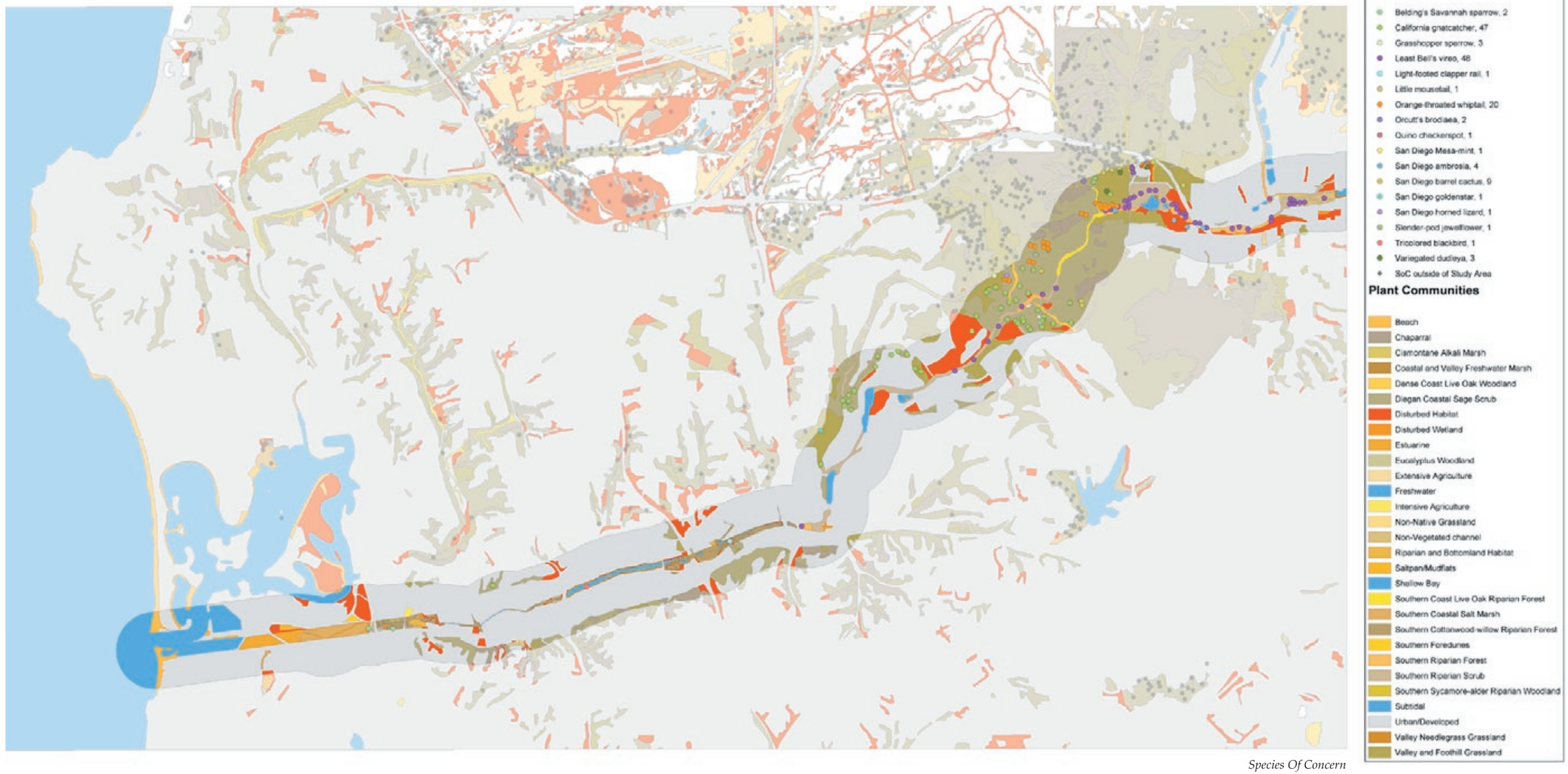
Plant communities within the study area

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



Exotic Vegetation Map



Species Of Concern

Wildlife

Shrinking habitat area and reduced habitat diversity limit the number of species within the study area. The species that are present are limited to those that can rely entirely on the remaining 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 study area, 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 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 acceptable for this section of the study area because of the proximity of development and attendant concerns of safety.

Studies of wildlife movement and resident populations (Integrated Natural Resources Management Plan for Marine Corps Air Station Miramar) suggest that a corridor width of 300' is generally adequate to support resident species of birds and small mammals, while a corridor width of 500' is generally optimum to allow movement of larger, as well as increased resident populations of birds and small mammals. The City of San Diego Land Development Code – Biology Guidelines, Section III Biological Impact Analysis and Mitigation Procedures, recommends that areas of native vegetation that are less than 400 feet wide for a length greater than 500' are considered isolated (p.21). The guidelines further reference the MSCP recommendation that at urban interface edge conditions range from 200 to 600 feet depending on adjacent land uses (p. 21).

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 and to the Pacific Ocean. 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.

Courtesy M. B. Stowe

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

Recreation Inventory

Active Recreation

Recreation Introduction

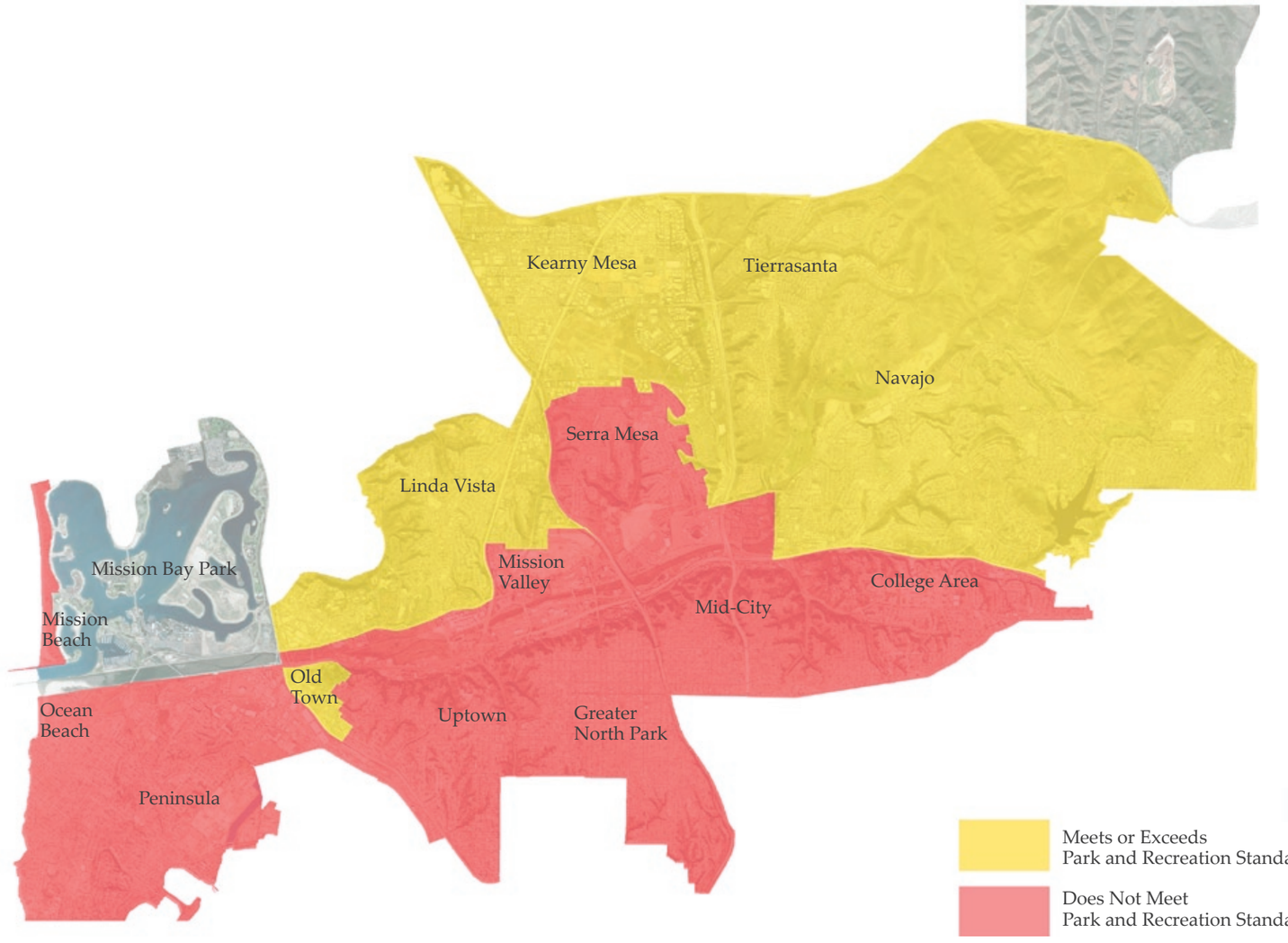
A major objective of the study is to identify the range of recreation opportunities in the river corridor. This section focuses on Active Programmed Recreation—defined as sports facilities, sports fields and parks—parkland suitable for organized sport activities, as well as major circulation trails. Passive recreation, such as nature study, hiking trails, interpretation of cultural sites and other activities related to specific resources are discussed separately in those specific resource sections. To supplement public resources, the San Diego River valley has many private facilities that offer commercial recreation. The relationship of those facilities to the San Diego River Park is discussed. The appreciation of the river as a recreational resource should be a fundamental part of recreation and land use planning 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 fifteen adjacent community planning areas of the City of San Diego. The Progress Guide and General Plan has established 2.8 acres per 1,000 residents as the active park required acreage goal throughout the City. Recommendations for new open space and recreational facilities are focused within corridor. Open, developable land for new parks is very limited throughout theses fifteen communities and many of them are at a deficit for active recreation acreage, according to Park and Recreation Department calculations. The river corridor is in concept an appropriate place to provide additional active and passive recreation sites for many reasons:

- The valley can be a “common” for the city.
- 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 can be created where the need exists, where they are 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 the proposed parks and regional recreation facilities.



Site planning criteria for new recreation sites takes into account new environmental considerations and factors including 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 sites relative to other objectives.
- Identify potential locations for active and passive recreation acreage that is identified in Community Plans.
- Identify additional recreation opportunities that may meet needs currently unaddressed in Community Plans, or other regional needs.
- 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 people. "Community parks", "neighborhood parks" and "mini-parks" are included in the population-based acreage in each community planning area. Community parks are a minimum of 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 2.8 acres per 1000 residents and the most recent population figures and SANDAG projections, the Park and Recreation Department determines the population based park acreage goal for each community. Using these calculations, the Park and Recreation Department has determined that most urbanized communities are park-deficient. Without additional acreage, 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 Town San Diego. The study area lies within smaller portions of the communities of Mission Beach, Peninsula, Uptown, Greater North Park, 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 some portions of the recreation requirements may have been permitted to be satisfied with private open space within new developments, particularly in Mission Valley. This has yielded private recreation amenities such as tennis courts, gyms, pools and meeting rooms for project residents, but these facilities are not available to the public and therefore are not 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, Tierrasanta 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 after school hours. The acreage within the joint-use facilities are included in the park and recreation inventory.

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 30,000 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 areas. These include the following:

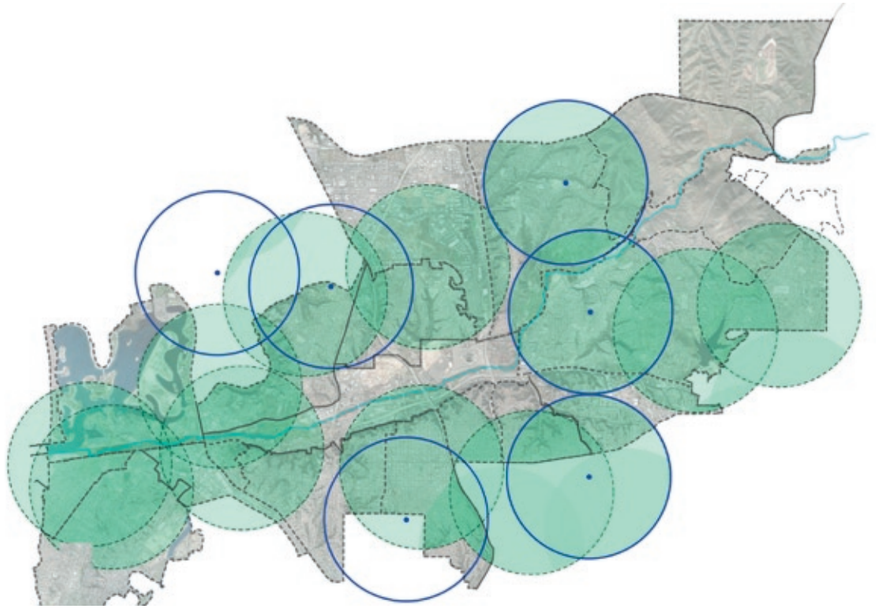
- Caltrans rights-of-way (State, freeway and interchange landscape areas)
- Admiral Baker Golf Course and Park (Federal, Navy golf course, swimming pool, picnic area, community building, gym)
- Army Corps of Engineers (Federal, river and tributary channels, floodways and structures)

Regional or Area-wide need

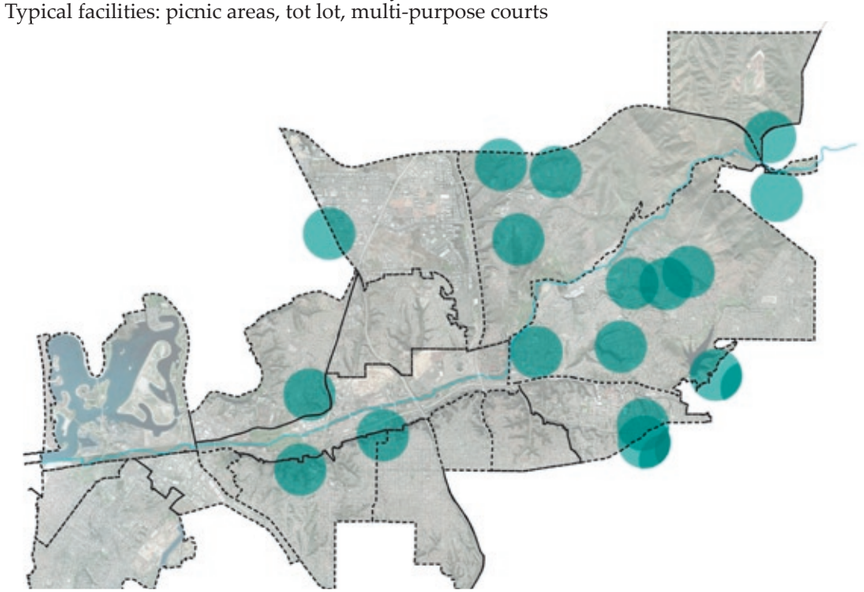
Although recreation need is currently evaluated within individual communities, the unmet opportunities adjacent to the river produce an overall need for active recreation land of more than 200 acres (even considering proposals within the community plans for new recreation facilities). Using other regional 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 San Diego River Park, the more residents and visitors will identify with the river as a significant resource for the region.



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

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

Recreation

- Golf Courses: Carlton Oaks, Riverwalk, Admiral Baker, Old Town State Historic Park
- Presidio Park
- Sea World
- Sports Arena
- Qualcomm Stadium and practice fields
- Point Loma and Mission Valley YMCA's
- Sefton Little League Fields
- 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 State Historic Park
- Presidio Park
- 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

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.

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

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 trails consist of a multi-use-trail for bicycles and pedestrians in the central part of Mission Valley (completed as part of the FSDRIP), multi-use trails on the levees in the estuary, trails in existing parks (Mission Bay Park, Dusty Rhodes Neighborhood Park, Mission Trails Regional Park) 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, the San Diego River Park plan proposes that a pedestrian-only, soft surface trail be on a separate path on the opposite side of the river.

Trail Definitions

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' soft 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.

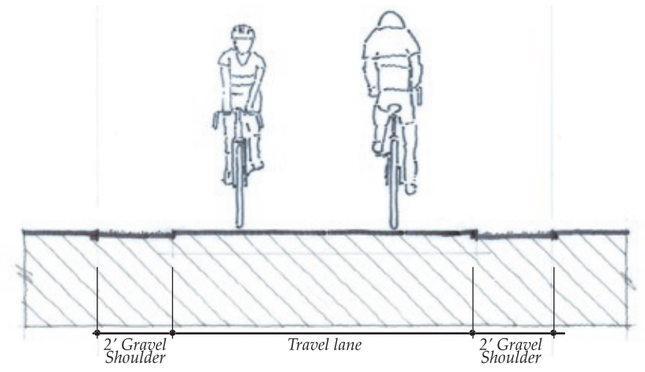
Refer to Design Guidelines for specific trail and path definitions used in this document and proposed by this plan

Caltrans

Class I Bikeways are defined by Caltrans as bike paths on their own rights-of-way for the exclusive use of bicycles and pedestrians. Caltrans 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. Caltrans 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.



Class 1 Bikeway

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.

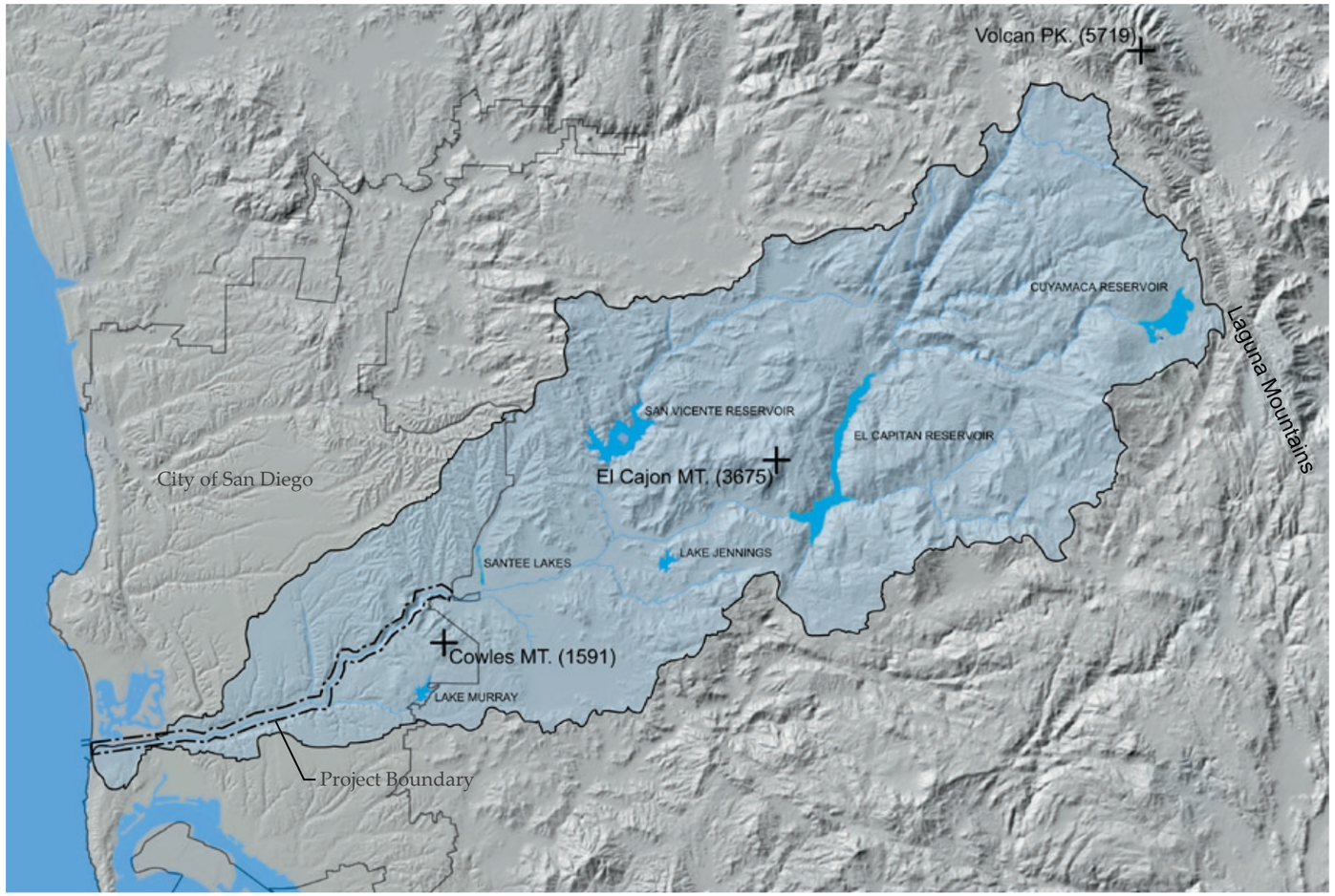
Geologic History

Rivers have been fundamental to the shaping of the earth's surface since vapor first coalesced into raindrops and fell to earth. 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.

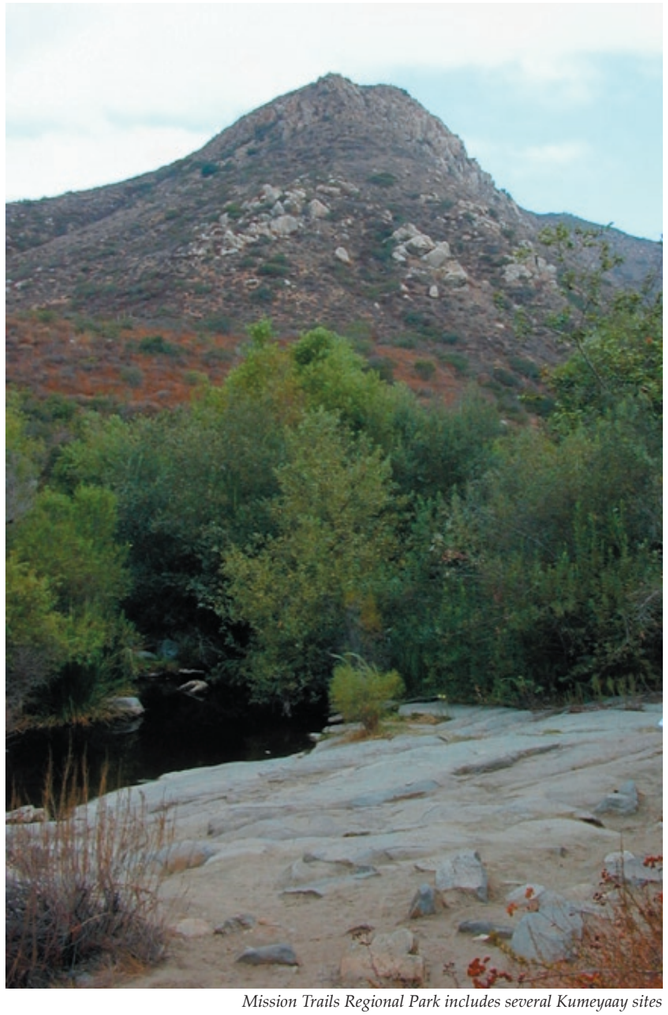
As the earth evolved, the fundamental process of erosion was influenced by two critical events. The first event was the development of vascular plants. Early vegetation existed in swamps and other lowlands, and the adaptation to higher and drier conditions likely occurred in riparian (river related) environments. The subsequent rapid 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 humans a species with the ability to think, manipulate and fundamentally change the 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



Mission Trails Regional Park includes several Kumeyaay sites

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 the Mission was relocated near Nipaguay shortly thereafter where it remains today as the San Diego Mission de Alcala

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 by 1815. The Mission Flume was constructed from 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 is a remnant of its past significance as it flows through the City of San Diego. 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 with 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 affected the natural riparian habitat that once flourished in the valley, by diminishing not only its extent, and its overall quality by disrupting the connections 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.

Old Mission Dam, Mission Trails Regional Park

Prehistoric Land Use

The San Diego River valley was first settled nearly 10,000 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 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

- Create a sense of place at Mission San Diego de Alcalá and the Presidio celebrating Nipaguay and Cosoy history as Spanish.
- Support interpretation of rock art sites in Mission Trails Regional Park
- Support interpretation of Bedrock Milling sites within Mission Trails Regional Park
- Support interpretation of Cowles 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	Rancheria name for the San Diego Mission area
Cosoy	Rancheria name for the area from the foot of Presidio Hill on both sides of the river
Qujar	A place name 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 from there.

Opportunities and Recommendations

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

Historic Land Use and Key People

Spanish Period

The 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, improvements to the efficiency of agricultural production and obtaining an adequate and reliable water supply were necessary. To achieve this 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 Truck 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 VaIley 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 (1972)

Recent History Place Names

Names tell a lot about the land and the people, often suggesting the deeper reasons why a place has evolved to its current condition.

Older Place names

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

Current Place names

Cowles (kohls) Mountain
Dog Spring
Spring Canyon
Grantville
Gravilla
Murphy Canyon
Murray Canyon
Alvarado Canyon
Adobe Falls
Mission Valley

Key historic sites

Utilities Inventory

Utilities

Existing utilities within the planning area present both constraints and opportunities. The constraints are primarily near-term issues. It is necessary to plan proposed improvements around some 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. Except for the major facilities described below, most utilities within the planning area can be relocated as necessary to accommodate improvements as described in this Master Plan. For those utilities that must remain in place, opportunities will exist in the future to replace aging facilities. At that time, replacement utilities should be sited in locations that are compatible with the San Diego River Park Draft Master Plan.

Sanitary Sewers

A trunk sewer and an interceptor sewer traverse the entire length of the planning area, aligned generally following the valley floor. The location of sanitary sewer pipelines 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 Morena 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 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. East of Interstate 5, the sludge line runs east beneath Friars Road, then north under Via Las Cumbres.

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. In 2001, the Metropolitan Wastewater Department initiated a Sewer Spill Reduction Program funded by sewer rate increases. This program includes cleaning and inspecting thousands of miles of sewer as well as accelerating the replacement and rehabilitation of older facilities. General guidance for sewer facility replacement and management in environmentally sensitive lands is provided by City Council Policies 400-13 and 400-14, both adopted in January 2002. Council Policy 400-14 makes the redirection of sewer flow away from environmentally sensitive lands a priority.

In the San Diego River Valley, the potential for damaging sewage spills has been reduced but not yet eliminated. There are a number of factors contributing 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.

A complete solution to the sewage spill problem in the San Diego River Valley will include the following: (1) Relocating sanitary sewers out of the river bed; (2) Redirecting sewage flow away from the valley floor; (3) making sewers more accessible for maintenance and repair; and (4) providing the means for the physical containment of any spills. As sewers in sensitive areas near the end of their useful service life, the Metropolitan Wastewater Department considers the redirection of flow as prescribed in Council Policy 400-14. However, it is not yet practical to relocate all the trunk sewers away from the valley floor. In the future, the rapidly improving technology in the field of trenchless construction and tunneling may make possible such a goal.

Relocation of trunk sewers and redirection of flow are a major expenses that cannot feasibly be included as part of this Master Plan. However, access to sewer manholes and planning for the relocation of facilities in the future should be a consideration in any development within the area.

The San Diego Aqueduct

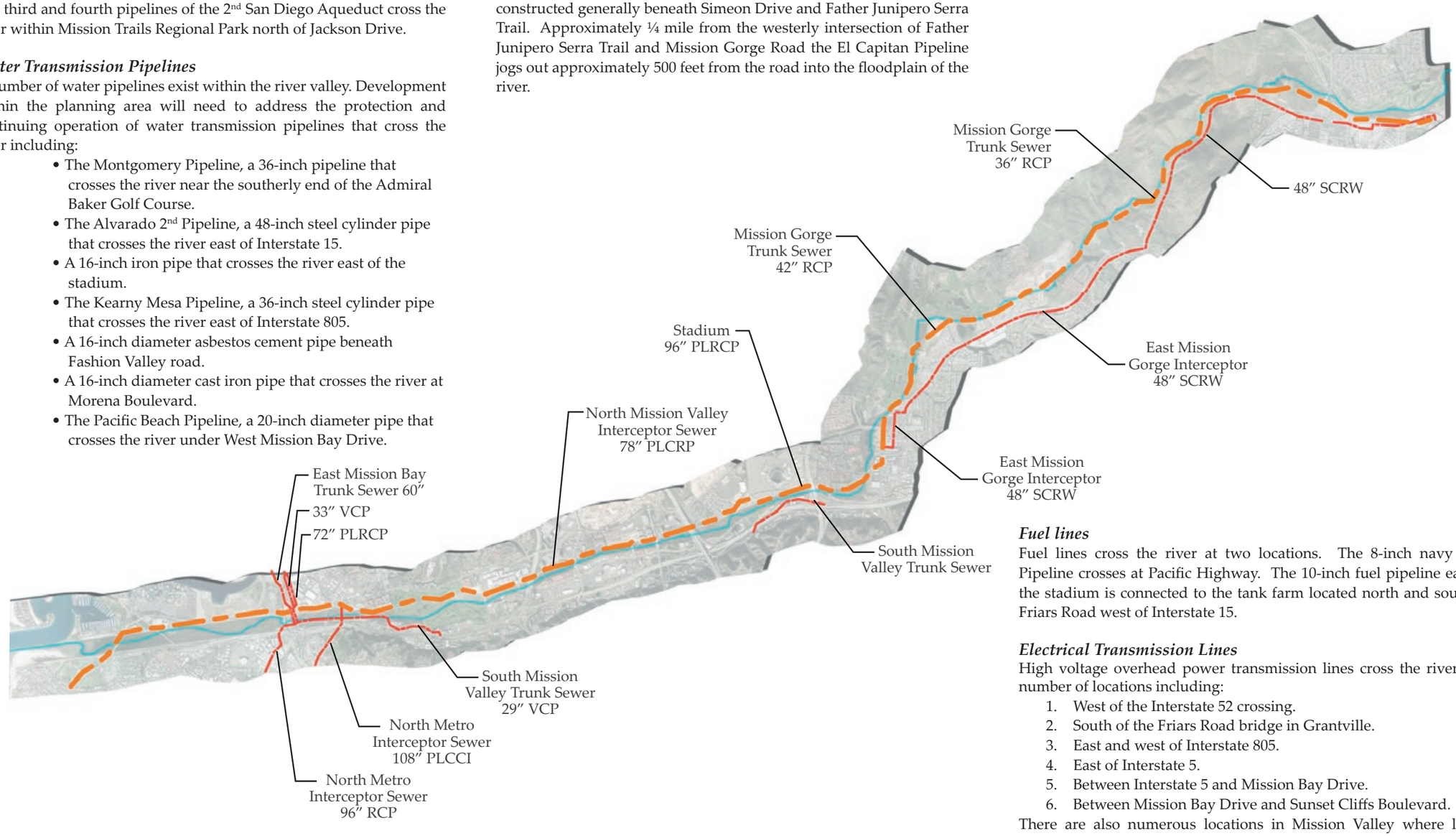
The third and fourth pipelines of the 2nd San Diego Aqueduct cross the river within Mission Trails Regional Park north of Jackson Drive.

Water Transmission Pipelines

A number of water pipelines exist within the river valley. Development within the planning area will need to address the protection and continuing operation of water transmission pipelines that cross the river including:

- The Montgomery Pipeline, a 36-inch pipeline that crosses the river near the southerly end of the Admiral Baker Golf Course.
- The Alvarado 2nd Pipeline, a 48-inch steel cylinder pipe that crosses the river east of Interstate 15.
- A 16-inch iron pipe that crosses the river east of the stadium.
- The Kearny Mesa Pipeline, a 36-inch steel cylinder pipe that crosses the river east of Interstate 805.
- A 16-inch diameter asbestos cement pipe beneath Fashion Valley road.
- A 16-inch diameter cast iron pipe that crosses the river at Morena Boulevard.
- 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 at two locations. The 8-inch navy Fuel Pipeline crosses at Pacific Highway. The 10-inch fuel pipeline east of the stadium is connected to the tank farm located north and south of Friars Road west of Interstate 15.

Electrical Transmission Lines

High voltage overhead power transmission lines cross the river at a number of locations including:

1. West of the Interstate 52 crossing.
2. South of the Friars Road bridge in Grantville.
3. East and west of Interstate 805.
4. East of Interstate 5.
5. Between Interstate 5 and Mission Bay Drive.
6. Between Mission Bay Drive and Sunset Cliffs Boulevard.

There are also numerous locations in Mission Valley where lower voltage primary overhead power lines cross the river.

Gas Transmission Mains

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

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

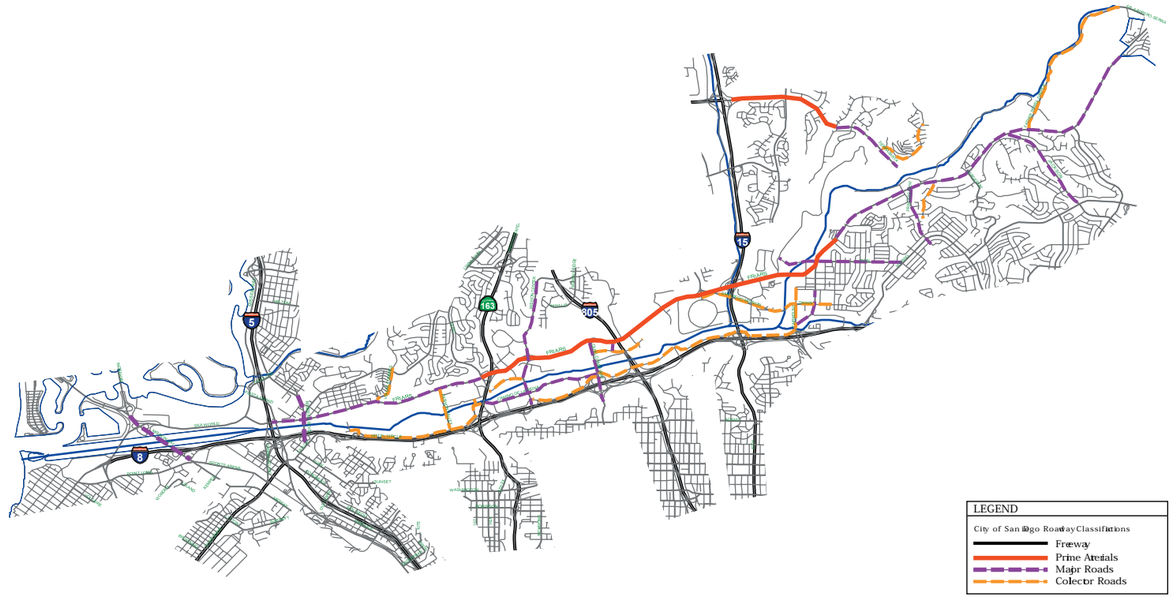
The San Diego River Corridor is characterized by frequent interstate highway crossings and by several major roads running roughly parallel to the river corridor. I-5, SR-163, I-805 and I-15 all traverse the river within a 6-mile segment. A large number of arterial roadways also cross the river; these 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 crosses the river and 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.

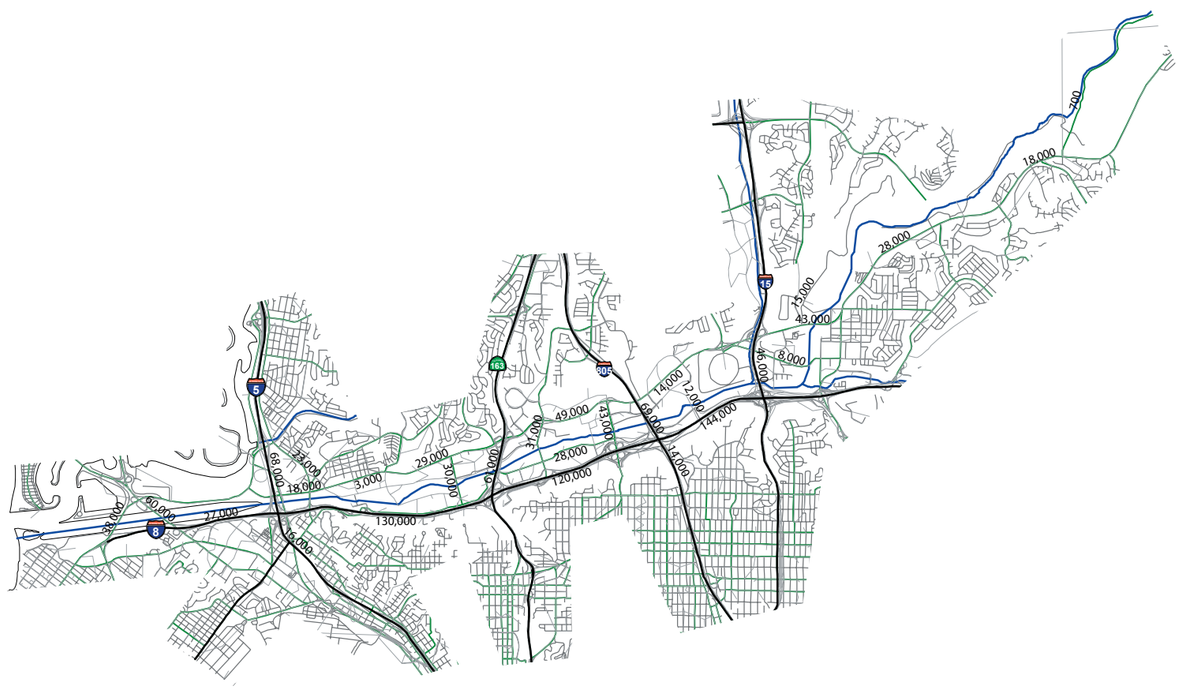
Vehicular Circulation

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.

I-8 and many of its interchanges also exhibit substantial congestion during peak hours; congestion extends 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
- **Friar's Road**
  Arterial modifications from Morena Boulevard to Fashion Valley Road

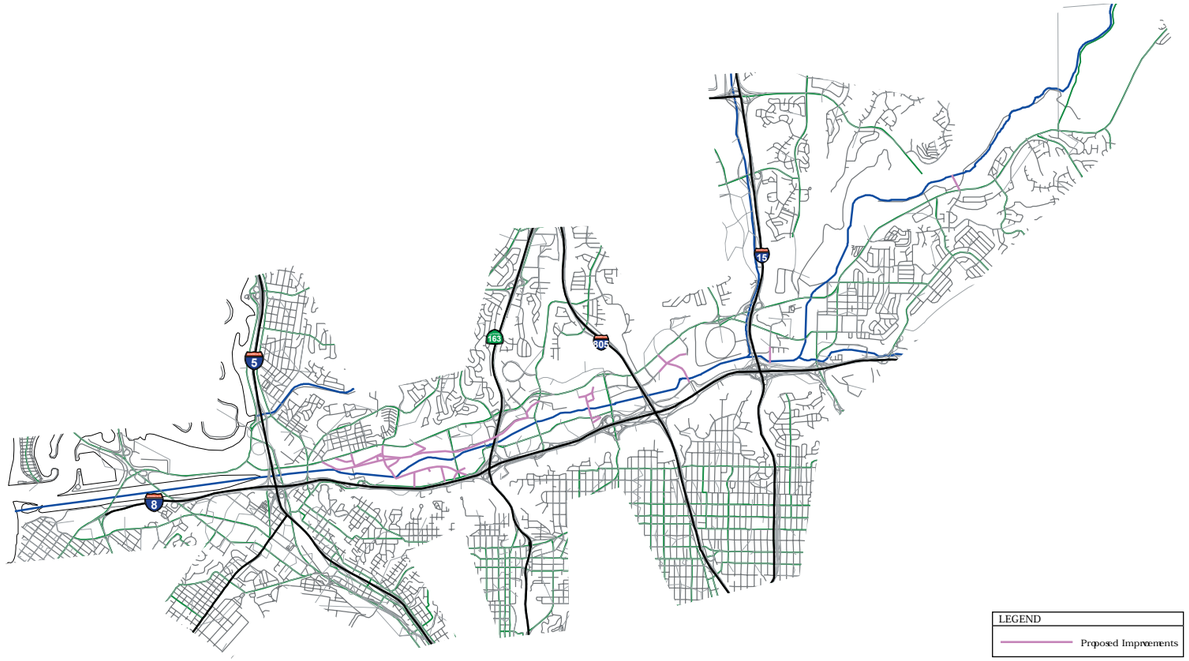
It should be noted that some proposed road improvements are not fully supported by the public and other are not funded. Proposals experiencing these constraints include:

- 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

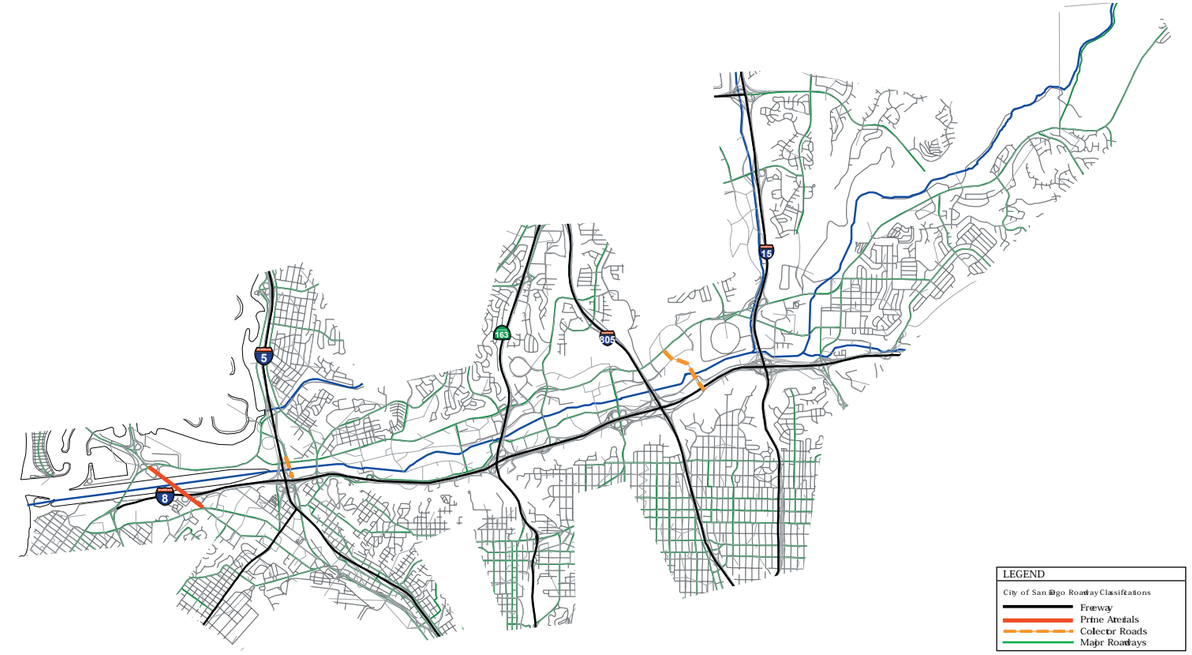
Pedestrian and Bicycle Circulation

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



Planned 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/Education.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**EDUCATION**	
E1S	Create San Diego River Park Trail head and waystation at Dog Beach.	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 incorporating materials that reflect the adjacent environment and neighborhoods. Link trail head and Waystation to existing bike lanes, bike routes, and trails in surrounding communities.
E2S	Maintain Dog Beach as an off-leash recreational destination and community asset. Enhance existing Dog Beach signage to include information about the river park.			Retains existing recreational amenity for do owners.		Support appropriate community and special interest groups to manage Dog Beach and integrate it with the San Diego River Park.
E3S	Coordinate with Mission Bay Park 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 appropriate community groups to install signage in vicinity to provide information and create awareness about estuary function and wildlife habitat.
E4S	Create San Diego River Park Trail head, 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 estuarine 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 appropriate community and special interest groups including friends of Famosa Slough to initiate feasibility study to explore benefits and impacts of replacing existing culvert with larger structure and 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	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 appropriate community and special interest groups to extend feasibility study to explore the potential to modify current plant to consider effect of improving hydrologic systems of Mission Bay and the river. Such a study should identify and develop trail connections from the San Diego River Park to Tecolote Canyon and with Mission Bay Park.
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 phytoremediation 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	Create estuary overlook platforms along the San Diego River Park Trail at estuary surface level.			Providing overlooks improves accessibility to bird and wildlife viewing.	Interpret unique habits, sensitivities and characteristics of estuary function, wildlife habitat and seasonal nesting requirements for sensitive species.	Collaborate with appropriate community and special interest groups 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).

RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Short Term	**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**EDUCATION**	
E9S 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.		Improving connection will expand riparian 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. While added park space provides additional recreational opportunities along San Diego River Park and Trail.		Collaborate with North Bay Redevelopment Plan to integrate it with the San Diego River Park .if the Sports Arena redevelopment plans move forward, seek opportunities to engage with the process to integrate those plans by creating trail connections, installing interpretive kiosks, and potentially a Community Park.
E10S Mission Bay Park interface zone			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.	Interpret unique habits, sensitivities and characteristics of river function, and wildlife habitats.	Coordinate with appropriate community/special interest groups for the Mission Bay Park Master Plan and South Shores General Development Plan to ensure appropriate park and river interaction and possible interpretive opportunities.
E11S Continue San Diego River Park multi-use trail east of the I-5 and create connections from Friars Road to Pacific Highway.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Coordinate with Community Plan, North Bay Redevelopment Plan and San Diego Bicycle Master Plan.
E12S Establish Green Gateway along I-5 across the river valley.		Re-vegetate rights-of-way and open space adjacent to freeways and major roadways with appropriate native vegetation.			Initiate dialogue with Caltrans, the City of San Diego and appropriate community/special interest groups. 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.
E13S Create a waystation, trail connection and naturalized open space between Old Town San Diego / 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.	Prepare detailed design study for location of waystation, trail connections, bicycle staging, and explore creation of shuttle links from trolley at Old Town/Linda Vista to Ocean Beach, Sea World and Mission Beach.. Initiate dialogue with City of San Diego to create shuttle links from trolley at Old Town/ Linda Vista and Ocean Beach/ Sea World/ Mission Beach.
E14S Create recreational trail connection between the San Diego River Park and the San Diego Bay.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Implement bikeways along Rosecrans Street and Taylor Streets as proposed by the City of San Diego Bicycle Master Plan
E15S Improve trail and open space connection between Tecolote Canyon and Mission Bay.	Improving Tecolote creek by relocating Fiesta Island Dike and providing larger culverts reduces overall flow restrictions on the creek.	Improving connection will expand riparian and canyon habitats and promote fish, bird and terrestrial habitat connections.	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Explore potential to reconstruct I-5 and railroad crossings over Tecolote Creek with larger bridges or culverts that can accommodate pedestrian movement. Consider multi-use path adjacent to riparian channel, and link to proposed (City of San Diego Bicycle Master Plan) Class I Bike Path adjacent to railroad right-of-way.
E16S 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 appropriate community/special interest groups to develop detailed study to confirm specific alignment. Implement Bikeway along Morena Boulevard to Taylor Street as proposed by the 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 Boulevard and to Morena Linda Vista Trolley Station. Coordinate with Mission Valley Community Plan to include in update as amendment.

RECOMMENDATION		BENEFITS				IMPLEMENTATION STRATEGY
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**EDUCATION**	
E17S	Broaden river channel and meander throughout Mission Valley Preserve.	Increases potential river meander, improving water quality and reducing flooding impact.	Expand estuarine and riparian habitat and diversify fish, bird and terrestrial habitat connections to Mission Bay. Old burn site; Residue is hazardous in Mission Valley Preserve.		Potential to interpret historic patterns of river delta and development of landfill.	Collaborate with appropriate agencies and community/special interest groups to prepare specific plans and identify funding sources to modify river channel.
E18S	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 Boulevard 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.
E19S	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 trail head with signage, interpretive kiosks and furnishings.
E20S	Create short term bike trail alignments through Riverwalk Golf Club in the trolley right-of-way			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Coordinate with the appropriate agency, community/special interest groups, land owners and golf course management to explore the potential bike trail. Trail would be relocated closer to river channel in the future when the golf course redevelops.
E21S	Support efforts to create a Presidio Park Master Plan.					Coordinate with appropriate agencies, community and special interest groups to begin discussions about initiating a master planning effort and to identify potential funding sources.
E22S	Create a Presidio Park entry monument on Taylor Street that incorporates its historic connection with the river.					Coordinate with appropriate agencies and community groups to initiate study to design and locate entry signage on north side of Presidio Park.
E23S	Remove 1.5 acre area of cobble fill on south side of river under I-5.					Identify potential donors or funding sources to remove fill and lower grade to river channel level. Fill could potentially be used to fill undesirable ponds upstream or may have value as structural fill for development projects elsewhere.
Long Term						
E1L	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 estuarine 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.		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.
E2L	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 appropriate agencies and community/special interest group plans for future improvements.
E3L	Explore potential to realign and terrace south river edge and expand estuary.	Reducing channelization encourages additional stream meander, increase extent of functioning tidal marsh area, improving water quality and increasing flood capacity.	Expands estuarine 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 to create a varied edge with native vegetation.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Long Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**EDUCATION**	
E4L	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 estuarine 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 their planning 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 amenities of the San Diego River Park.
E5L	Explore potential to realign and terrace north river edge and expand estuary.	Reducing channelization encourages additional stream meander, increase extent of functioning tidal marsh area, improving water quality and increasing flood capacity.	Expands estuarine 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 to create a varied edge with native vegetation. Collaborate with appropriate community and special interest groups to explore potential to replace Fiesta Island dike with a bridge located north of Tecolote Creek.
E6L	If results of feasibility study proposed in short term recommendations are positive, implement improvements to estuary between Mission Bay and the river.	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 estuarine 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.	Interpret unique habits, sensitivities and characteristics of estuary function, wildlife habitat and seasonal nesting requirements for sensitive species.	Collaborate with appropriate agencies and community/special interest groups to prepare specific plan and identify funding sources improve estuarine environment.
E7L	Investigate potential for locating a River and Estuary Interpretive Center that supports the Mission Bay Park Master Plan interpretive 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.	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 appropriate agencies and community/special interest groups 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	Explore potential to create a 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 Recommendations.	Create multi-use path and open space link to San Diego Bay and bike paths to south.		Collaborate with North Bay Redevelopment as it moves forward.
E10L	Create major San Diego River Park access node at Linda Vista and integrate with potential Green Gateway at I-5 and Friars 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.
E11L	Create San Diego River Trail on north side of river through Riverwalk development.			Connect trolley stations. Connect along Linda Vista Road and Morena to Tecolote. Trial connection Tecolote could be through estuary or along old PCH.		Coordinate with San Diego Bicycle Master Plan and redevelopment of Riverwalk Golf Club. When Riverwalk redevelops coordinate with appropriate agencies, community/special interest groups and land owners to identify trail alignment and development concept that orient to the river.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Long Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**EDUCATION**	
L1S	Aggregate undeveloped land of YMCA, Sefton Fields, and MTDB as open space to broaden river channel and expand habitat.	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 Recommendations regarding naturalizing floodplain areas.	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail. While added park space provides additional recreational opportunities along San Diego River Park and Trail.	Interpret natural stream processes.	Coordinate appropriate agencies and community/special interest groups to identify means of aggregating land. Integrate with Mission Valley Preserve to aggregate land to initiate specific study to develop design concept.
L2S	Explore potential to develop Neighborhood Park. Engage Riverwalk 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. See page 59.		Redesign trail for compatibility with river or relocate. Create upland habitat areas within floodplain. Refer to General Recommendations 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 and to improve river edges through golf course. Coordinate with San Diego Bicycle Master Plan and Riverwalk GC owner. Engage bicycle master planners in process to explore potential revised alignment following trolley right-of-way. Initiate dialogue to explore long term intent and potential of land to accommodate park and/or trails. Coordinate with Mission Valley Community Plan, and appropriate agencies and community/special interest groups to identify alignment and buffer to incorporate into plan update as amendment.
L3S	Explore potential to acquire under-developed land site. Vacant parcels are an opportunity to create new river-oriented community amenity.			Potential to coordinate with link to Old Town with additional pedestrian trail on south side of Sefton Park.	Potential to interpret archaeological and historical site context.	Engage land owner to discuss potential for land acquisition, easement or to develop a river oriented amenity with trail connection. Current use is parking / storage. Investigate potential archeological value of the site.
L4S	Create historic interpretation of Kosoy Rancheria and agriculture 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 and/or easement for trail connection and interpretive waystation. Integrate with trail implementation project.
L5S	Create trail under SR-163 to connect existing Class I Bike Paths to the east and west of SR-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 City of San Diego Bicycle Master Plan.
L6S	Establish Green Gateway along SR163 across the river valley by introducing native landscapes along the roadway.		Improve visual and wildlife habitat continuity across the valley. Refer to General Recommendations 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.
L7S	Create open space and trail connection to upland communities along Ulric Road.		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.
L8S	Establish Green Gateway interchanges throughout by introducing native vegetation along roadways		Improve visual and wildlife habitat continuity across the valley. Refer to General Recommendations regarding Green Gateways.			Initiate dialogue with Caltrans and appropriate community groups to explore means of changing right-of-way plant palette.
L9S	Explore potential to connect FSDRIP bike trails across intersections with grade separated crossings on northside of river.			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. Improved crossings are important to improve continuity of multi-use trail.		Follow proposed alignment of Class 1 Bikeway in accordance with San Diego Bicycle Master Plan. Initiate dialogue with Bicycle Master Planners and City of San Diego Streets to identify funding source and develop detail design and construction plan.
L10S	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. See Page 61.	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 appropriate community/special interest groups and land owners to explore means of influencing development in progress modify street extension and integrating creek corridor into future evolution of existing development.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**EDUCATION**	
L11S	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.
L12S	Utilize existing underpass as a means of connecting to neighborhoods and canyon north of Friar's Road.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Support City of San Diego and property owners in effort to improve underpass entrances. Provide lighting and potential better pedestrian connections to the underpass.
L13S	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.	Interpret unique habits, sensitivities and characteristics of river function, and wildlife habitats.	Coordinate with San Diego Bicycle Master Plan and develop specific study to confirm route alignment.
L14S	Explore potential to reconnect Ruffin Canyon with the River		Improve visual and wildlife habitat continuity from canyon to valley.	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.	Interpret unique habits, sensitivities and characteristics of canyon and wildlife habitats.	Initiate dialogue with appropriate community groups, land owners and developers to integrate the development with the San Diego River Park. Explore design modifications to extend native plant species and trail connections from Ruffin Canyon through the redevelopment site.
L15S	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 Recommendations 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.
L16S	Explore potential to acquire some or all of undeveloped land adjacent to the river.	Acquisition 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 Recommendations 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 easements. Coordinate with Mission Valley Community Plan to include in update as amendment.
L17S	Mission City Parkway Bridge Mitigation Site. Integrate new riparian and sage scrub habitat restoration with San Diego River Park and trail.		Opportunity to expand riparian and sage scrub habitat areas within floodway.	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail. While added open space provides additional recreational opportunities along San Diego River Park and Trail.		Coordinate with appropriate public agencies and community groups.
L18S	River Garden site. Connect to San Diego River Park and trail.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail. While River Garden Site provides additional recreational opportunities along San Diego River Park and Trail.		Collaborate with San Diego River Park Foundation and appropriate community groups to support River Garden project and connect it to the San Diego River Park Trail. Coordinate with Mission Valley Community Plan to include in update as amendment.
L19S	If stadium redevelops, engage with developer and planner to develop a community park and additional naturalized open space with the San Diego River Park. See page 60.	Increases potential river meander, improving water quality and reducing flooding impact.	Improve visual and wildlife habitat continuity across the valley and along its adjacent canyons.	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).	Interpret unique habits, sensitivities and characteristics of canyon and naturalized open space habitats.	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.
L20S	If stadium redevelops, engage developers to integrate open space connections between San Diego River Park and canyons. See page 60.		Improve visual and wildlife habitat continuity across the valley and along its adjacent canyons.	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail. While added open space provides additional recreational opportunities along San Diego River Park and Trail.		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.

RECOMMENDATION		BENEFITS				IMPLEMENTATION STRATEGY
Short Term		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
L21S	Create multi-use trail in conjunction with Qualcomm redevelopment.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Coordinate with stadium redevelopment process and San Diego Bicycle Master Plan to identify specific alignment.
Long Term						
L1L	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.		Coordinate with Caltrans to explore potential to improve pedestrian component of the Taylor Street bridge to better accommodate pedestrians and bicyclists.
L2L	Engage land owners to encourage any future rede-velopment 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 habitat and open space corridor that follows the 100 year floodwayto provide a buffer for river, river meander, native vegetation and San Diego River Park Trail corridor.
L3L	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.	Site behind the Union Tribune could offer opportunity to expand River Park corridor.	Create views to river and access from development.	Coordinate 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.
L4L	In the long term, investigate opportunities to improve water quality in FSDRIP. Explore the potential and methods needed to recreate the FSDRIP area as a component of a functional river environment by removing flow restrictions and separating river from pond.	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. Improve 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 investigate removal of flow restrictions, aeration devices, etc. to water quality that improves the river environment and to separate stream flow from ponds.
L5L	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 trail heads/ staging areas feasible at both ends.		Coordinate with San Diego Bicycle Master Plan to identify specific alignment and connection priorities.
L6L	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.		Initiate feasibility study to identify specific trail alignment. Coordinate with San Diego Bicycle Master Plan and Caltrans to identify potential trail alignment.
L7L	Relate and connect open space in development plans with the River Park. Create 'green street' edge with native plant species to improve visual and habitat connection to Murray Canyon		Improve visual and habitat connection to Murray Canyon.	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.	Create views to river and access from development	Coordinate with land owners and developers to integrate the San Diego River Park into the development process and to explore design modifications to a river and valley sensitive approach.
L8L	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.
L9L	Create open space and trail connections to uplands via an improved Texas Street.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Coordinate with City of San Diego and the San Diego Bicycle Master Plan to improve Texas Street and create a dedicated multi-use trail separated from street with a naturalized open space corridor.
L10L	Improve Mission City Parkway over crossing to connect river corridor and upland open space			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Coordinate with Caltran to explore potential to improve Mission City Parkway bridge over I-8 to connect people to uplands. Coordinate with City of San Diego and the San Diego Bicycle Master Plan to improve Texas Street and create a dedicated multi-use trail separated from street with a naturalized open space corridor.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
Short Term - Confluence		**HYDROLOGY**	**ECOLOGY**	**RECREATION**	**CULTURE / EDUCATION**	
C1S	Develop city owned property as wetland habitat preserve integrate with potential water reclamation plant. Potential for Caltrans property to be developed for habitat and areas for the San Diego River Park Trail.	Improve stream dynamic, water quality, groundwater recharge and reduce flooding.	Retains wetland habitat and provides additional wildlife habitat	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.	Potential to interpret wetland habitat and its associated species.	Integrate Caltrans property as part of riparian open space and pursue dedication of new river open space preserve.
C2S	Create San Diego River Park Trail along north edge of river.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Coordinate with the appropriate agencies, community groups and the Grantville Redevelopment Study to identify specific route alignment of potential multi-use trail on north side of the river.
C3S	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.	Coordinate with Grantville Redevelopment Study to identify potential land for park or open space through acquisition or open space easements.
C4S	Improve open space and trail connection with Alvarado Canyon and Navajo Canyon.	Potential to improve creek dynamic, water quality, groundwater recharge and reduce flooding with a single entity managing the public lands.	Improve visual and habitat connection to Alvarado Canyon.	Creates visual and physical connection from river corridor to Alvarado Canyon and Adobe Falls, Kensington and College West communities, Create multi-use bridge near Mission.		Coordinate with appropriate agencies and community/special interest groups to study potential and 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.
C5S	Improve open space and trail connection with Alvarado Canyon.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Coordinate with appropriate agencies to improve on-street bike lane and provide signage.
C6S	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.	Improve river dynamic, water quality, groundwater recharge and reduce flooding.		Potential to improve the open space and trail connection to the Grantville Redevelopment Area.		Coordinate with Grantville Redevelopment Study and appropriate agencies and community groups to identify potential for open space easements or land acquisition to increase open space on east edge of ponds.
C7S	Create San Diego River Park Trail along east edge of river.			Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		Coordinate with appropriate agencies, community groups and the Grantville Redevelopment Study to study potential and 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.
Short Term - Upper Valley						
U1S	Coordinate with proposed Grantville redevelopment to preserve additional open space along Alvarado Creek Corridor at the confluence with the San Diego River.	Future benefit when implemented in long term.	Future benefit when implemented in long term.			Coordinate with appropriate agencies, community groups and the Grantville Redevelopment Study to identify potential land for habitat, trail and recreation through acquisition or open space easements. Coordinate with Navajo Community Plan. Refer to Alvarado Confluence Enhancement on preceding pages.
U2S	Create habitat and continuous multi-use trail near river adjacent to Admiral baker Golf Course.	Future benefit when implemented in long term.	Future benefit when implemented in long term.	Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.	Create views to river and access from golf course.	Continue dialogue with Navy planners to explore opportunities to modify golf course to create space for trail corridor and to improve relationship of golf course with the river. Coordinate with Navajo Community Plan.
U3S	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 habitat corridor that follows the 100 year floodway, broaden the river channel with potential to create meander, and a continuous multi-use trail.
U4S	Coordinate with the anticipated 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 and begin discussions to consider trail and open space as an integral part of the future redevelopment of the site.

RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
	HYDROLOGY	ECOLOGY	RECREATION	CULTURE / EDUCATION	
Long Term - Confluence					
C1L Implement trail and open space plans	Potential to improve water quality through expanded native vegetation filtration.	Potential to improve wildlife connectivity through expanded open space.	Potential for natural open space and passive recreation park somewhere within this area.		Prepare specific plan for design of trail alignment and natural open space as land or easement is acquired
C2L Implement open space identified through Grantville Redevelopment Study 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 acquisition of additional land area.		It is anticipated that the Grantville Redevelopment Study will identify lands that are appropriate for open space to continue the San Diego River Park and Trail. If land is acquired, initiate specific development plan for the San Diego River Park and Trail.
C3L Implement trail connection and interpretive signage to Mission San Diego De Alcala connecting via Rancho Mission Road and San Diego Mission 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.
Long Term - Upper Valley					
U1L Implement potential improvements to trail and habitat connections with Alvarado Canyon and Navajo Canyon.	Improve stream condition of Alvarado Creek confluence to increase channel width and potential meander to improve water quality and ground water recharge.	Potential to improve wildlife connectivity through expanded open space.	Potential to connect Alvarado Canyon and Adobe Falls 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 Improve open space and trail connection to Elanus Canyon north of Admiral Baker Golf Course.			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. 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.
U3L Continue to collaborate with Navy planners to integrate Admiral Baker Golf Course with the river to create expanded riparian corridor, habitat and trail connections.	Potential to improve water quality through expanded native vegetation filtration.	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.		Continue 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.
U4L 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 and develop specific plan for realignment of river channel.
U5L 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.		Coordinate with appropriate agencies and community groups to prepare specific plan and implement improved open space parks.
U6L As Superior Mine redevelops, implement plan to focus development on river corridor and to create riparian habitat and multi-use trail as component of redevelopment plan.		Refer to General Recommendations 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 appropriate agencies, community groups and Superior Mine land owners and planners to integrate the San Diego River Park and Trail with proposed development.
U7L Create trail connection to Tierrasanta neighborhood with the San Diego River Park			Trail connection will create access to the River Park from Tierrasanta.		Coordinate with appropriate agencies, community/special interest groups and land owners to identify specific alignment and access points.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
		HYDROLOGY	ECOLOGY	RECREATION	CULTURE / EDUCATION	
Short Term - Gorge						
G1S	Support Mission Trails Regional Park effort to establish a continuous trail system and identify potential connections between the San Diego River Park Trail and Existing hike/bike trails in Mission Trails Regional Park..	Potential to improve water quality through increased soft surface filtration.		Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.		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.
G2S	Support existing and proposed interpretation of the river and history of the park at Mission Trails Visitor and Interpretive Center				Build upon interpretation of significance of river to settlement of region.	Continue dialogue with Mission Trails Regional Park Master Plan and Citizens Advisory Committee.
G3S	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.	Continue dialogue with Mission Trails Regional Park Master Plan and Citizens Advisory Committee.
G4S	Support the implementation of the Kumeyaay Lakes Dredging and Berm Restoration Capital Improvement Project.	Explore the potential to reintroduce sediment excavated into the river system downstream to invigorate sediment transport process.	Ensure native habitat along Kumeyaay Lakes.			Continue dialogue with Mission Trails Regional Park Master Plan and Citizens Advisory Committee.
G5S	Create soft-surface San Diego River Park Trail segment between Mission Trails Regional Park and proposed segment adjacent to Carlton Oaks Golf Course. Connect to Mast Boulevard Trail head on Park and to Father Junipero Serra trail.	Potential to improve water quality through increased soft surface filtration.		Improving connection will enhance awareness and recreational experience for users of the multi-use river trail.	Create views to river and access from golf course.	Coordinate with Mission Trails Regional Park Master Plan, citizens advisory committee, private land owners and appropriate agencies to identify specific trail alignment, establish easements and means to implement.
G6S	Support the implementation of the Old Mission Dam Dredging Capital Improvement Project.	Explore the potential to reintroduce sediment excavated above dam into the river system downstream to invigorate sediment transport process.	Ensure native habitat value along the river.		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.	Continue dialogue with Mission Trails Regional Park Master Plan and Citizens Advisory Committee.
Short Term - Plateau						
P1S	Create San Diego River Park Trail head, 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/trail head location.
P2S	Create historic interpretation zone.			Provide continuous multi-use trail.	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 providing information about the San Diego River Valley and its importance to the settlement of the valley as well as the natural systems and ecology of the region. Implement as part of the trail development.
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.		Potential for community educational program for removal of exotic vegetation	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.

	RECOMMENDATION	BENEFITS				IMPLEMENTATION STRATEGY
		HYDROLOGY	ECOLOGY	RECREATION	CULTURE / EDUCATION	
P4S	Create River Park Trail head, as a gateway to River Park at Carlton Oaks GC. Coordinate with City of Santee to create habitat and trail connection to Santee Lakes and to Mast Park.		Potential for native vegetation to replace non-native species within the golf course.	Provide continuous multi-use trail under SR-52 and through or adjacent to Carleton Oaks Golf Course that will connect to City of Santee trail system.		Initiate dialogue with City of Santee planners, Padre Dam Municipal Water District, golf course owners and City of San Diego to identify potential trail alignment, vegetation changes, and kiosk/trail head location. Coordinate with improvements proposed by Santee Lakes master Plan.
Long Term - Gorge						
G1L	Collaborate with Mission Trails Regional Park to create waystation at edge of Mission Trails Regional 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 as part of the Superior Mine redevelopment.
G2L	Continue to support maintenance of the Old Mission Dam dredging. This project may need to recur 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 into the river system downstream to invigo-rate sediment transport process.
Long Term - Plateau						
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, trail linkages under or over SR-52 to East Elliot and interpretation of San Diego River Valley history.
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	Integrate secondary stream channel through golf course with main San Diego River channel and create buffer. Expand native vegetation through golf course for wildlife habitat and to increase filtration to improve water quality.	Natural buffer will improve water quality by filtering runoff from golf course.	Natural buffer will expand wildlife habitat and improve connectivity.			Initiate dialogue with Carlton Oaks Golf Course to identify methods to modify golf course to be more environmentally compatible with river corridor.
P4L	Explore potential to realign some golf holes to eliminate dike, recreate stream meander, realign multi-use trails and expand native wildlife habitat. Consider a new concept for the golf course as a links or target course that is substantially native vegetation.	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 interpretive opportunities - Upper river, reservoirs, topography, communities, Gateway to San Diego.	Initiate dialogue with appropriate agencies, community/special interest groups and Carlton Oaks Golf Course to explore potential changes to course.

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	Mexican Elderberry	ru	deciduous tree

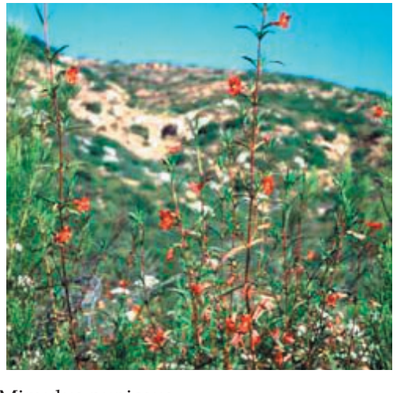
Salix Lasiolepis
http://ic.ucsc.edu/~wxcheng/wewu/

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 Sage/ Coastalbrush	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	Golden 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	Monkeyflower	c/css	woody perennial
Mirabilis californica	Wishbone Bush	c/css	evergreen shrub
Muhlenbergia rigens	Deer Grass	c/css	grass
Prunus ilicifolia	Holly-Leaf Cherry	c/css	evergreen tree
Rhamnus californica	California Coffeeberry	c/css	evergreen shrub
Rhus integrifolia	Lemonade Berry	c/css	evergreen shrub
Rhus ovata	Sugar Bush	c/css	evergreen shrub
Ribes indecorum	White-Flowered Currant	c/css	deciduous shrub
Rosa californica	California Wild Rose	ru	deciduous shrub
Salvia apicra	White Sage	c/css	drought-deciduous
Salvia mellifera	Black Sage	c/css	drought-deciduous
Sisyrinchium bellum	Blue-Eyed Grass	c/css	perennial
Typha spp.	Cattail	rl	marsh
Viguiera lanata	Woolly-Leaf Sunflower	c/css	drought-deciduous
Vitis girdiana	Wild Grape	ru	deciduous vine
Yucca whipplei	Chaparral Yucca	c/css	succulent

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

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 Sage	bu,	evergreen shrub
Artemisia californica	California Sage/ Coastal Sagebrush	bu	evergreen shrub
Baccharis 'centennial'	Centennial Baccharis	bu	evergreen shrub
Baccharis pilularis	Coyote Bush	bu	evergreen shrub
Ceanothus griseus horizontalis	Carmel Creeper	bu	evergreen shrub
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	Monkeyflower	br, bu,	shrub/perennial
Mirabilis californica	Wishbone Bush	bu	evergreen shrub
Muhlenbergia rigens	Deer Grass	bu	grass
Prunus ilicifolia	Holly-Leaf Cherry	bu	evergreen shrub
Prunus lyonii	Catalina Island Cherry	bu	evergreen shrub/tree

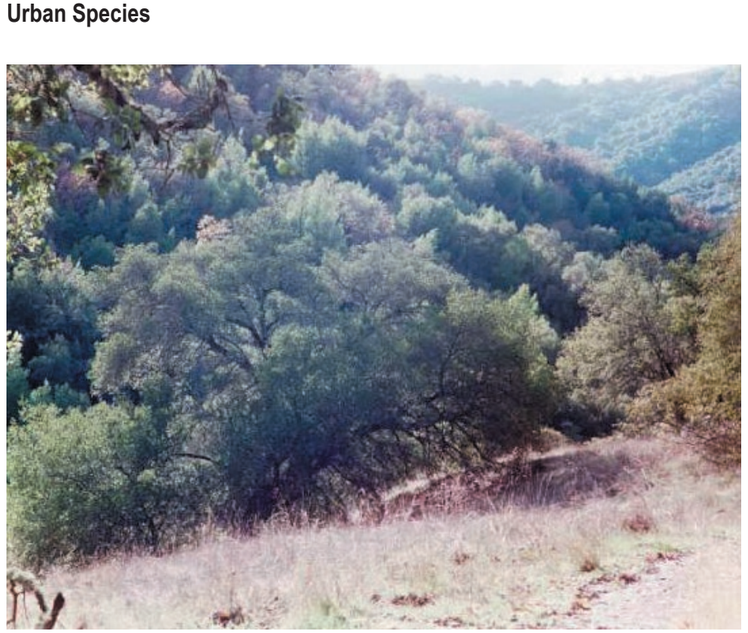
Mirabilis californica
http://www.santabarbarahikes.com/flowers

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

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

Rhamnus californica	California 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

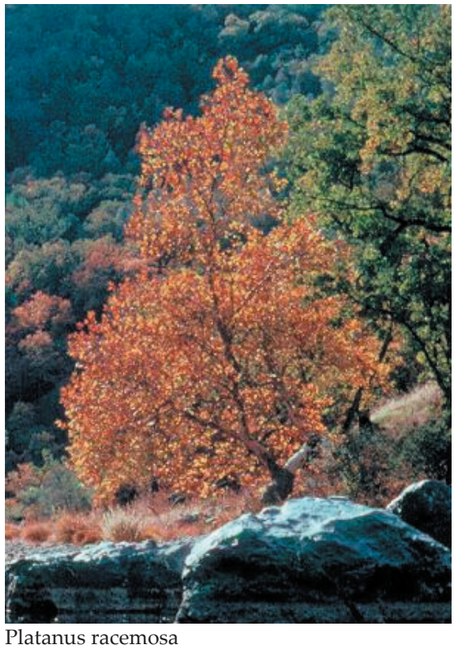
Urban Species



Quercus agrifolia
http://www.coestatepark.com
"Copyright (c) Lee Dittmann, used with permission."

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
"Copyright (c) Lee Dittmann, used with permission."

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

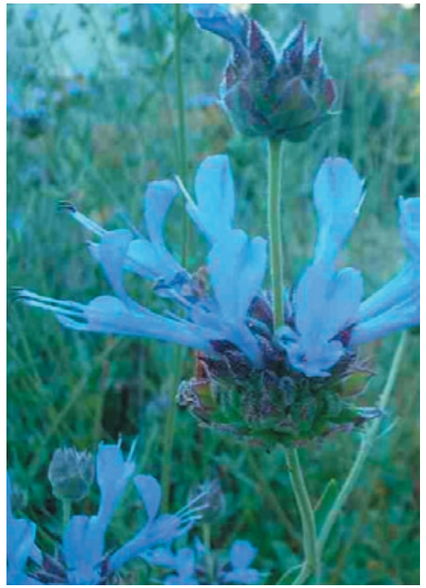
Trees

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 California Sage/ Coastal Sagebrush	evergreen shrub
Baccharis 'centennial'	Centennial Baccharis	evergreen shrub
Baccharis pilularis ssp.consainguinea	Coyote Bush	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
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

Dendromecon harfordii
http://www.theodorepayne.org



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

Glossary

active recreation	programmed activities requiring specific built facilities, such as baseball fields, soccer fields, swimming pools, etc.
aeration	a process of adding oxygen to water, accomplished by natural means such as streambed turbulence or by artificial means such as fountains
alluvial	of or relating to the sediment deposited by flowing water
alluvium	sediment deposited by flowing water
aquifer	an underground layer of porous rock, sand or gravel that bears water
basin	a region drained by a single river system
best management practices	structural, nonstructural or managerial methods that protect surface- and groundwater quality; these practices prevent or reduce the movement of sediment, nutrients, pesticides and other pollutants from the land into bodies of water
biodiversity	variability in different species of plants and animals within and between ecosystems
biomass	total amount of living matter, both plants and animals, within a given area
biota	inclusive term referencing the entire body of plant and animal life of a given region
braiding	condition in which a river channel has broken into a network of smaller, interwoven channels; erosion, sediment load, and variable flows can all contribute to braiding
Caltrans	California Department of Transportation
channelization	re-design of a river or stream's pathway; channelization will often straighten a waterbody's course to remove meander, and/or armor the banks so that flows can travel downstream faster
confluence	area where two or more rivers join and flow into each other
cut-off fixture	a lighting fixture that reduces or eliminates the light emissions above a 90 degree plane; a full cut-off fixture allows no lights to escape above a horizontal line through the fixture, a semi-cutoff allows a reduced amount of light above this angle
daylighting	redirection of a section of a stream or creek that was previously underground into an above-ground channel
delta	alluvial deposit at the mouth of a river; area where a river divides before entering a larger body of water
disturbance/recovery cycle	the length of time necessary for an ecosystem to restore itself following a damaging event; system resilience
easement	the legal right to use land not owned by the party in question for a particular or limited purpose, such as a highway or utility
ecostructure	the more constant, stable elements of the biosphere that form the framework of environmental interactions and events
ecosystem	a self-sustaining system of organisms (plant and animal) and environment that functions as a single ecological unit
ephemeral (river)	a river that flows sporadically and briefly, usually following storm events or snowmelt; the flow may last hours or days
evapotranspiration	loss of water from the soil by evaporation and by transpiration of the plants growing in the soil
exotic plants	non-indigenous vegetation; exotic species may be introduced to a region either intentionally or accidentally
filtration	the process of separating materials, as in pollutants or sediment, from the liquid in which they are suspended
floodplain	any normally dry land, usually adjacent to a stream river or lake, that is subject to flooding

floodway	a channel for carrying excess waters downstream, usually following storm events; water velocities tend to be greatest in this area
flow velocity	the volume of water passing through a specified area in a specified unit of time
FSDRIP	First San Diego River Improvement Project
glare	light that is significantly brighter than the level to which the eye is adapted, and which causes annoyance, discomfort or loss of visual performance and visibility
grade-separated crossing	a highway or road crossing that uses an underpass or overpass to allow different modes of travel to cross without interruption over the highway or road
groundwater recharge	process by which external water, usually rain or snowmelt, is added to an aquifer
headwaters	source of a river or stream
hydraulic	moved, operated or effected by liquid
hydrologic	dealing with the properties, distribution and circulation of water on and below the earth's surface and in the atmosphere
hydrologic regime	sum total of water that falls in or flows through an area on average during a given period
hydromodification	process whereby a streambank or riverbank is eroded by flowing water, typically resulting in suspension of sediments in the water
impervious	not allowing the passage of water
impound	to collect and confine water in a reservoir or other structure
infill	development of vacant, underutilized or derelict parcels within an already urbanized area
infiltration basin	a facility constructed within highly permeable soils that provides temporary storage of stormwater runoff, used to remove pollutants and encourage stormwater to seep back into the ground
infrastructure	the basic services and facilities needed for a community or society to function, such as transportation and utility systems
interceptor sewer	a sewer designed to convey dry weather flow from the combined sewer system to the treatment plant
interpretive kiosk	a small structure with one or more open sides that is used to display cultural or other educational materials about a nearby feature or area
invasive plants	species that disrupt native plant communities; these species compete with and may often displace native vegetation
Kumeyaay	late prehistoric peoples inhabiting the San Diego River valley, circa 2000 years ago to mid 1700's.
levee	an embankment to control flooding
light trespass	light which shines into neighboring properties or is of an undesirable or obtrusive nature
links style golf	golf course characterized by open, rolling terrain, natural vegetation, target landing zone and considerable use of topographic features
low flow channel	the course or path within a larger channel that typically carries flows during periods of low and/or normal water levels
macrophyte	algae visible to the naked eye; a macroscopic, aquatic plant
maintenance assessment district	a special district that assesses additional property tax within a defined region to fund and maintain unique public amenities that are above city standards, in this case, along the river corridor
meander	irregular, turning course of a stream or river

mitigation site	an area used to compensate for an environmental impact by providing substitute or replacement resources in another location
MTRP	Mission Trails Regional Park
multi-use trail	non-vehicular pathway that accommodates a variety of users, which may include pedestrians, bicyclists and, less frequently, equestrians
native plants	a region's indigenous vegetation; plant species which existed in an area before human intervention
non-point source load	pollutants that come from a wide variety of sources, rather than a single, specific point of origin
open space	area generally free from development or developed with low intensity uses that respect natural environmental characteristics
outfall sewer	a sewer that discharges treated sewage effluent to a stream or river
overstory	uppermost layer of foliage in the tree canopy
passive recreation	hiking trails, cultural interpretation nature study
perennial (river)	a river that flows continuously
physiographic	describing the earth's physical geography
phytoremediation	use of plants and trees to remove or neutralize contaminants
pioneer species	the first species or community to colonize a barren or disturbed area
plant community	the plant populations existing in a shared habitat or environment
plant palette	the set or selection of plants chosen for a particular purpose
plume	a subsurface column of one or more pollutants released from a point source
pocket park	a small park accessible to the public
pulse flow	high flows occurring during storm events
quasi-governmental entity	a body or organization that carries out, by contract or assigned power, functions normally executed by a government agency
reach	portion of a stream or river with a unified character or landscape
riffle	area of shallow, turbulent water passing through or over stone or gravel of a fairly uniform size
right of way	strip of land over which public infrastructure--roads, utilities, railways--is built
rip rap	large rocks of a fairly uniform size used to prevent erosion
riparian	of, on or related to the banks of a natural water body
SANDAG	San Diego Association of Governments
sediment load	organic and inorganic matter, both large and small, that is suspended in and/or carried by moving water; includes suspended particulate matter, nutrients dissolved in water as well as gravel or stones that move along the bottom of the streambed
sediment transport	the movement of materials by gravity, water or wind
setback	a required distance between property line and edge of building or structures; setbacks may apply from all (front, side, rear) or no property lines of a particular parcel
sight line	imaginary line from the eye to a perceived object
sky glow	a condition where the night sky is illuminated by overly bright electric lights, producing a luminous haze that prevents a clear view of the stars
spill light	light which extends outside the intended area or object of illumination

stakeholder	an individual or group who has a particular interest, monetary or otherwise, in a specific topic or project
substrate	the base on which an organism lives
sustainable design	design that meets the needs of the present without compromising the ability of future generations to meet their own needs; the thoughtful use of resources that reduces the negative impacts
swale	a shallow topographic depression designed to convey water, usually from storm events
symbiotic	describing a cooperative relationship of two dissimilar organisms that is mutually beneficial to each
synergy	combined energy of two or more organisms or entities that is advantageous to both or all parties
tidal marsh	low, flat marshlands traversed by channels and tidal hollows, subject to tidal inundation
topography	the surface features, both natural and human-made, of a region
tributary	a small river or stream that flows into a larger river or stream
trunk sewer	a sewer that receives wastewater from many areas
understory	underlying layer of vegetation, particularly smaller trees and shrubs, in the tree canopy
urban runoff	water that collects and quickly runs off of primarily impervious surfaces such as roofs, streets, sidewalks, parking lots; this water, carrying such things as oils, grease, pesticides, soil, pet droppings, is untreated when it enters the storm sewer system and is thus one of the largest sources of non-point waterway pollution
water quality buffer	a vegetated zone adjacent to a water body that helps prevent pollutants from entering surface waters by trapping sediment and the substances contained therein
watershed	a region draining into a river, river system or other body of water; may contain several basins
waystation	a rest or interpretive area occurring between principal destinations along a route such as a bike trail
xeriscape	the use of drought-resistant and water-conserving plants

References

606 Studio, Department of Landscape Architecture, 2002. San Diego River Park Conceptual Plan. California State Polytechnic University, Pomona.

Anchor Environmental CA, L.P., et al. 2003. Subtask 8.5 San Diego River Watershed Water Quality Report. pp. 97.

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/

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.

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.

Dunne, Thomas and Leopold, Luna, 1978. Water in Environmental Planning. W.H. Freeman and Company, New York, San Francisco.

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, Michael. 1986. Landscape Ecology. John Wiley and Sons. New York. 1986.

Horne, A.J. and Goldman, C.R. 1994. Limnology 2nd edition. McGraw-Hill, Inc. New York.

Lynch, Kevin, 1974. Temporary Paradise? A Look at the Special Landscape of the San Diego Region. Massachusetts Institute of Technology, Cambridge.

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

McPhee, John, 2000. Annals of the Former World; Assembling California. Farrar Straus & Giroux, New York.

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

Mount, Jeffrey, 1995. California Rivers and Streams: The Conflice Between Fluvial Process and Land Use. University of California Press. Los Angeles, California.

National Research Council (NRC). 1992. Restoration of Aquatic Ecosystems-Science, Technology, and Public Policy. National Academy Press. Washington, D.C.

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

Pryde, Phillip, 1992. San Diego, An Introduction to the Region. Third Edition. San Diego: Department of Geography, San Diego State University.

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

RWQCB. 2003. California Regional Water Quality Control Board, San Diego Region, 2003. Status Report: San Diego River Watershed. To John H. Robertus from Michael Porter, September 10, 2003.

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

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