3.0 Watershed Overview

3.1 Physical Characteristics

The Rose Creek Watershed (RCW) consists of three primary drainages; Rose Canyon, San Clemente Canyon, and Stevenson Canyon. It extends 13 miles east to west from its eastern most tip on MCAS Miramar to the confluence of Rose and San Clemente creeks generally at the intersection of Interstate 5 and State Route 52 before turning south for an additional 3 miles before entering Mission Bay. The physical characteristics of the RCW determine the hydrology, vegetation and development patterns for the entire watershed. The RCW is characterized by relatively steep foothills in the headwaters, transitioning to broad mesa's throughout the mid-section, which drain into steeply incised canyons as runoff concentrates and flows though the primary drainages towards Mission Bay. These characteristics are discussed in the sections that follow to increase the understanding of the natural processes that affect the RCW.

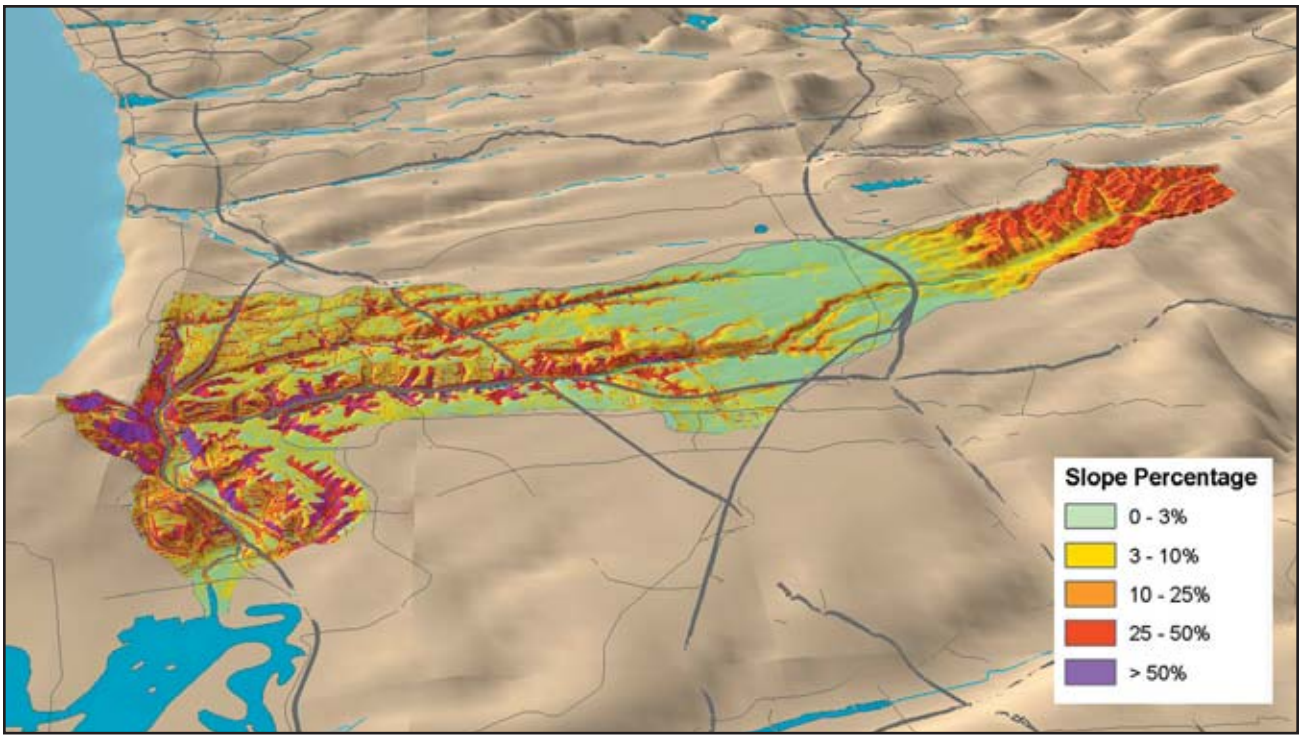
3.1.1 Elevation

The topographic profile of the RCW ranges from sea level at the mouth of Rose Creek at Mission Bay to over 1,100 feet in the headwaters on MCAS Miramar. The mid-elevations (250-500) (e.g. Mesa Tops) dominate the RCW, representing over 80% of the watershed. The most noticeable high point is Mt. Soledad in La Jolla that rises 822 feet above sea level.

3.1.2 Slope

Steep slopes (>50%) are predominantly found along the bluffs of Rose and San Clemente Canyons within the lower half of the RCW. These slopes lessen in steepness as the canyons move eastward toward the mesas of MCAS Miramar. Gently sloped mesa tops (0-3%) dominate the watershed occupying roughly 39% of the watershed (Figure 3-1). West of Interstate 805 (in the communities of Clairemont Mesa and University) the mesa tops are highly developed, which is in sharp contrast to the large expanse of undeveloped mesa top present on MCAS Miramar. A majority of the moderately steep slopes between 25-50% can be found in the headwaters within eastern MCAS Miramar.

Figure 3-1: 3d view w/slopes draped *Existing Conditions Report - Figure 4-2*



3.1.3 Precipitation

Precipitation patterns show the average annual precipitation totals ranges from about 12 inches to 15 inches in a west to east gradient, with the eastern headwater receiving the highest amounts. This pattern reflects a mild influence from the Peninsular mountain range that is common throughout the coastal portions of southern California where precipitation generally increases with increasing elevation. The typical southern California coastal climate includes a dry season typically occurring during the summer months with higher precipitation primarily during the winter and spring. This natural climatic pattern would typically only support stream flows during the wet season or for short period of times after rain events. However, the lower reaches of the streams within the RCW currently support nearly year-round flows resulting from urban runoff and over irrigation.

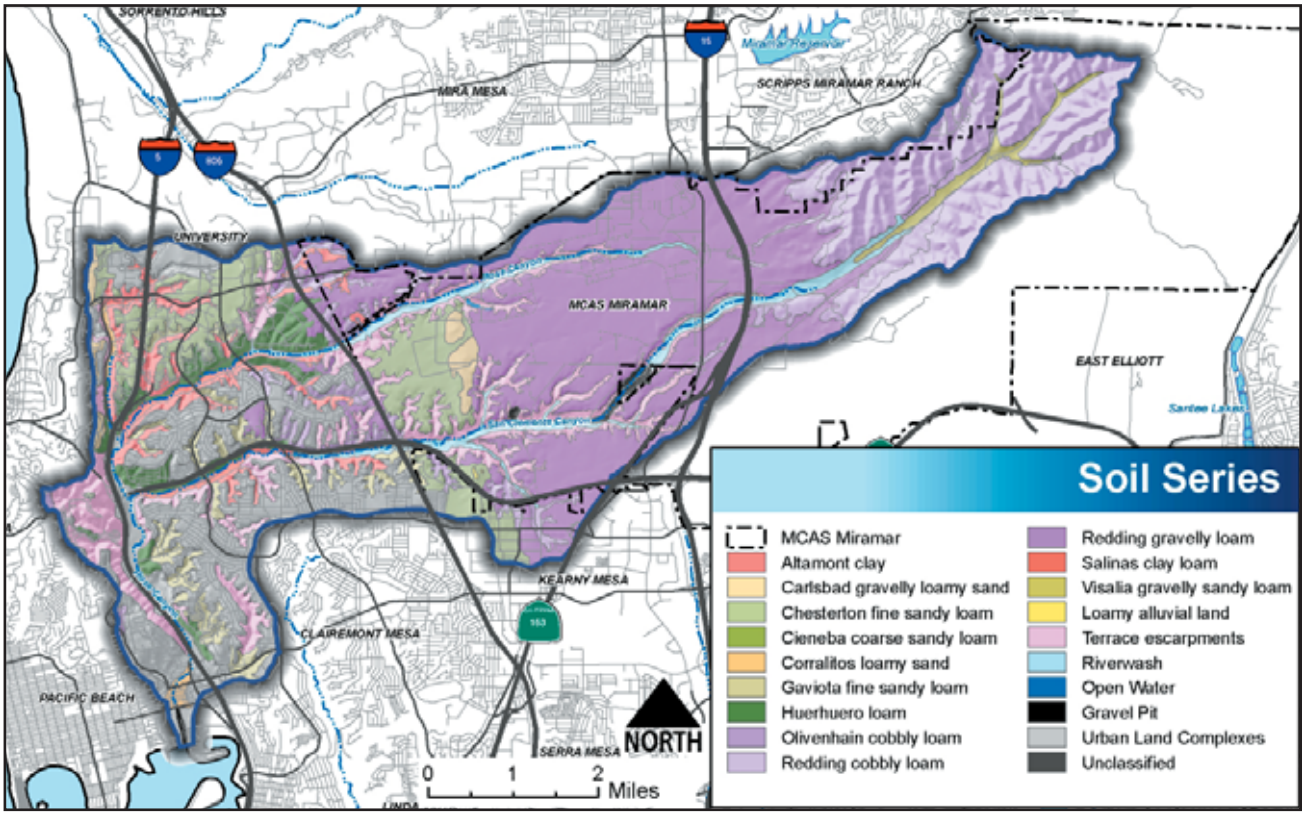
3.1.4 Soils

The RCW is comprised of approximately 20 different soil series with five of these series representing nearly 86 percent of the RCW (Table 3-1 and Figure 3-2). The most significant soil series are: Redding gravelly loam (30.1%); Redding cobbly loam (17.3%; Urban Land Complexes (13.6%); Loamy alluvial land (10.4%; and Chesterson fine sandy loam (8.3%). The two Redding series make up the vast majority of MCAS Miramar and the Chesterson and Urban land complexes dominate the developed portions west of Interstate 805. Nearly all of the soil series are included in Hydrologic Soil Group D, which is characterized by very slow infiltration rates when wet, high shrink-swell potential, shallow clay hardpans, or are shallow over near impervious subsurface material. The vast majority of the soil series are also have serve erosion potential and naturally generate higher rates of runoff due to their low permeability rates (<0.2inches/hour) and water holding capacity (<0.1inches/inch of soil).

Table 3-1: Soil Series

Description	Acres	Percent
Altamont clay	877	3.7%
Carlsbad gravelly loamy sand	267	1.1%
Chesterton fine sandy loam	1,899	8.1%
Cieneba coarse sandy loam	4	0.0%
Corralitos loamy sand	93	0.4%
Gaviota fine sandy loam	802	3.4%
Huerhuero loam	855	3.7%
Olivenhain cobbly loam	431	1.8%
Redding cobbly loam	3,994	17.0%
Redding gravelly loam	6,947	29.7%
Salinas clay loam	224	1.0%
Visalia gravelly sandy loam	255	1.1%
Loamy alluvial land-Huerhuero complex	4	0.0%
Terrace escarpments	2,405	10.3%
Riverwash	776	3.3%
Open Water	8	0.0%
Gravel Pit	89	0.4%
Urban land complex	3,143	13.4%
Unclassified area	352	1.5%
Total	**23,427**	**100.0%**

Figure 3-2: Soils Series *Existing Conditions Report - Figure 4-4*



3.1.5 Geology

Dr. Tom Demere, Curator of Paleontology at the San Diego Natural History Museum describes the geology of coastal San Diego as follows: “In the Coastal Plain region, resistant peaks composed of Mesozoic crystalline rocks (such as at Rock Mountain on the north side of Otay Valley, Black Mountain near Rancho Penasquitos, and Cowles Mountain near San Carlos) are actually “rooted” at depth to the buried Mesozoic crystalline rock terrain. These basement “highs” poke through the younger Cretaceous and Tertiary sedimentary cover and demonstrate the amount of topographic relief on the buried landscape of western San Diego County.

The Coastal Plain Region is underlain by a “layer cake” sequence of marine and non-marine sedimentary rock units that record portions of the last 140 million years of earth history. Over this period of time the relationship of land and sea has fluctuated drastically so that today we have ancient marine rocks preserved up to elevations around 900 feet above sea level and ancient river deposits as high as 1,200 feet.

Faulting related to the local La Nacion and Rose Canyon fault zones has broken up this “layer cake” sedimentary sequence into a number of distinct fault blocks in the southwestern part of the county. North of La Jolla the effects of faulting are not as great and the rock units here are relatively undeformed.

Excellent exposures of late Cretaceous-aged (72-76 million years old) marine sedimentary rocks occur in the sea cliffs along the west side of the Point Loma Peninsula and in La Jolla from Bird Rock to La Jolla Shores. The sea cliffs north of Scripps Institution of Oceanography provide spectacular exposures of Eocene-aged (42-48 million years old) marine sedimentary rocks.”

3.1.6 Geologic Hazards

Based in part on this 'layer cake' of sedimentary rock deposits, a variety of geologic hazards (Figure 3-3) exist within the RCW that need to be accounted for and potentially addressed during the planning and implementation of improvement projects.

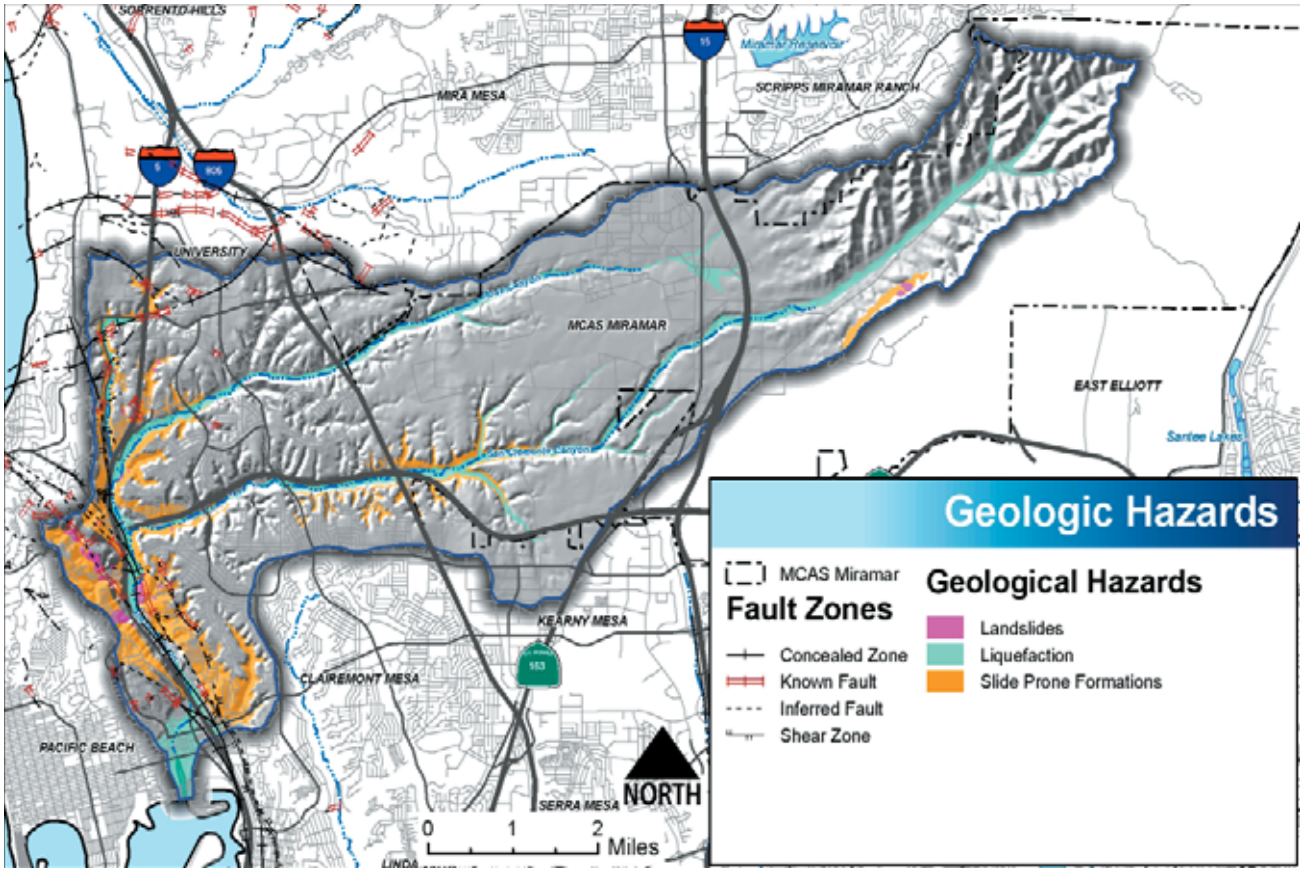
Landslides, a type of "mass wasting" denotes a downward movement of soil and rock under the influence of gravity. Landslides vary in sizes depending on the geology and initial cause of the landslide. Landslides have predominantly occurred on the steep slopes of Rose Creek south of the confluence with San Clemente Creek.

Liquefaction occurs in saturated soils in which the space between individual particles is completely filled with water. Increased water pressure caused by the shaking of an earthquake allows the particles to move in respect to each other thereby decreasing the stability of the soil. Potential liquefaction can be found along the entire length of both San Clemente Creek and Rose Creek and at the mouth of Rose Creek in Mission Bay.

Slide Prone Formations are areas of neutral to unfavorable geologic formations that can cause landslides. These areas can be identified as having steep slopes with very little vegetation to stabilize the slope. Slide Prone Formations can be found along the steep hills along Rose Creek and San Clemente Creek. The potential for landslides to occur during wet periods can be exacerbated by the build up of iceplant on many steep slopes, which can lead to slumping due to the added weight of the plant material and its shallow root system.

Figure 3-3: Geologic Hazards

Existing Conditions Report - Figure 4-5



the San Diego area. This fault zone is approximately 19 miles in length and extends from La Jolla south through Rose Canyon, then Old Town and on into San Diego Bay and across to the Silver Strand. The Rose Canyon Fault Zone is also responsible for two of San Diego's most recognizable landmarks—Mount Soledad and San Diego Bay. The Rose Canyon Fault Zone has steps or "kinks' in it. The left step near Ardath Road caused compression, which piled up sedimentary layers to form Mount Soledad. Near the south end of the fault zone, a right-step caused the fault to spread apart, resulting in the formation of a basin and San Diego Bay. This fault is capable of producing a magnitude 6.9 earthquake and has a slip rate of about 1.1mm a year, which is relatively small when compared to the 22-24mm/year of the San Andreas Fault.

3.2 Biological Resources

The RCW contains a diverse suite of biological resources focused within four areas: U.S. Marine Corps Air Station, Miramar (MCAS), Rose Canyon, San Clemente Canyon, and Mission Bay. Natural resources within the RCW include remnants of historically more widespread vegetation communities and wildlife habitats that continue to serve important conservation benefits for a variety of rare and sensitive plant and animal species. Most of the remaining natural lands within the project area are designated as open space (*e.g.,* Rose Canyon Open Space Park, Soledad Natural Park, Marian Bear Memorial Natural Park), except for the section of lower Rose Creek from the southern boundary of Marian Bear Memorial Natural Park to Mission Bay, which is designated as a mix of vacant land, flood control channel, industrial parks, and freeway rights-of-way. In addition to the open space areas available to the public, undeveloped portions of MCAS also support valuable natural resources within RCW.

These biological resources, both flora and fauna, have been the focus of local, state, and federal protection efforts for more than four decades. Within the RCW, these efforts have been consolidated and focused into two initiatives: the City of San Diego Multiple Species Conservation Plan (MSCP) and the MCAS Miramar Integrated Natural Resource Management Plan (INRMP). Both programs seek to provide protections to habitats that provide food and shelter to so-called 'umbrella' threatened or endangered species. Not all habitats and associated species are provided the same level of protection under these programs and in the case of the MSCP, sufficient funding has not been secured to provide for restoration, management and monitoring of designated lands. The recommendations in this Assessment are designed to augment, complement, and reinforce the protections anticipated in the MSCP. The following section describes these programs and the resources they are striving to protect and conserve.

3.2.1 Planning Efforts

The MSCP is a habitat conservation program for southwestern San Diego County. The MSCP is intended to preserve a network of habitats to protect endangered and threatened species while allowing for economic development. It was created to meet the habitat needs for multiple species rather than focusing on individual species. A component of the MSCP were the Biological Core and Linkage Areas (BCLA), which were established to prioritize preservation efforts (Figure 3-4). MCAS Miramar does not participate in the MSCP, but has its own conservation plan as described later in this section. Over 2,000 acres of land, or ~9% of the RCW, was identified as a BCLA.

As the MSCP program evolved, the BCLAs were refined, augmented, and prioritized. The resulting targeted conservation areas were termed Multiple Habitat Planning Areas (MHPA) and are the areas in which preserves will be assembled and managed for their biological resources. MHPAs are defined by physical areas with mapped boundaries for conservation, as well as areas with quantitative criteria for conservation of vegetation communities tied to criteria for preservation design (Figure 3-5). The City of San Diego open space parks associated with Rose Canyon and San Clemente Canyon make up most of the 1,522 acres of MHPA land within the RCW.

Figure 3-4: MSCP Biological Core & Linkage Areas *Existing Conditions Report - Figure 5-1*

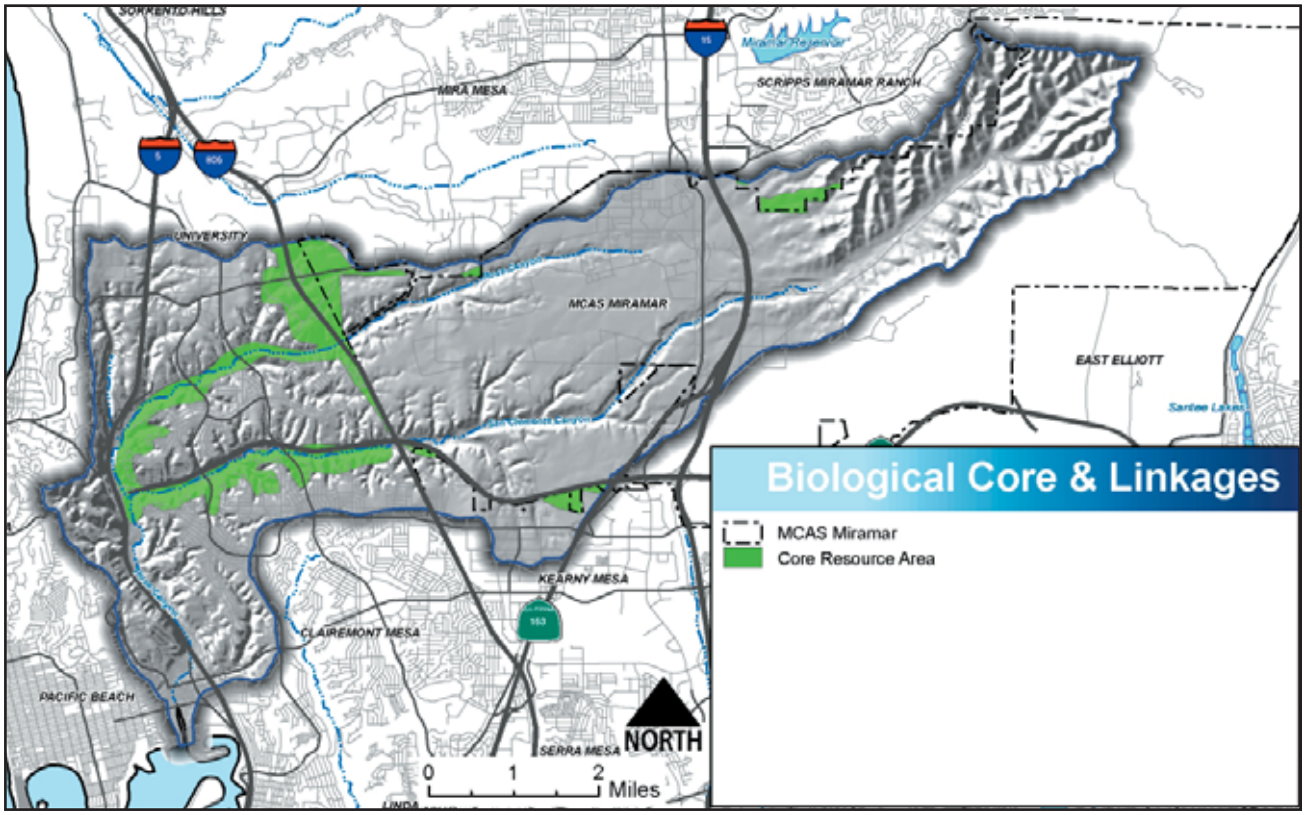
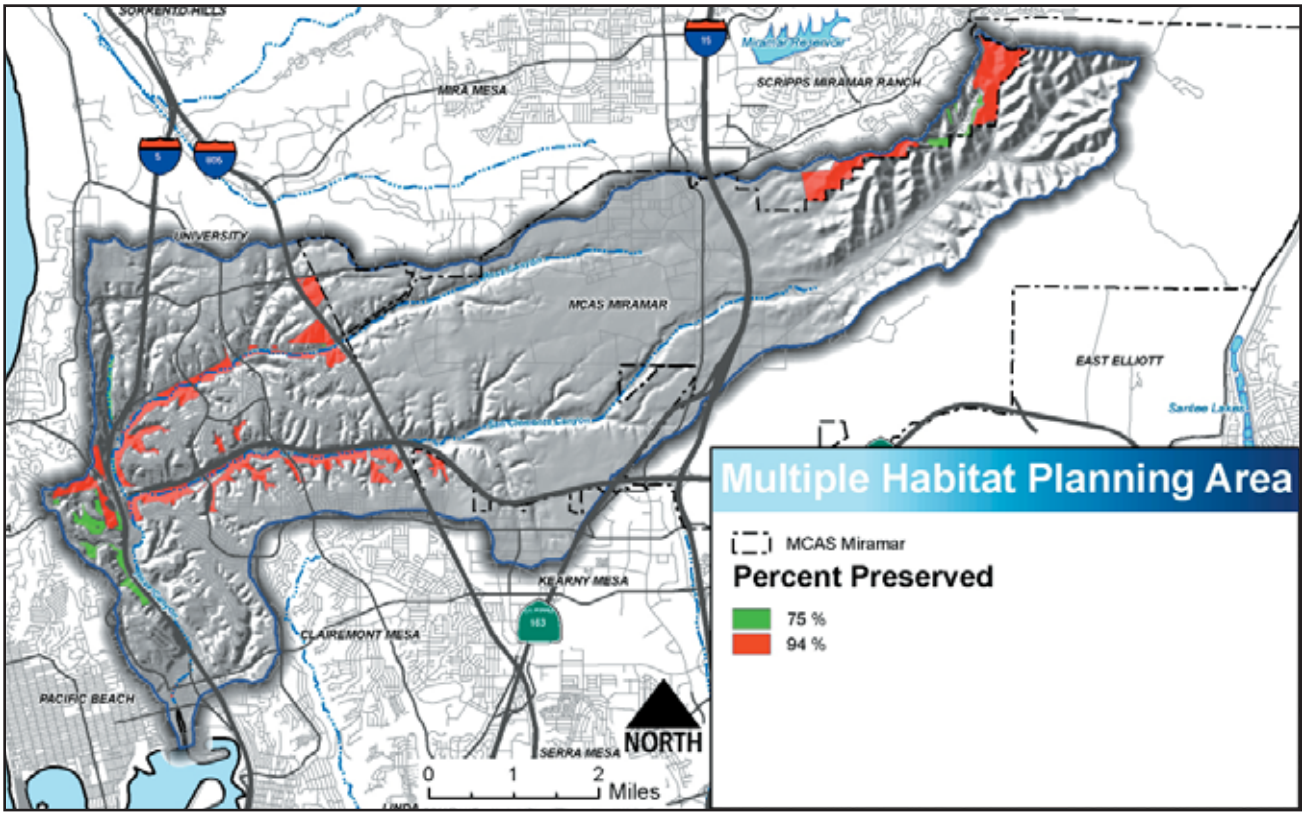
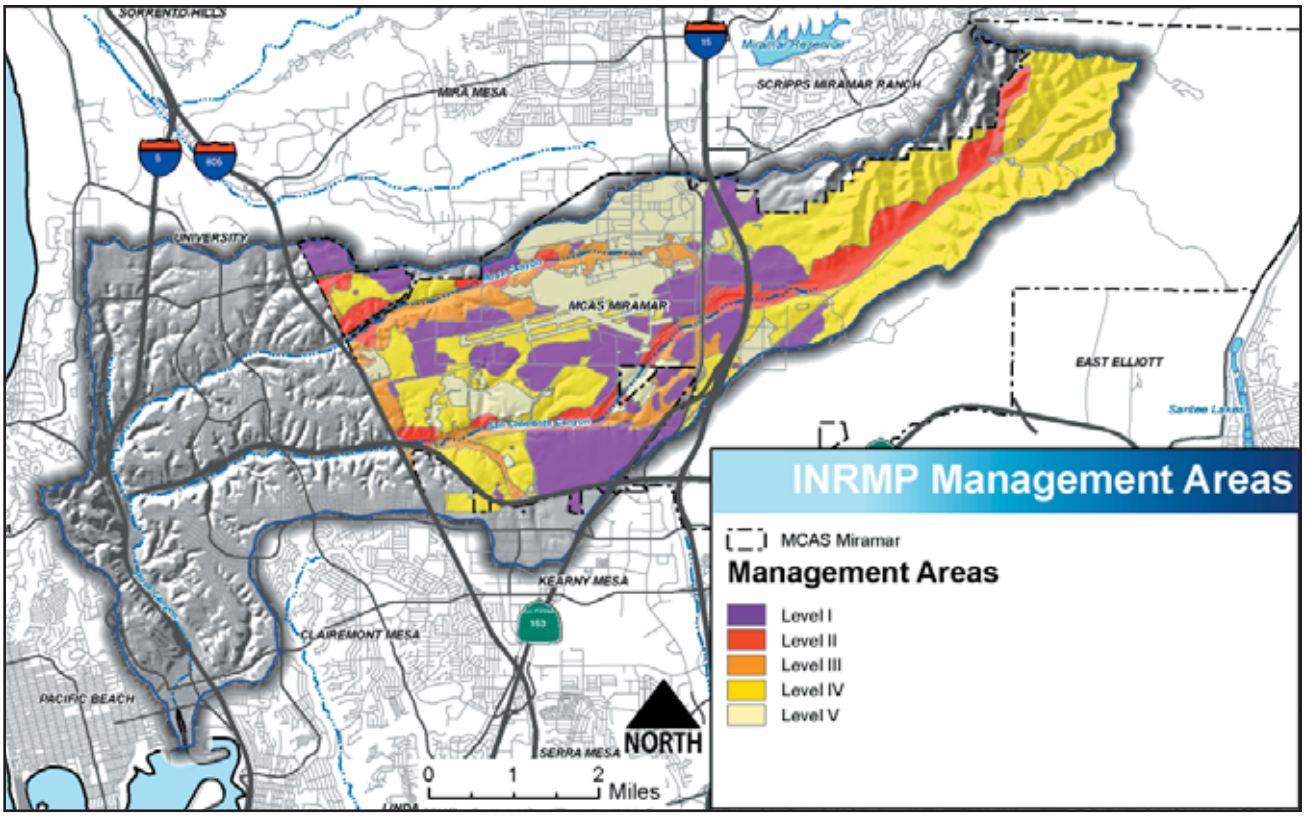


Figure 3-5: MSCP Multiple Habitat Planning Areas *Existing Conditions Report - Figure 5-2*



MCAS Miramar is implementing its own habitat management efforts through its INRMP. The purpose of the INRMP is to integrate MCAS Miramar's land use needs with the management and conservation of natural resources. The INRMP summarizes the baseline information that ensures compliance with regulatory and planning processes such as those by the National Environmental Policy Act, Endangered Species Act (ESA) and the Clean Water Act. MCAS Miramar's overall strategy for conservation and management is to limit activities; avoid conflicting development; and perform mitigation actions in areas supporting high densities of vernal pools and other wetlands, threatened or endangered species. The station uses the concept of Management Areas to aid in the management and conservation of its resources. Management Area delineations define the distribution of regulated and sensitive natural resources on MCAS Miramar warranting special attention. Currently, the INRMP management areas are in the process of revision, as is the entire document. The management area boundaries are being changed to reflect new information and developments. The revised INRMP is scheduled to be completed in the fall of 2005 and will display new Management Area boundaries (http://www.miramar.usmc.mil/miramar/Environ_naturalresource.htm). As part of MCAS Miramar's ongoing efforts to avoid and/or minimize impacts on sensitive species, vernal pools, other wetlands and habitat linkages, first consideration will be given to the use of Management Area Level V, the Level IV. This will assist planners in avoiding areas supporting the existing resources in Level I, II and III (Figure 3-6).

Figure 3-6: MCAS Miramar INRMP Management Areas *Existing Conditions Report - Figure 5-3*



3.2.2 Native Plant Communities

Native plant communities found within the RCW provide an insight into what plant and animal species could be present (Figure 3-7 and Table 3-2). Specific habitat types also give perspective on site-specific biological assessments necessary for review during the watershed management planning process. Throughout the RCW, Southern mixed chaparral, chamise chaparral, and non-native grassland typically dominate the north-facing slopes. Coastal sage scrub, non-native grassland and native grassland dominate the south-facing slopes. The canyon floors within the upper half of the RCW typically support limited riparian vegetation, usually in the form of sparse sycamores and willows, while the canyon floors in the lower half of the RCW support more robust riparian communities along the creeks and drainages, including southern willow scrub, willow riparian forest, and southern coast live oak riparian forest. In addition, freshwater marsh habitat occurs intermittently along the drainages.

Along the fringing floodplain terraces, non-native grasslands and exotic species generally dominate where there was once a floodplain community. Within MCAS Miramar, undeveloped mesa tops support native shrublands, grasslands, and large vernal pool complexes. Southern sycamore riparian woodland and Southern coast live oak riparian forest are rarely found close to the coast. San Clemente Canyon, and to a lesser degree Rose Canyon, are two of the exceptions. This habitat is an important habitat for a number of migratory and resident birds, including raptors, like this White-tailed Kite.

Table 3-2: Native Plant Communities

Native Plant Communities/Wildlife Habitats	Total Habitat Area (Acres)	Percent of Watershed
Developed	10448.6	44.60%
Disturbed Habitat	1805.2	7.71%
Non-Native Vegetation	567.0	2.42%
URBANIZED LANDS	**12,820.8**	**54.73%**
Eucalyptus Woodland	373.4	1.59%
Non-Native Grassland	1603.5	6.84%
Valley and Foothill Grassland	34.2	0.15%
Diegan Coastal Sage Scrub	2703.9	11.54%
Coastal Sage-Chaparral Scrub	368.9	1.57%
Chaparral	399.4	1.70%
Southern Maritime Chaparral	179.9	0.77%
Chamise Chaparral	2852.8	12.18%
Ceanothus Chaparral	23.2	0.10%
Southern Mixed Chaparral	1260.6	5.38%
Scrub Oak Chaparral	153.6	0.66%
Coast Live Oak Woodland	152.5	0.65%
UPLAND HABITATS	**10,106.1**	**43.14%**
Vernal Pool	68.3	0.29%
Mule Fat Scrub	13.9	0.06%
Southern Willow Scrub	46.8	0.20%
Southern Arroyo Willow Riparian Forest	35.3	0.15%
Southern Cottonwood-willow Riparian Forest	173.5	0.74%
Southern Sycamore Riparian Woodland	55.7	0.24%
Southern Coast Live Oak Riparian Forest	11.6	0.05%
Non-Vegetated Channel	12.4	0.05%
Open Water	29.1	0.12%
Emergent Wetland	7.4	0.03%
Freshwater Marsh	34.8	0.15%
Cismontane Alkali Marsh	0.0	0.00%
Southern Coast Salt Marsh	1.5	0.01%
Shallow Bay	10.5	0.04%
WETLANDS AND WATERS HABITATS	**500.8**	**2.14%**
TOTAL WATERSHED AREA	**23427.6**	

Figure 3-7: Native Plant Communities

Existing Conditions Report - Figure 5-4

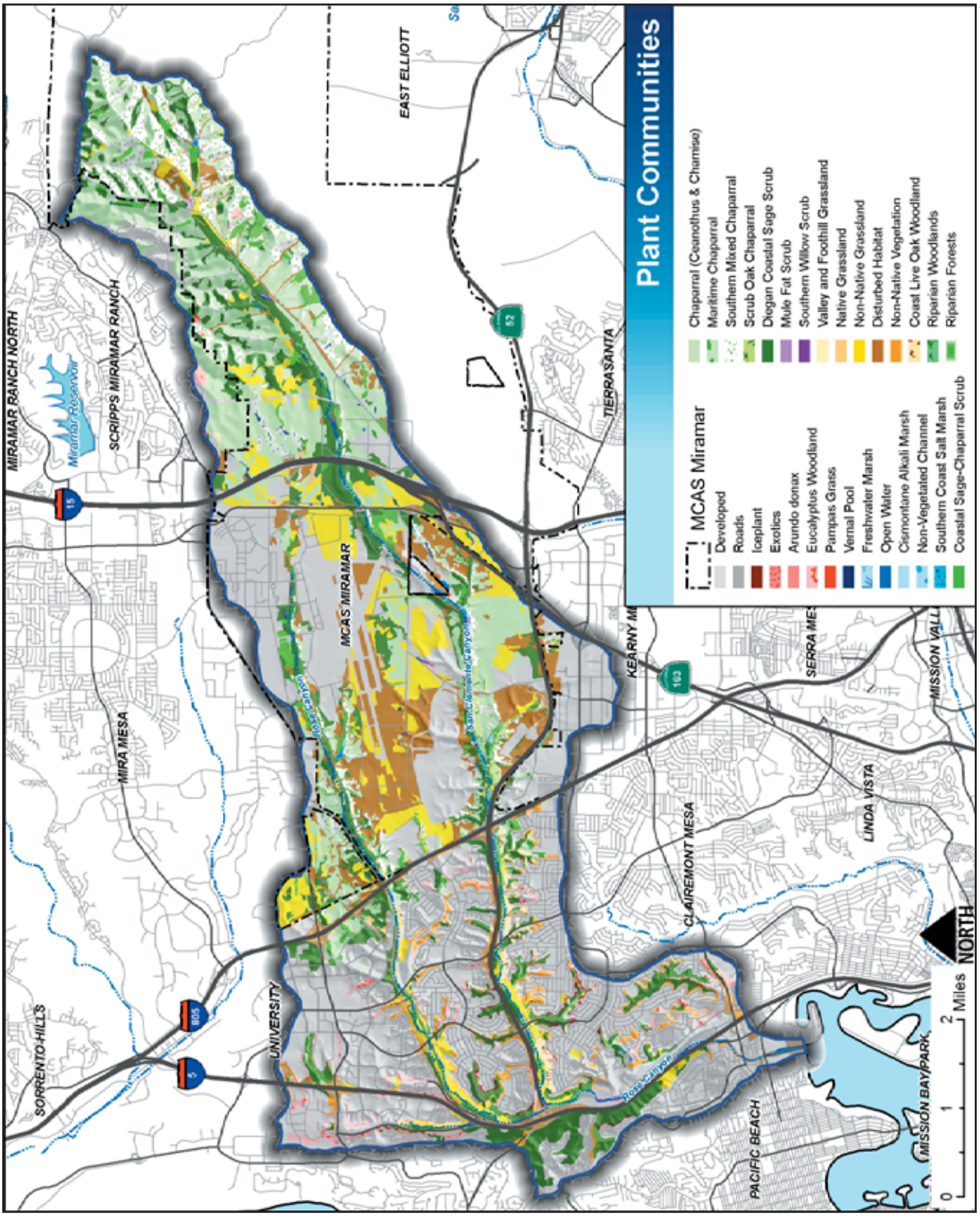
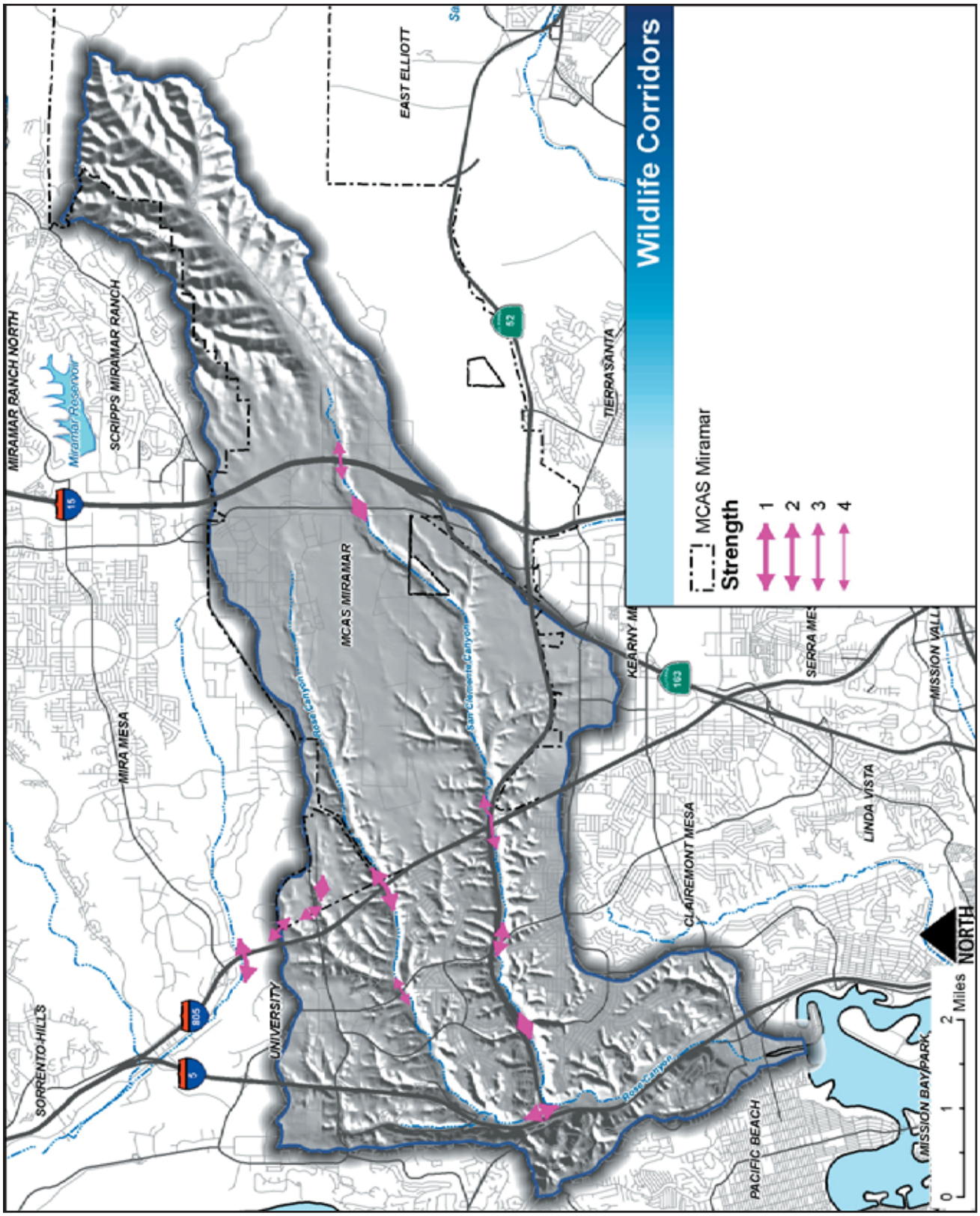


Figure 3-8: Wildlife Corridors



3.2.3 Wildlife Corridors

At a more regional level, the network of natural lands within the RCW are linked to adjacent open space areas both inside and outside of the watershed by habitat corridors. However, the few inter-watershed corridors that do remain are small in size, composed of marginal habitat, contain significant hazards to wildlife, and may be lost to future development. The natural habitats outside the RCW that remain connected to the RCW project area include Carroll Canyon to the north and the San Diego River watershed through MCAS to the east (Figure 3-8).

3.2.3.1 Wildlife Corridor Issues

A variety of issues related to wildlife movement within the RCW, as well as connections to other watersheds exists and are described below:

- Eastgate Mall Road and Miramar Road effectively block the best connection from the RCW to Carroll Canyon to the north. This creates a tenuous connection between these canyon systems across an area that exhibits extreme wildlife losses due to road kills.

- Interstate 805 acts as a significant north-south obstruction to the free movement of ground-dwelling animals between the RCW project area and MCAS Miramar, Mission Trails Regional Park and other open space lands located further east. Flying animals such as invertebrate, bird, and bat species are not as restricted and likely cross over this obstruction relatively freely.

- Interstate 805 spans Rose Canyon by a large-span bridge, which provides relatively unrestricted wildlife movement along the canyon bottom for even large mammals, such as mule deer, between the RCW project area and MCAS Miramar. However, within San Clemente Canyon, the configuration of the Interstate 805/State Route 52 interchange restricts this habitat connection to a low elevation bridge structure under a sizable interchange. The constriction through this area is further impaired by the presence of the Miramar Landfill on MCAS Miramar property along a significant portion of the linkage. Consequently, this constricted habitat link between the large areas of natural lands within the RCW project area and those within MCAS Miramar would not be expected to function as efficiently as the large Interstate 805 freeway bridge span over Rose Canyon.

- Interstate 15 serves as a significant barrier for ground-dwelling wildlife to move between RCW project area and MCAS Miramar in the west and the contiguous open space of eastern MCAS Miramar and Mission Trails Regional Park to the east. A small culvert connection under I-15 limits wildlife movement to and from upper San Clemente Canyon.

- The existing transportation infrastructure of the Genesee Avenue crossing over Rose Creek was designed for water flowage and railroad needs, it functions very poorly as a wildlife linkage.

Other impairments to wildlife movement also occur, including a number of stream channel segments that have been armored and built up on both sides. These create significant and perhaps even worse barriers to wildlife movement than do small culverts where some degree of cover is provided to wildlife making use of the corridors. Perhaps the greatest channel-armoring barrier to wildlife movements within the watershed is found at the

lower end of the watershed at the vertical sided concrete channel beneath East Mission Bay Drive. This un-vegetated concrete channel is frequently flooded and has vertical sides that abut high traffic businesses such as In-N-Out Burger, effectively precluding wildlife, particularly species such as the light-footed Clapper Rail, from moving between the riparian habitats of Rose Creek and the fringe habitats around Mission Bay. Other barren concrete trapezoidal channel sections occur upstream along Rose Creek and further impair wildlife movement within the lower portions of Rose Creek.

3.2.4 Special Status Species

Special status species are listed as sensitive by one or more of the following resource agencies or societies: United States Fish & Wildlife Service (USFWS), California Department of Fish & Game (CDFG), or the California Native Plant Society (CNPS). Species may be sensitive for a variety of reasons, including limited geographic distribution, documented or suspected population declines, extensive habitat loss, and/or natural occurrence in low numbers. One, or a combination of these factors, may cause a given species to be more vulnerable to extinction. There are a number of categories, depending on the significance of the threat of the species' survival, under which a given species can be listed as sensitive at the local, state, or federal level. The listing of the California Gnatcatcher as a federally listed species was the primary catalyst for the passage of the State of California Natural Community Conservation Planning Act of 1991 (NCCP). The Gnatcatcher is the most widely distributed species on the threatened and endangered list occurring within the RCW.

Special status species (both flora and fauna) are at the heart of both the MSCP and the INRMP. They are the focus of additional local, state, and federal regulations that provide specific protections for these species and the habitats they depend on for various portions of their life cycles. The special status species that have been sighted within the RCW (as documented by the CDF&G's Natural Diversity Database (CNDDB), SANDAG's regional sensitive species database, or MCAS Miramar's sensitive species database) are shown in Figure 3-9. Table 3-3 documents additional sensitive species that have been documented to exist within the RCW through other studies or are likely to occur based on habitat conditions that appear conducive to their occurrence.

3.2.5 Invasive Exotic Species

Invasive species infestation is second only to habitat destruction as a cause for the reduction of biodiversity worldwide (Czech 2004 and Wilcove et al 1998). An "invasive exotic species" is defined as a species that is: 1) non-native (or alien) to the ecosystem under consideration *and*; 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can be plants (flora), animals (fauna), and other organisms (e.g., microbes). Some exotics may exert pressure on biological communities by one or more of the following mechanisms: direct consumption; predation; competition; and/or as a vector for transmittance of pathogens and diseases. Because the RCW is surrounded by landscapes altered by urbanization, invasive exotic species are now plentiful, diverse, and constantly testing the ecological resistance of the remaining natural lands of the RCW.

The opportunity for many invasive plants and animals to become established within the RCW has come from the transportation and introduction by well-intentioned people, well before the true characteristics of these deleterious species were known. Countless species considered benign at one point in time have demonstrated their ability to become a formidable threat to the biodiversity throughout southern California and beyond. Invasive exotic plants species are often early colonizers of disturbed habitats and can often out-compete native species for space and resources. However, not all non-native species have the ability to spread quickly beyond the place where they are introduced and out-compete the native flora and fauna. Those that do spread quickly are considered an unwanted invasive species and should be targeted for eradication or control to minimize their impact on the quality of the remaining natural lands of the RCW.

Table 3-3: Special Status Species and Potential for Occurrence

Common Name	Scientific Name	Federal Status	California Status	CNPS	MSCP	Potential of Occurrence
RIPARIAN & WETLAND PLANTS						
San Diego Button Celery	*Eryngium aristulatum* ssp. *parishii*	FE	SE	1B	Covered	P
Southwestern Spiny Rush	*Juncus acutus* ssp. *leopoldii*	None	None	4	Not covered	P
Little Mousetail	*Myosurus minimus* ssp. *apus*	FSC	None	3	Covered	P
Spreading Navarretia	*Navarretia fossalis*	FT	ST	1B	Covered	P
Coulter's Salt-Marsh Daisy	*Lasthenia glabrata* ssp. *coulteri*	None	CSC	1B	Not Covered	L
Estuary Seablite	*Suaeda esteroa*	None	None	1B	Not Covered	L
San Diego Mesa Mint	*Pogogyne abramsii*	None	CSC	1B, R-E-D	Covered	P
Purple Stemodia	*Stemodia durantifolia*	None	CSC	1B	Not Covered	P
Prostrate Navarretia	*Navarretia prostrata*	None	CSC	1B	Covered	P
Long-spined Spine Flower	*Chorizanthe polygonoides* var. *longispina*	None	CSC	1B	Not Covered	P
Willowy Monardella	*Monardella viminea*	FE	ST, CSC	1B, R-E-D	Not Covered	P
Palmer's Sagewort	*Artemisia palmeri*					P
San Diego Marsh-Elder	*Iva hayesiana*					P
Woven-spored Lichen	*Texosporium sancti-jacobi*	None	CSC	1B	Not Covered	P
California Orcutt Grass	*Orcuttia californica*	FE	SE	1B	Covered	P
RIPARIAN & WETLAND ANIMALS						
Riverside Fairy Shrimp	*Streprocephalus wootoni*	FE	None	--	Covered	P
San Diego Fairy Shrimp	*Branchinecta sandiegonensis*	FE	None	--	Covered	P
Ring-necked Snake	*Diadophis punctatus*	None	SA	--	Not covered	P
California Legless Lizard	*Anniella pulchra*	None	CSC	--	Not covered	M
Southwestern Pond Turtle	*Emys marmorata pallida*	None	CSC	--	Covered	L
Arroyo Toad	*Bufo californicus*	FE	CSC	--	Covered	A
Red-legged Frog	*Rana draytoni*	FT	CSC	--	Covered	A
Red Diamond Rattlesnake	*Crotalus ruber*	FSC	CSC	--	Not covered	L
Orange-throated Whiptail	*Aspidoscelis hyperythra*	FSC	CSC, Protected	--	Covered	M
Western Spadefoot Toad	*Spea hammondii*	FSC	CSC, Protected	--	Covered (?)	L
Two-striped Garter Snake	*Thamnophis hammondii*	None	CSC, Protected	--	Not covered	M
Cooper's Hawk	*Accipiter cooperii*	None	CSC	--	Covered	P
Light-footed Clapper Rail	*Rallus longirostris levipes*	FE	SE	--	Covered	L
Least Bell's Vireo	*Vireo bellii pusillus*	FE	SA, SE	--	Covered	L
Redhead	*Aythya americana*	None	CSC		Not covered	O
Peregrine Falcon	*Falco peregrinus*	None	SE		Covered	O
Willow Flycatcher	*Empidonax traillii brewsteri*	None	SE		Not covered	O
Yellow Warbler	*Dendroica petechia morcomi*	None	CSC		Not covered	P
Yellow-breasted Chat	*Icteria virens longicauda*	None	CSC		Not covered	P
Tri-colored Blackbird	*Agelaius tricolor*	None	CSC		Covered	O
Townsend's big-eared bat	*Corynorhinus townsendii*	None	CSC	--	Not covered	L
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	None	CSC	--	Not covered	P
Pallid bat	*Antrozous pallidus pacificus*	None	CSC	--	Not covered	L
Western mastiff bat	*Eumops perotis*	None	CSC	--	Not covered	P
Bobcat	*Lynx rufus*	None	Calif. Regulated	--	Not covered	P
Mountain Lion	*Puma concolor*	None	Calif. Regulated	--	Covered	P
Coyote	*Canis latrans*	None	Calif. Regulated	--	Not covered	P
Southern Mule Deer	*Odocoileus hemionus fuliginata*	None	Calif. Regulated	--	Covered	P
ESTUARINE ANIMALS						
Wandering (Saltmarsh) Skipper	*Panoquina errans*	None	None	--	Covered	P
California Brown Pelican	*Pelecanus occidentalis californicus*	FE	SE	--	Covered	L
White-faced Ibis	*Plegadis chihi*	None	CSC	--	Covered	P
Light-footed Clapper Rail	*Rallus longirostris levipes*	FE	SE	--	Covered	L
Western Snowy Plover	*Charadrius alexandrinus nivosus*	FT	CSC	--	Covered	L
California Least Tern	*Sterna antillarum browni*	None	CSC	--	Covered	L
Large-billed Savannah Sparrow	*Passerculus sandwichensis rostratus*	None	SE	--	Covered	L
Peregrine Falcon	*Falco peregrinus*	None	SE		Covered	P
Belding's Savannah Sparrow	*Passerculus sandwichensis beldingi*	None	SE	--	Covered	L

San Diego Button Celery

Spreading Navarretia (photo Greg Mason)

San Diego Mesa Mint

Willowy Monardella (photo Ken Gilliland)

Light-footed Clapper Rail

Least Bell's Viero (photo Bob Steele)

Table 3-3: Special Status Species and Potential for Occurrence (continued)

Common Name	Scientific Name	Federal Status	California Status	CNPS	MSCP	Potential of Occurrence
UPLAND PLANTS						
Orcutt's Brodiaea	*Brodiaea orcutti*	None	None	1B	Covered	P
Mesa Spike-Moss	*Selaginella cinerascens*	None	None	None	Not covered	P
San Diego Ambrosia	*Ambrosia pumila*	FE	None	1B	Covered	H
Graceful Tarplant	*Holocarpha virgata* ssp. *elongata*	None	None	4	Not covered	H
Del Mar Aster	*Lessingia filaginifolia* var. *linifolia*	None	None	1B	Not covered	P
San Diego Sunflower	*Viguiera laciniata*	None	None	4	Not Covered	H
Palmer's Grappling-Hook	*Harpagonella palmeri*	None	None	4	Not Covered	H
Snake Cholla	*Cylindropuntia californica* var. *californica*	None	None	1B	Covered	P
Variegated Dudleya	*Dudleya variegata*	None	None	1B	Covered	H
Del Mar Manzanita	*Arctostaphylos glandulosa* ssp. *crassifolia*	FE	None	1B	Covered	H
Wart-stemmed Ceanothus	*Ceanothus verrucosus*	FSC	None	2	Covered	P
Orcutt's Spineflower	*Chorizanthe orcuttiana*	FE	SE	1B	Covered	P
Summer Holly	*Comarostaphylis diversifolia* ssp.	FSC	None	1B	Covered	P
Short-leaved Dudleya	*Dudleya blochmaniae* ssp. *brevifolia*	FSC	SE	1B	Covered	A
San Diego Button Celery	*Eryngium aristulatum* ssp. *parishii*	FE	SE	1B	Not covered	P
San Diego Barrel Cactus	*Ferocactus viridescens* var. *viridescens*	FSC	None	2	Covered	P
Cleveland's Goldenstar	*Muilla clevelandii*	None	CSC	1B	Covered	P
Coast Barrel Cactus	*Ferocactus viridescens*	FSC	SE	1B	Covered	P
Coulter's Goldfields	*Lasthenia glabrata*	None	CSC	1B	Not covered	L
Campbell's Liverwort	*Geothallus laevis*	None	CSC	1B	Not covered	L
Bottle Liverwort	*Sphaerocarpos drewei*	None	CSC	1B	Not covered	P
Rayless Ragwort	*Senecio aphanactis*	None	CSC	1B	Not Covered	P
Nuttall's Lotus	*Lotus nuttallianus*	FSC	None	1B	Covered	L
San Diego Goldenstar	*Muilla clevelandii*	FSC	None	1B	Covered	P
Nuttall's Scrub Oak	*Quercus dumosa*	FSC	None	1B	Covered	P
UPLAND ANIMALS						
Monarch Butterfly	*Danaus plexippus*	None	CSC	--	Not Covered	P
Hermes Copper	*Lycaena hermes*	FSC	SA	--	Under Review	L
Western Spadefoot Toad	*Spea hammondii*	FSC	CSC, Protected	--	Covered ?	L
San Diego Horned Lizard	*Phrynosoma coronatum*	FSC	CSC	--	Covered	M
Orange-throated Whiptail	*Aspidoscelis hyperythra*	FSC	CSC, Protected	--	Covered	M
Coastal Rosy Boa	*Lichanura trivirgata*	FSC	SA	--	Not covered	L
Red Diamond Rattlesnake	*Crotalus ruber*	FSC	CSC	--	Not covered	L
Two-striped Garter Snake	*Thamnophis hammondii*	None	CSC, Protected	--	Not covered	M
Western Skink	*Eumeces skiltoniaus*	None	CSC	--	Not Covered	P
Western Whiptail	*Aspidoscelis tigris*	None	SA	--	Not Covered	P
Western Banded Gecko	*Coleonyx variegatus*	None	SA	--	Not Covered	M
Western Patch-nose Snake	*Salvadora hexalepis*	None	CSC	--	Not Covered	P
Granite Night Lizard	*Xanthusia henshawi*	None	SA	--	Not Covered	L
Northern Harrier	*Circus cyaneus*	None	CSC	--	To Be	P
Cooper's Hawk	*Accipiter cooperii*	None	-	--	Covered	P
Burrowing Owl	*Speotyto cunicularia hypugaea*	None	CSC	--	To Be	A
Coastal Cactus Wren	*Campylorhynchus brunneicapillus cousei*	None	CSC	--	Covered	P
Coastal California Gnatcatcher	*Polioptila californica californica*	FT	CSC	--	Covered	P
Southern California Rufous-crowned Sparrow	*Aimophila ruficeps canescens*	FSC	CSC	--	Covered	P
Bell's Sage Sparrow	*Amphispiza belli belli*	FSC	CSC	--	Covered	P
Prairie Falcon	*Falco mexicanus*	None	CSC	--	Not covered	O
Mountain Plover	*Charadrius montanus*	None	CSC	--	Covered	A
Vaux's Swift	*Chaetura vauxi*	None	CSC	--	Not covered	O
Olive-sided Flycatcher	*Contopus cooperi*	None	CSC	--	Not covered	O
California Horned Lark	*Eremophila alpestris actia*	None	CSC	--	Not covered	P
Grasshopper Sparrow	*Ammodramus savannarum perpallidus*	None	CSC	--	Not covered	P
Townsend's big-eared bat	*Corynorhinus townsendii*	None	CSC	--	Not covered	L
pallid bat	*Antrozous pallidus pacificus*	None	CSC	--	Not covered	L
Western mastiff bat	*Eumops perotis*	None	CSC	--	Not covered	P

Del Mar Manzanita

San Diego Goldenstar

San Diego Horned Lizard (photo Jim Melli)

Western Banded Gecko (photo Brad Hollinsworth)

California Gnatcatcher

Bell's Sage Sparrow (photo Bob Steele)

Table 3-3: Special Status Species and Potential for Occurrence (continued)

Common Name	Scientific Name	Federal Status	California Status	CNPS	MSCP	Potential of Occurrence
Mexican long-tongued bat	*Choernycteris mexicana*	None	CSC	--	Not covered	P
California pocket mouse	*Chaetodipus californicus femoralis*	None	CSC	--	Not covered	P
Northwestern San Diego pocket	*Chaetodipus fallax fallax*	None	CSC	--	Not covered	P
San Diego desert woodrat	*Neotoma lepida intermedia*	None	CSC	--	Not covered	P
black-tailed jackrabbit	*Lepus californicus benettii*	None	CSC	--	Not covered	L
badger	*Taxidea taxus*	None	CSC	--	Covered	L
bobcat	*Lynx rufus*	None	Calif. Regulated	--	Not covered	P
Mountain Lion	*Puma concolor*	None	Calif. Regulated	--	Covered	P
coyote	*Canis latrans*	None	Calif. Regulated	--	Not covered	P
Southern Mule Deer	*Odocoileus hemionus fuliginata*	None	Calif. Regulated	--	Covered	P

FE = Federal Endangered, FT = Federal Threatened, CSC = California Department of Fish and Game (CDFG) Species of Special Concern; SA = CDFG Special Animal, SE = California Endangered Species Act (ESA) Endangered, ST = California ESA Threatened. The abbreviation, FSC, indicates "Federal Species of Concern", which is a "term of art" for former Category 2 species whose conservation status is of concern to the USFWS but for which no official status has been designated. It is provided here for informational purposes only. CNPS = California Native Plant Society,

Status/Potential for Occurrence Codes: P = Present, H = High, M = Moderate, L = Low, A = Absent, O = occasional migrant or nonbreeding visitor.

Mountain Lion (photo Kenneth Fink)

Coyote (photo H.Towner)

Bobcat (photo Tom Brakefield)

Southern Mule Deer (photo Greg Skafte)

Unfortunately, the vegetation communities within the RCW are not in pristine condition, having been impacted by a variety of human activities that have contributed to invasive exotic species proliferation (Table 3-4 and Figure 3-10). Some of the most problematic species are pampas grass, tamarisk, arundo, castor bean, Brazilian pepper, and ice plant. Of these species, pampas grass is the most pervasive in the finger canyons and other disturbed upland areas, while ice plant is predominantly spreading downhill from private mesa top landscapes. The other species are primarily associated with the riparian and railroad corridors. The distribution of these invasive exotic species are most prevalent downstream of storm drain outfalls where disturbed conditions and regular water inputs favor their growth habitats over other native species. Tables 3-5 and 3-6 document other exotic invasive plants species and animal species respectively.

Table 3-4: Mapped Invasive Species

Common Name	Scientific Name	Mapped Area (acres)
Invasive Exotic Plant Species		
Hottentot Fig, Sea Fig	*Carpobrotus sp.*	85.99
Pampas Grass	*Cortaderia sp.*	16.82
Nasturtium	*Tropaeolum majus*	11.81
Brazilian Pepper Tree	*Schinus terebinthifolius*	3.47
Giant Reed	*Arundo donax*	3.07
Cape Ivy	*Delairea odorata*	1.98
Shamel Ash	*Shamel uhdei*	0.77
California Fan Palm	*Washingtonia filifera*	0.71
Canary Island Date Palm	*Phoenix canariensis*	0.69
Acacia	*Acacia sp.*	0.59
Algerian Ivy	*Hedera canariensis*	0.51
Eucalyptus	*Eucalyptus sp.*	0.50
Tamarisk, Salt Cedar	*Tamarix parviflora*	0.26
Landscape/Ornamental Trees	various	0.18
Myporum / Ngaio	*Myoporum laetum*	0.17
Castor Bean	*Ricinus communis*	0.16
Mission-Olive	*Olea europea*	0.07
Artichoke Thistle	*Cynara cardunculus*	0.01
Total Area of Invasive Exotic Plant Dominance		**127.76**

Figure 3-9: Special Status Species *Existing Conditions Report - Figure 5-5*

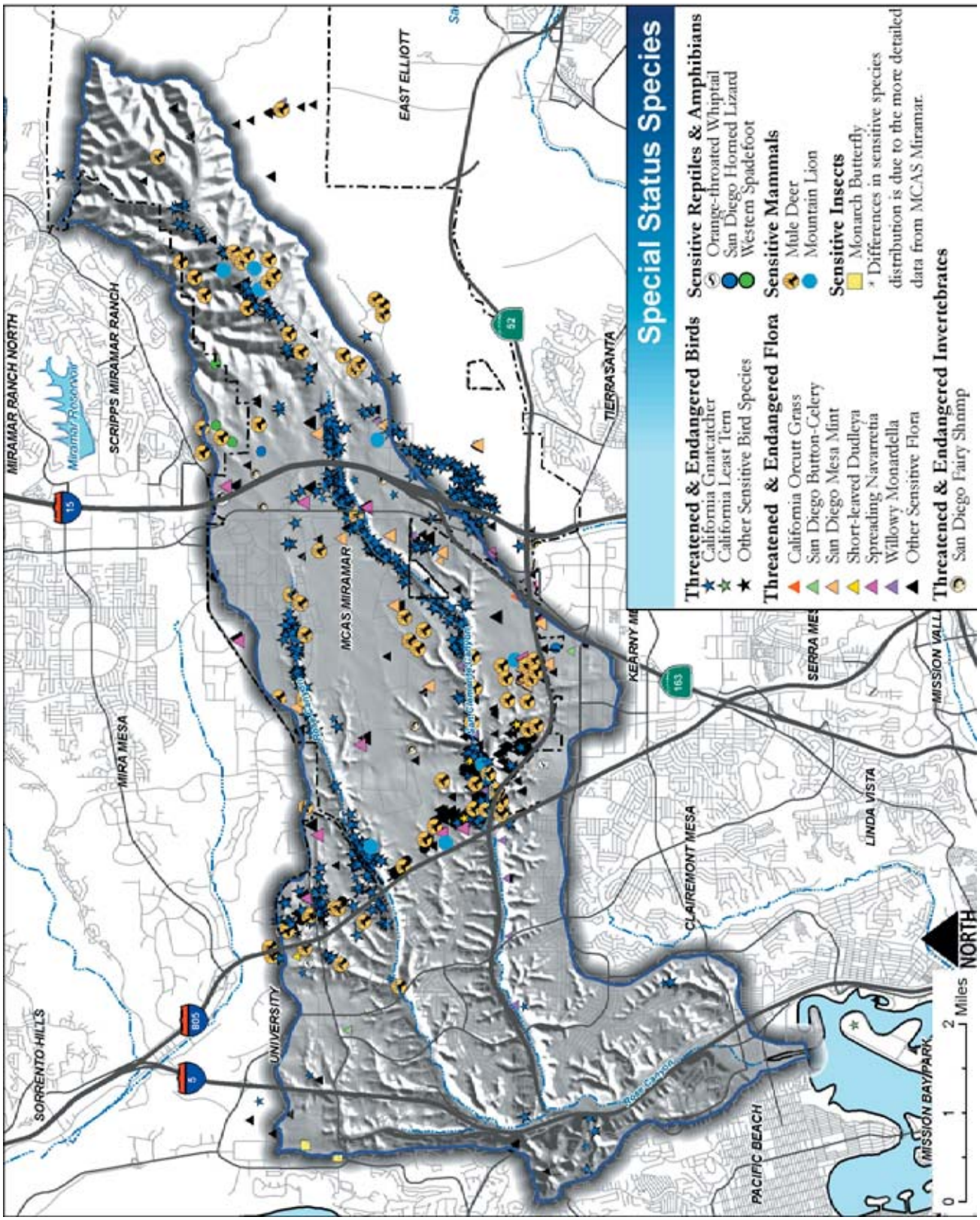


Figure 3-10: Invasive Exotic Plant Species

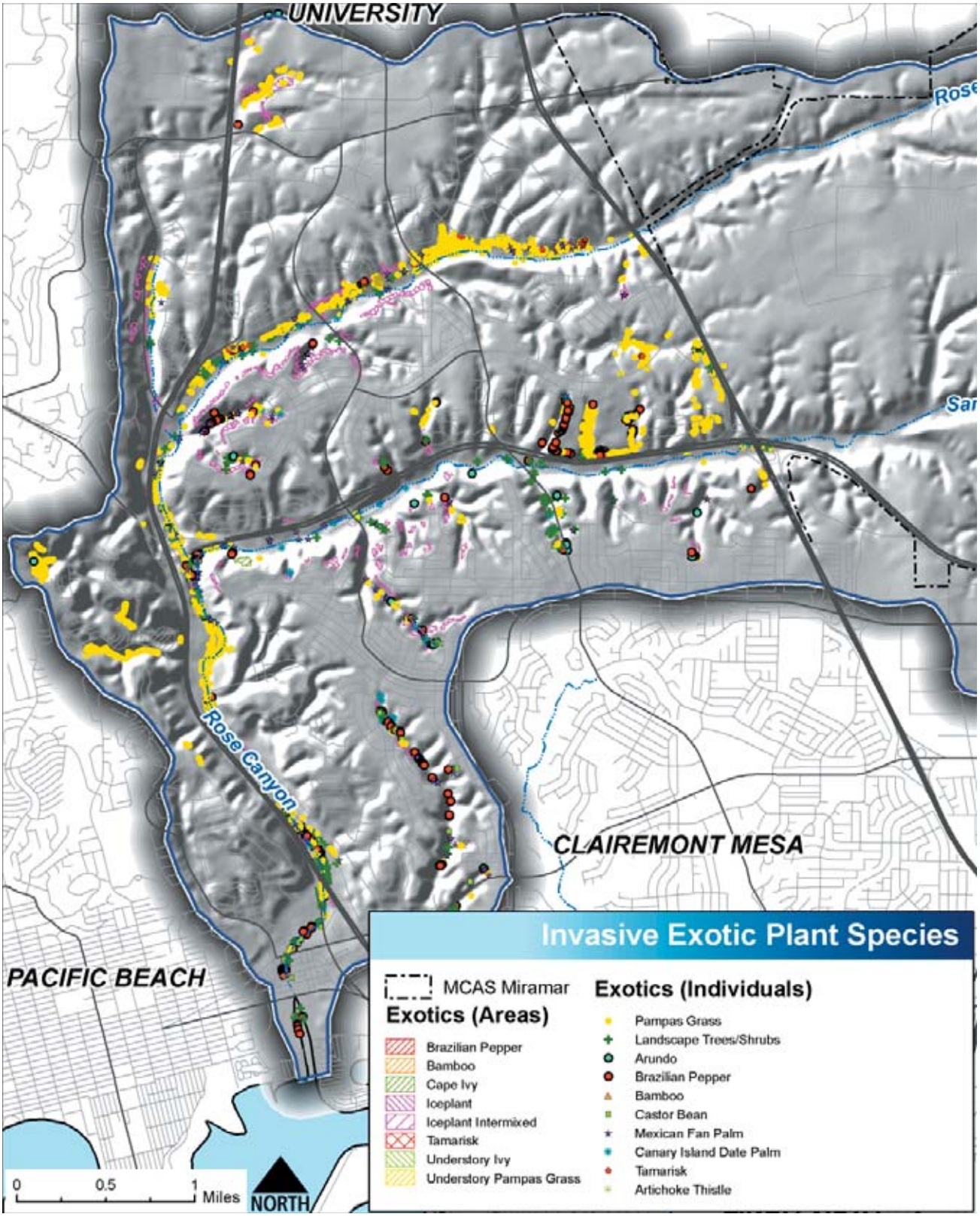


Table 3-5: Invasive Exotic Plant Species

Other Common Invasive Exotic Plant Species	
Common Name	**Scientific Name**
Water Bent	*Agrostis viridis*
Scarlet Pimpernel, Poor Man's Weatherglass	*Anagallis arvensis*
Hollow-Stem Asphodel, Onionweed	*Asphodelus fistulosus*
Australian Saltbush	*Atriplex semibaccata*
Slender Wild Oat	*Avena barbata*
Wild Oat	*Avena fatua*
Purple Falsebrome	*Brachypodium distachyon*
Black Mustard	*Brassica nigra*
Ripgut Grass	*Bromus diandrus*
Red Brome	*Bromus madritensis ssp.*
Foxtail Chess	*Bromus madritensis* ssp. *Rubens*
Italian Thistle	*Carduus pycnocephalus*
Tocalote	*Centaurea melitensis*
Yellow Star Thistle	*Centaurena solstitialis*
Garland/Crown Daisy	*Chrysanthemum coronarium*
Bull Thistle	*Cirsium vulgare*
Common Poison Hemlock	*Conium maculatum*
Brass buttons	*Cotula coronopifolia*
Bermuda Grass	*Cynodon dactylon*
African Umbrella Plant	*Cyperus involucratus*
Common Teasel	*Dipsacus sativus*
	Dittrichia graveolens
	Ehrharta erecta
Long-beak Filaree/Storksbill	*Erodium botrys*
Short-beak Filaree/Storksbill	*Erodium brachycarpum*
Red-stem Filaree/Storksbill	*Erodium cicutarium*
Red Gum, River Red Gum	*Eucalyptus camaldulensis*
Sweet Fennel	*Foeniculum vulgare*
Crete Hedypnois	*Hedypnois cretica*
Short-Pod Mustard	*Hirschfeldia incana*

Other Common Invasive Exotic Plant Species	
Common Name	**Scientific Name**
Glaucous Barley	*Hordeum murinum* ssp. *Glaucum*
Smooth Cat's Ear	*Hypochaeris glabra*
Perennial Pepperweed	*Lepidium latifolium*
Sweet Alyssum	*Lobularia maritima*
Italian Ryegrass	*Lolium multiflorum*
Cheeseweed	*Malva parviflora*
Horehound	*Marrubium vulgare*
Indian Sweetclover	*Melilotus indica*
Natal Grass	*Melinis repens*
Crystalline Iceplant	*Mesembryanthemum crystallinum*
Slender-Leaf Iceplant	*Mesembryanthemum nodiflorum*
Tree Tobacco	*Nicotiana glauca*
Mexican Palo Verde	*Parkinsonia aculeata*
African Fountain Grass	*Pennisetum setaceum*
Bristly Ox-Tongue	*Picris echioides*
Smilo Grass	*Piptatherum miliaceum*
Common Knotweed, Doorweed	*Polygonum arenastrum*
Annual Beard Grass, Rabit's Foot Grass	*Polypogon monspeliensis*
Wild Radish	*Raphanus sativus*
Curly Dock	*Rumex crispus*
Russian-Thistle, Tumbleweed	*Salsola tragus*
Mediterranean Schismus	*Schismus barbatus*
Common Groundsel	*Senecio vulgaris*
Common Catchfly	*Silene gallica*
London Rocket	*Sisymbrium irio*
Hare's-Ear Cabbage	*Sisymbrium orientale*
Common Sow-Thistle	*Sonchus oleraceus*
Spanish Broom	*Spartium juneceum*
	Vulpia myuros
Cockelbur	*Xanthium strumarium*

Nasturtium

Giant Reed (Arundo)

Cape Ivy

Salt Cedar (Tamarisk)

California Fan Palm

Castor Bean

Onionweed

Periwinkle (Vinca)

Cheeseweed

Artichoke Thistle

Bull Thistle

Italian Thistle

Yellow Star Thistle

Curly Dock

Table 3-6: Invasive Animal Species

Common Name	Scientific Name	Area Infested
Invasive Exotic Animal Species		
Argentine ant	*Iridomyrmex humilis*	lower watershed
African clawed-frog	*Xenopus laevis*	permanent freshwater pools
Red-ear Slider	*Trachemys scripta*	entire watershed
Brown-headed Cowbird	*Molothrus ater*	lower watershed
Black Rat	*Rattus rattus*	lower watershed
House Mouse	*Mus musculus*	lower watershed
Feral Domestic Cat	*Felis catus*	lower watershed
Virginia Opossum	*Didelphis virginiana*	entire watershed

Argentine Ant

African clawed-frog

Virginia Opossum

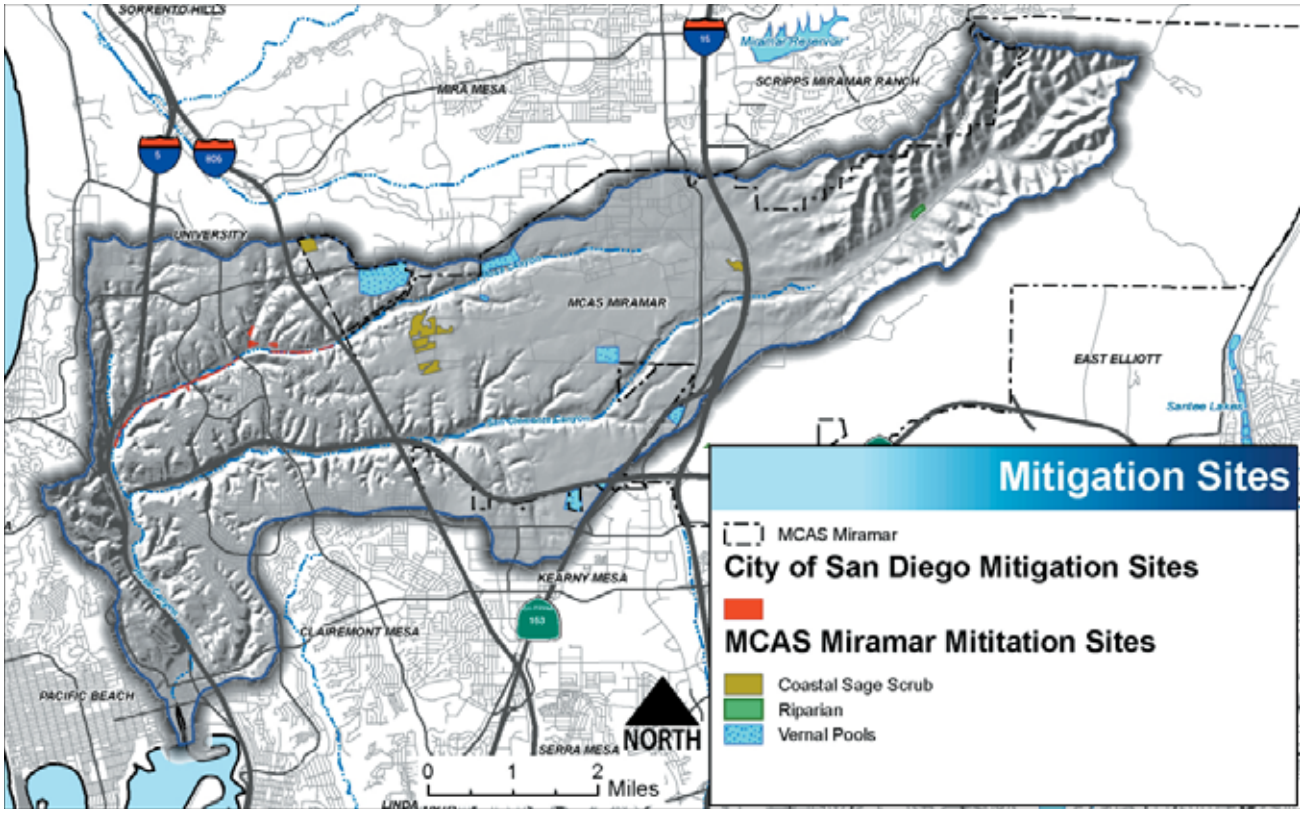
Red-eared Slider (photo John White)

Red Swamp Crayfish (photo Benjamin Miller)

3.2.6 Restoration, Enhancement and Mitigation Efforts

Documenting where previous restoration, enhancement, or mitigation efforts have occurred throughout the RCW is important in determining where future efforts can be appropriately planned and implemented. Figure 3-11 shows the restoration, enhancement, or mitigation efforts that the project team has identified to date. These represent efforts undertaken by MCAS Miramar, various City of San Diego departments, private developers, and volunteers. The three types of mitigation areas on MCAS Miramar are vernal pool restoration, coastal sage scrub mitigation and riparian mitigation. Currently, MCAS Miramar is restoring about five acres of vernal pool habitat, 88 acres of coastal sage scrub and 2.4 acres of riparian wetland. It should also be noted that some of the older mitigation sites that are beyond the five-year monitoring period have declined and are now infested with invasive exotics. The decline of these sites underscores the necessity for long-term maintenance and management of restoration and mitigation sites to prevent their gradual degradation by invasive exotic plants or human activities.

Figure 3-11: Mitigation Sites *Existing Conditions Report - Figure 5-6*



3.3 Water Resources

Water resources, whether generated and maintained by precipitation and groundwater or by urban runoff, are the circulation system of every watershed. A natural stream system acts as the distribution system not only for runoff from precipitation, but also for habitat building sediments and associated nutrients, seeds and rhizomes of many native plant species, and as shelter for many animals moving through and between watersheds. In semi-arid climates like San Diego, streams and ponds often provide the only source of year-round water for many animal species. Streams become critical components of a watershed's ecosystem during times of drought or catastrophic events like a fire. However, streams that occur in more developed watersheds also act as distribution systems for pollutants that are washed off landscapes, sidewalks, and streets; unnaturally erosive storm flows that can cause significant stream bank and bed erosion; seeds and rhizomes of invasive exotic plant species; and as shelter and concealment areas for non-native predators, such as domestic or feral cats.

The major surface water resources within the RCW are Rose Creek and San Clemente Creek. Both creeks flow southwesterly until their confluence near the interchange between Interstate 5 and State Route 52, then flow south to Mission Bay. Both creeks would naturally only have precipitation driven seasonal flows with riparian and aquatic communities adapted to periods of dry conditions. With the contribution of dry weather flows from the nearby urbanized landscaping, the lower sections of both Rose Creek and San Clemente Creek are now nearly perennial in nature. There are no significant groundwater aquifers present in the RCW. The aquifers that do exist are narrow shallow alluvium deposits that support the existing riparian communities along the canyon bottoms.

3.3.1 Streams

Both creek systems are very cobbled in nature with numerous sections of standing water in their lower reaches. The portions of Rose and San Clemente creeks east of Interstate 805 are intermittent streams with cobblestone streambeds and various trees growing intermittently within them (Figure 3-12). As the creeks progress southwest beyond Interstate 805, their character changes as dry-weather flows are added from adjacent urban development from over-irrigation of landscapes. These dry-weather flows have allowed for the formation of dense riparian scrub habitat with numerous small in-stream ponds as wide as six feet. Various types of riparian trees have taken root within the drier channel segments, or within the over-bank floodplain, including sycamores, bay laurel, coast live oak, and various willows. Along the lower portions of the creeks, the riparian scrub habitat is dense with a healthy understory and narrow channels varying from two feet to six feet wide. The San Clemente Creek channel is typically a bit wider than Rose Creek, which may in part be due to the less dense riparian understory that exposes the stream banks to more direct storm flows and erosion potential.

3.3.2 Ponds

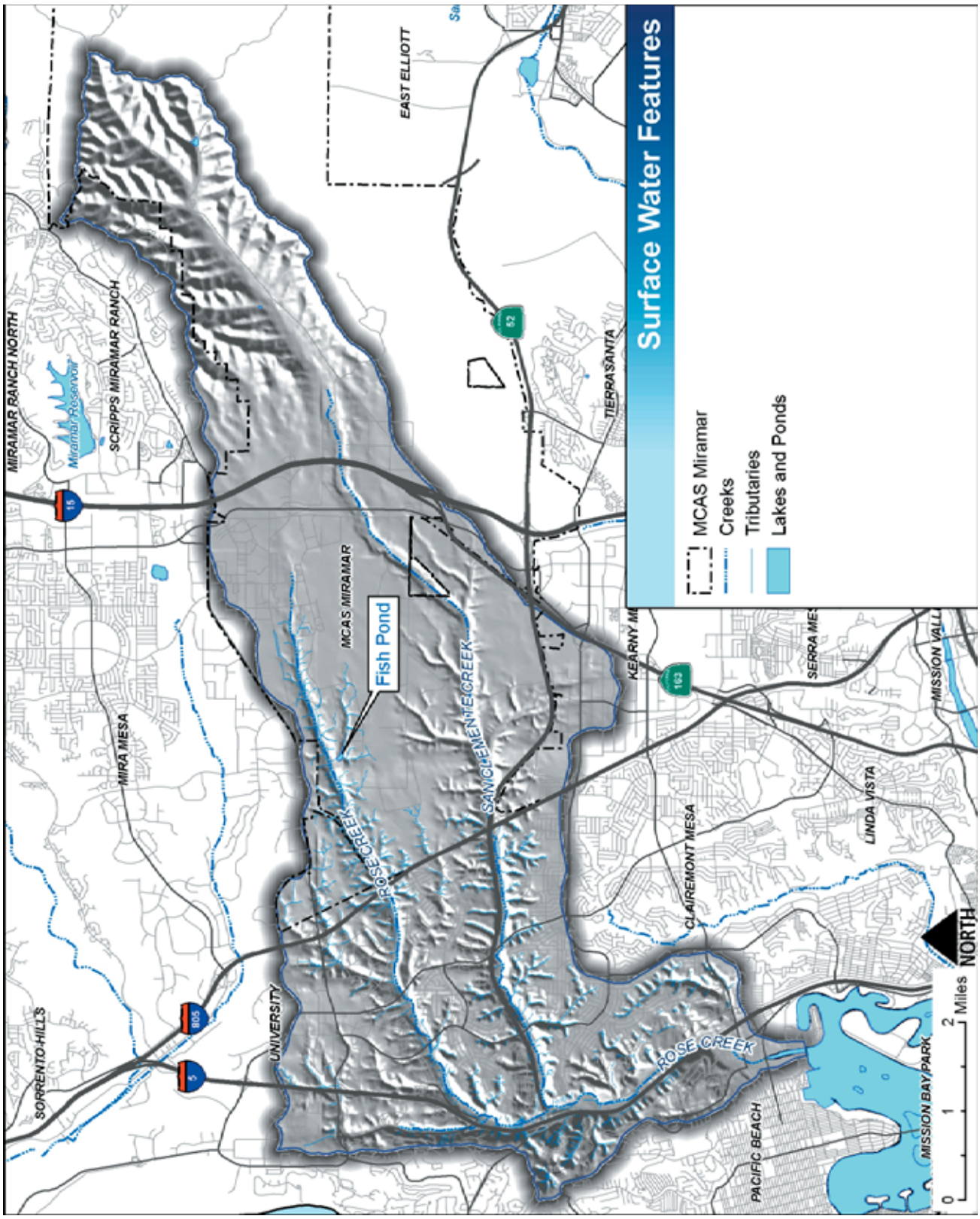
There are no major surface water impoundments within the Rose Creek Watershed. The closest major surface water impoundment is the Miramar Reservoir just north of the northeastern watershed boundary in Scripps Miramar Ranch. The largest surface water impoundment within the RCW is the Fish Pond within MCAS Miramar on Rose Creek (Figure 3-12). The Fish Pond is used for recreational purposes by MCAS Miramar personnel and has been stocked with non-native game fish species. Other small in-stream impoundments can be found along both Rose Creek and San Clemente Creek. The larger of these are found along San Clemente Creek at the site of past aggregate extraction activities near the current Sim J. Harris operation in the middle of MCAS Miramar.

3.3.3 Human Effects on Rose Creek

The earliest records and maps drawn by Mission Clerics from information gleamed from trappers and settlers of the San Diego area refer to False Bay (Mission Bay) and major floods in the San Diego River Valley (now Mission Valley) beginning in 1770. Devastating floods were recorded in 1780, 1825 and 1862.

Floodwaters in 1825 caused the San Diego River to shift its normal course from False Bay, emptying instead, into San Diego Bay. The river mouth was diverted back to False Bay in 1876 when silt made San Diego Bay too shallow for large sailing ships. In 1915, as San Diego was reveling in the fame of the World's Fair, False Bay officially became Mission Bay. Then the floods of 1916 occurred and redirected Rose Creek to where it is today. The flood velocity took a direct path to the bay, cutting a channel through the current area that is now the rock and concrete channel we see today. Business leaders of the time vowed to control the waters and had set their minds to turn the adjacent land into developable real estate. Men and machinery began the task of draining the "swamp" of Mission

Figure 3-12: Surface Water Features *Existing Conditions Report - Figure 6-1*



Bay and preparing it for the twentieth century. Gradual improvements to the new channel were accelerated in the 1930s (Figure 3-13) to accommodate WWII military needs, as well as postwar land development in the 1940s. The creek's straightened channel allowed development to squeeze the waterway in the same manner as many other urban streams. In less than 25 years, Rose Creek's channel was re-aligned and armored by the U.S. Army Corps of Engineers to prevent floodwaters from flowing down El Camino Real-Coast Highway.

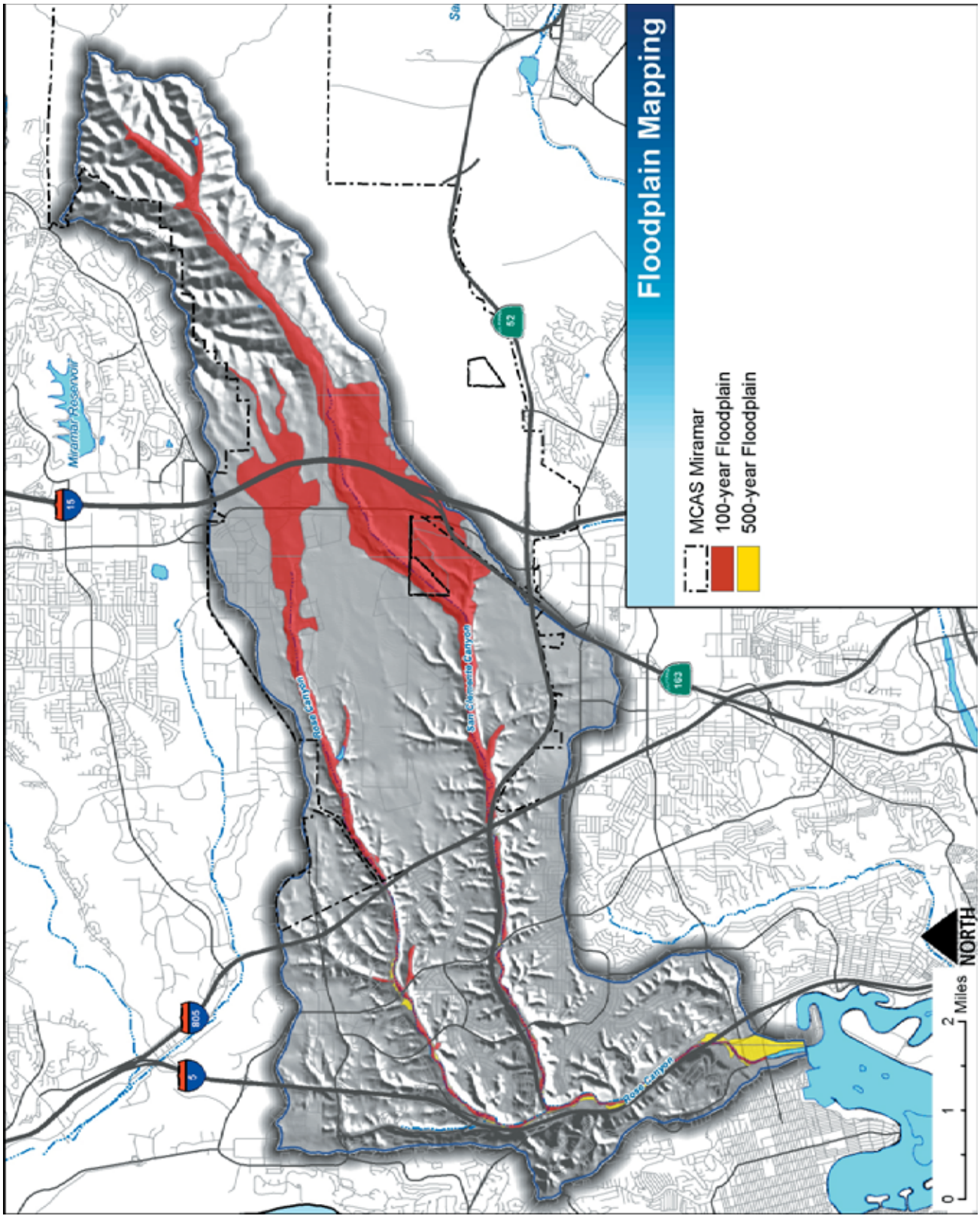
Figure 3-13. 1935 Aerial photograph of Rose Creek

3.3.4 Flood Hazards

Flood hazard areas are determined using statistical analyses of records of river flow, storm tides, and rainfall. This information is obtained through consultation with the community, use of floodplain topographic surveys, and hydrologic and hydraulic analyses. The Flood Insurance Study (FIS) developed by Federal Emergency Management Agency covers those areas subject to flooding from rivers and streams, along coastal areas and lakeshores, or shallow flooding areas. Flood Insurance Studies use detailed hydrologic and hydraulic analyses to model the 1% annual chance flood event or 100-year storm event to determine Base Flood Elevations (BFE), and designate floodways and risk zones (Zones AE, A1-30, AH, AO, VE, and V1-30). The flood hazard data are portrayed in tabular fashion in the FIS narrative and graphically as flood profiles that are attached to the narrative.

Floodplain mapping and management within the RCW is divided along the jurisdictional lines of the City of San Diego and MCAS Miramar. Both jurisdictions have relied on the Army Corps of Engineers to analyze and map the floodplains within their jurisdictions, but have done so at different points in time and have not collaborated to develop a comprehensive map of the floodplains within the RCW using consistent methodologies and data inputs. According to the 1997 FIS study that covers the City's jurisdictional area, only about 1% of the RCW lies within the 100 Year Flood Zone or Zone A (Figure 3-14) and twenty five percent of MCAS Miramar owned land within the RCW is under a Zone A category.

Figure 3-14: 100-yr Floodplain *Existing Conditions Report - Figure 7-6*

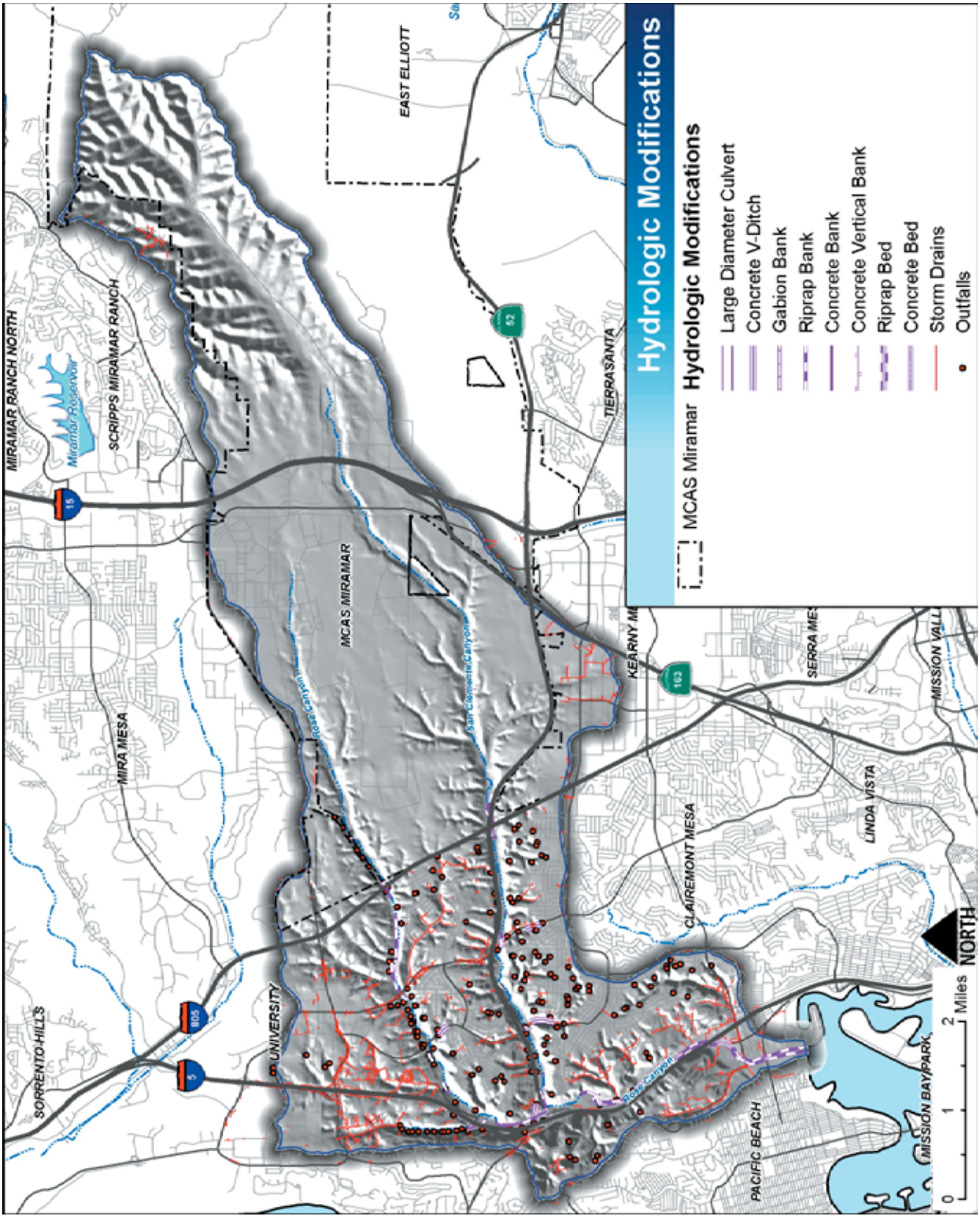


3.3.5 Hydrologic Modifications

A hydrologic modification is the alteration of the natural circulation or distribution of water by the placement of structures or other activities (USEPA, 1992). Hydrologic modifications are typically human modifications to the surface water hydrology (e.g. dams, stream channelization, culverts, roads, roofs, and urban development storm drains) and are typically categorized into three categories: 1) dams; 2) channelization and channel modifications; and 3) streambank and shoreline erosion. These modifications can adversely impact the hydrology and quality of surface waters and aquatic and riparian habitats in a variety of ways.

Understanding the degree to which the natural hydrology has been modified by land development and channel or floodplain modification is an important first step (Figure 3-15). As the lands within a watershed are converted from native vegetation communities to various types of developed land uses (e.g. transportation networks, commercial areas, and residential developments), the ability of the land surface to absorb rainfall is modified, causing higher rates of runoff to occur. These increases in storm water runoff, including dissolved and suspended pollutant loads, are often focused into street gutters, roadside ditches, and storm drainpipes, and conveyed and discharged into a canyon, tributary drainage, or main channel This modifies the runoff volume and velocity typically experienced under natural conditions. The natural environment is forced to respond to these new forces in an effort to reach an adjusted state of dynamic equilibrium. Adjustments often appear as the formation of stream channels in canyon bottoms that did not previously have them, or the enlargement of an existing stream's cross-sectional area via streambed down-cutting or stream bank erosion. As more natural land area is converted to developed land uses, the volume and rate of runoff typically continues to increase, which in turn causes the natural drainage system to continue to adjust. The drainage network will continue to try and adjust to a new equilibrium by incising channels deeper or widening them until the sediment transport capacity of the stream reaches a point of dynamic equilibrium, which is when the sediment input to the system approximately equals the sediment being transported through the system.

Figure 3-15: Hydromodifications *Existing Conditions Report - Figure 7-4*



3.3.6 Impervious Surfaces

Today, the RCW is nearing a built-out condition from a land conversion and development perspective. This should shift the emphasis of new development to redevelopment and infill, which will be regulated by the newer stormwater regulations, thus reducing the current amount of stormwater discharge from properties that were developed under older regulations. It also means that essentially the vast majority of the land development related hydrologic modifications west of Interstate 805 may have already occurred within the watershed, so that as we improve our understanding of how the watershed currently functions from the perspectives of hydrology, hydraulics, sediment transport, and geomorphology, we are not just developing an understanding of how it is functioning in 2005, but also how it is likely to continue to function into the future without intervention. This places the RCW in a somewhat unique situation in that many watersheds in coastal southern California are still experiencing significant land development and will likely do so for some time into the future, making watershed planning and restoration more difficult due to constantly changing conditions.

To help assess the hydrologic condition of the RCW without the development of various modeling tools, researchers have found that the degree of imperviousness within a watershed can be used to assess the condition and health of the aquatic resources, which are often used as a metric for determining the amount of stress a watershed is facing. Impervious surfaces (asphalt, concrete, and to some degree grass) increase surface water runoff during rainfall events, as well as during dry weather. Increased surface water runoff can result in increased flooding, pollution, and erosion. One of the primary acknowledgements that is recurrent in many water quality related plans and programs is that past construction techniques and development patterns have created large expanses of impervious surfaces that are directly linked to current hydrologic modifications and water quality problems.

Imperviousness has been identified as a primary indicator to measure the impacts of land development within a watershed, and is defined as areas that are not “green.” Impervious surfaces include transportation categories such as roads, freeways and parking lots, buildings, rooftops, sidewalks, and any development that interrupts the transport of water into the soil. At higher levels of urbanization (imperviousness), base flow is diminished, stormwater flows are larger and more frequent, sediment transport potential increases and the stability of the watershed stream channels degrade. Pollutant loads are also increased in areas of high urbanization as runoff picks up and suspends pollutants that have been deposited on the impervious surfaces as it flows over them. Infiltration is greatly reduced due to decreases in pervious areas, which can result in reductions in groundwater recharge.

Imperviousness is also one of the few variables that can be explicitly quantified, managed, and controlled at each stage of land development. It can also be assessed and managed at various scales including, watershed-wide, hydrologic basin, sub-basin, and all the way down to the catchment (an area of land draining to a single storm drain). Researchers have identified three categories relating to the percent of impervious cover:

- 1 to 10 percent impervious surface is a sensitive watershed
- 11 to 25 percent is an impacted watershed
- More than 25 percent is a non-supporting watershed

Table 3-7: Impervious Percentage by Land Use Category within the RCW

LU	Description	Imp_%
1000	Spaced Rural Residential	5%
1100	Single Family Residential	varies
	< 1/8ac	90%
	1/8 - 1/4ac	80%
	1/4 - 1/2ac	75%
	1/2 - 3/4ac	70%
	>3/4ac	30%
1200	Multi-Family Residential	85%
1300	Mobile Home Park	65%
1401	Jails/Prisons	85%
1402	Dormortories	50%
1403	Military Barracks	75%
1409	Other Quarters	70%
1501	Low-Rise Hotel	95%
1502	High-Rise Hotel	90%
1503	Resort	85%
2101	Industrial Park	85%
2103	Light Industry	90%
2104	Warehousing/Public Storage	95%
2201	Extractive Industry	20%
2301	Junkyard/Dump/Landfill	10%
4102	Military Airports	85%
4104	Airstrips	20%
4112	Freeway	65%
4113	Communications And Utilities	65%
4114	Center City Parking	95%
4116	Park and Ride Lots	90%
4117	Railroad Right-Of-Ways	50%
4118	Surface Street Right-Of-Ways	75%
4119	Other Transportation	95%
5002	Regional Shopping Center	90%
5003	Community Shopping Center	95%
5004	Neighborhood Shopping Centers	95%
5005	Specialty Commercial	90%
5006	Automotive Dealership	95%
5007	Store-Front Commercial	95%
5009	Other Retail	90%
6001	Office - High-Rise	85%
6002	Office - Low Rise	85%
6003	Government/Civic Centers	90%

LU	Description	Imp_%
6101	Cemetery	50%
6102	Churches	85%
6103	Libraries	85%
6104	Post Offices	95%
6105	Fire/Police	95%
6109	Other Public Services	85%
6501	UCSD Hospital	90%
6502	Hospitals	75%
6509	Other Health Care	85%
6701	Military Use	40%
6702	Military Traini	60%
6703	Military Weapons	20%
6801	UCSD	45%
6802	Other Universities/Colleges	50%
6804	Senior High Schools	50%
6805	Junior High and Middle Schools	50%
6806	Elementary Schools	50%
6807	School District Offices	80%
6809	Other Schools	80%
7204	Golf Courses	10%
7205	Golf Course Clubhouses	80%
7207	Marina	95%
7210	Recreation	40%
7601	Parks-Active	25%
7603	Open Space Reserves, Preserves	2%
7606	Landscape Open Space	15%
7607	Residential Recreation	30%
8001	Orchards And Vineyards	10%
8002	Intensive Agriculture	20%
8003	Extensive Agriculture	2%
9101	Vacant, Not Graded	2%
9200	Water	10%
9201	Bays-Lagoons	100%
9202	Inland Water	100%
9300	Indian Reservations	2%
9501	Residential Under Construction	85%
9502	Commercial Under Construction	90%
9503	Industrial Under Construction	95%
9504	Office Under Construction	90%
9505	School Under Construction	85%

A sensitive watershed should be the most protected category with zoning, site impervious restrictions, stream buffers, and stormwater practices applied to maintain pre-development stream quality. An impacted watershed can expect to see more degradation after development with less stable channels and some loss of biodiversity. Non-supporting watersheds should recognize that pre-development channel stability and biodiversity cannot be fully maintained, even when stormwater practices and zoning restrictions are fully applied. The objective then becomes to protect the downstream water quality by removing pollutants and to restore biodiversity in degraded streams as much as possible.

To initiate discussions among the stakeholders within the RCW about the relationship of impervious surfaces, land use planning, and watershed health, a visual assessment of impervious cover was completed for each of the 90 land use categories (Table 3-7) using the SANDAG 2000 Color Infrared Aerial Imagery and extrapolated across the entire watershed (Figure 3-16). Based on this analysis, imperviousness varies throughout the sub-basins within the RCW and averages about 38 percent for the entire RCW, placing it well into the non-supporting watershed category. In addition to this watershed-wide information, it is also important to understand the types and distribution of impervious surfaces to select appropriate management practices to eliminate, reduce, and minimize the negative effects caused by stormwater runoff from these surfaces.

To determine what effect, if any, the scale of the assessment might have on the results, seven sub-basins (Figure 3-17) were delineated and evaluated: Upper San Clemente; Marian Bear; Upper Rose; Rose Canyon; Gilman; Lower Rose; and Stevenson. Within these sub-basins, imperviousness ranges from a low of 23 percent in Upper San Clemente to a high of 78 percent within Gilman as shown in Table 3-8.

Table 3-8: Percent Impervious by Sub-basin and Basin, 2000

Sub-Basin	Total Acres	Impervious Acres	% Impervious
Upper San Clemente	9,275.1	2,089.2	23%
Marian Bear	2,408.8	1,076.4	45%
Upper Rose	5,114.8	1,679.5	33%
Rose Canyon	2,677.1	1,434.1	54%
Gilman	1,388.5	1,079.8	78%
Stevenson	384.9	178.4	46%
Lower Rose	2,178.3	1,370.7	63%
Total	23,427.6	8,908.2	38%

Basin	Total Acres	Impervious Acres	% Impervious
San Clemente Creek	11,683.9	3,165.6	27%
Rose Creek	9,180.4	4,193.5	46%
Below Confluence	2,563.3	1,549.1	60%
Total	23,427.6	8,908.2	38%

Based on this information, all of the sub-basins are at least in the impacted category, with the majority falling well within the non-supporting category. This information would appear to suggest that conditions within the watershed are highly stressed and that most of the sensitive aquatic resources have likely been lost and are not restorable. However, this perspective is not fully supported by some of the more sensitive biological resources known to still exist within the watershed. The existence of these resources would suggest there is still hope to improve and stabilize the physical conditions within the watershed and at least partially restore these resources to a more healthy and stabilized condition.

Figure 3-16: Impervious Surfaces

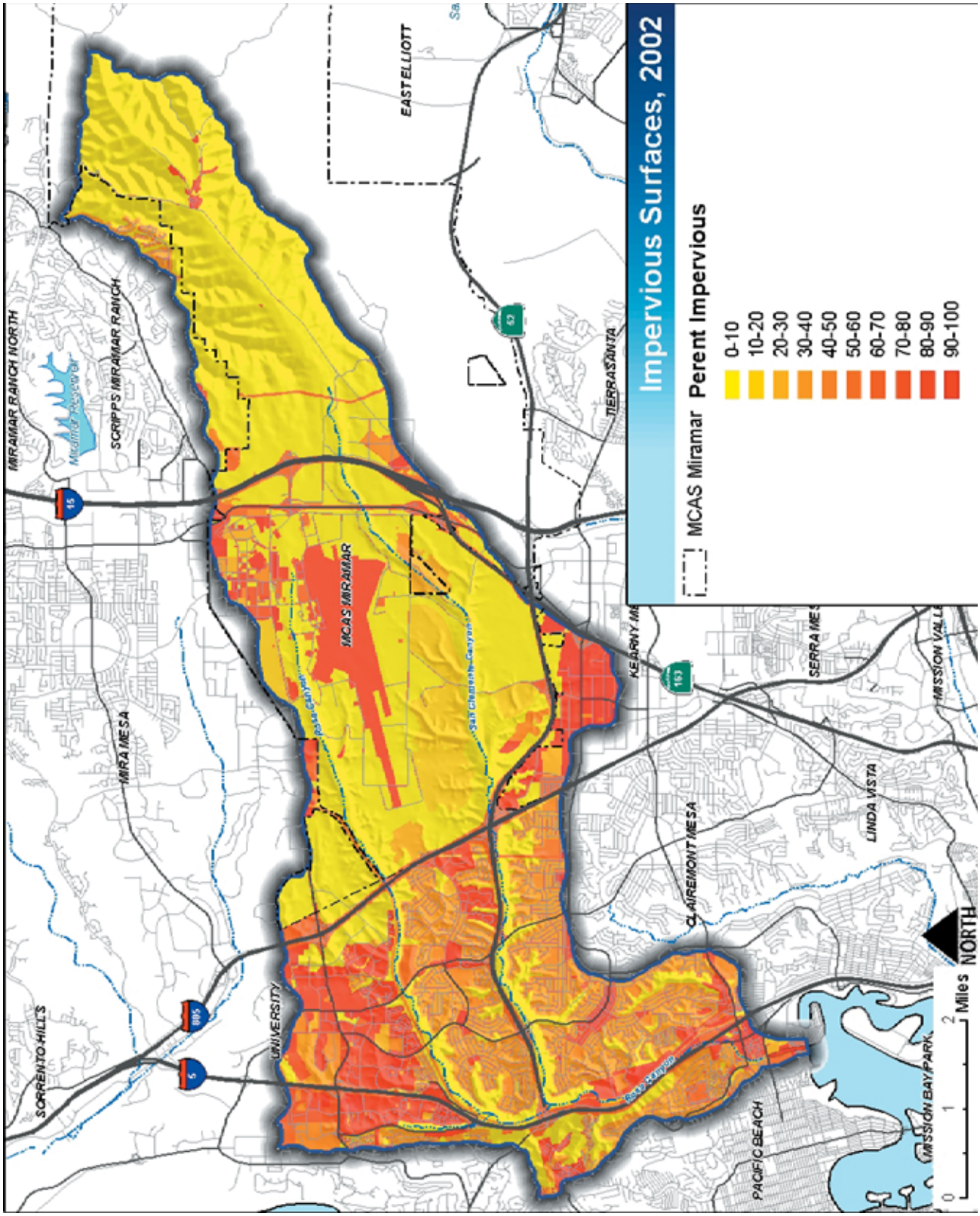
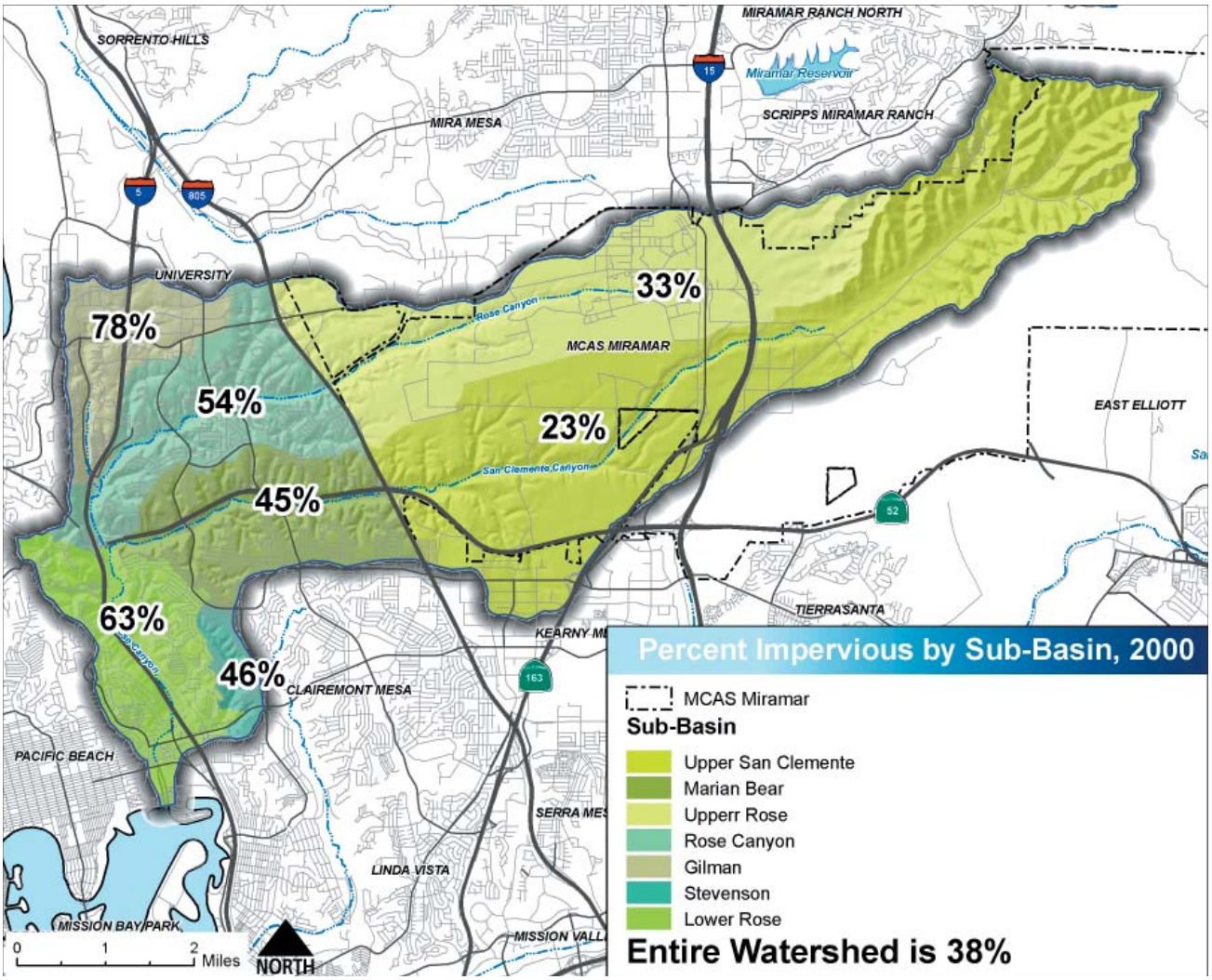


Figure 3-17: Percent Impervious by Sub-Basin



3.4 Cultural Resources

The RCW has a rich history of settlement dating back to as early as 1769 when the Spanish traveled up Rose Canyon from the Presidio as a route from San Diego to Monterey. In the 1880s the small farming and ranching communities of Linda Vista and Miramar were established. The community of Linda Vista was centered in the eastern end of San Clemente Canyon and the surrounding mesa lands where the community of Miramar was settled. These settlements are currently situated at the intersection of Miramar Road and the Interstate 15 freeway.

3.4.1 Prehistoric

The Late Prehistoric village of La Rinconada de Jamo, observed by the Spanish in 1769, is located at the mouth of Rose Canyon as it enters Mission Bay. Traveling north on Rose Creek from Mission Bay, smaller Archaic and Late Prehistoric camps are found within Rose Canyon on the banks and terraces and it is likely that sediments have buried many sites over time and that many are deep beneath the existing surface.

3.4.2 Historic

At the time of Spanish contact in southern San Diego County, the people living in the area were called the Diegueno, after the mission at San Diego. However, many people living in the region were not affiliated with the mission. Yuman-speaking people, whose origins can be traced along the Colorado River area were termed the Kumeyaay as a common name of these people living in the southern and central part of the county.

Kumeyaay groups resided along Rose Canyon and San Clemente Canyon and focused on subsistence activities such as staple seed bearing plants during early and mid-summer months. Plant resources such as manzanita, elderberries and sage were collected during summer months. During fall and winter months, settlements may have moved to higher elevations for acorn harvesting. Animal resources were exploited when meager plant supplies existed.

The lands in Rose Canyon and San Clemente Canyon became Pueblo Lands of the City of San Diego as the area was settled and land grants were made. In the mid-1800s, a San Diego entrepreneur named Louis Rose was one of the first to purchase land in the canyon. He constructed a tannery, along with a vineyard, garden, tobacco plants and grazing pastures. In 1882, the California Southern Railroad completed a track through the canyon and by 1912, a train stop known as the Elvira Station could be found near the current Gilman Drive. The Rose Creek crossings were particularly problematic with floods and washouts in the winters of 1883-1884. The flood of 1916 washed out even more tracks, resulting in the re-routing of tracks to the north side of Rose Canyon at a higher elevation. The creek crossings were then eliminated, but portions of the old route can still be seen today.

Prior to military control, the small farming community of Linda Vista had been established in what is now the MCAS Miramar Main Station area. The United States Government has owned the site of MCAS Miramar since World War I, when it was an Army Infantry Training Center called Camp Kearny. When completed, Camp Kearny consisted of 8,000 acres of leased land upon which 1,162 buildings were constructed. In 1922, Camp Kearny was closed and most of the buildings demolished. Following World War II, the southern half was utilized as an auxiliary air station to Naval Air Station North Island, while the northern half was designated Marine Corps Air Depot Miramar.

3.4.3 Cultural Resources Inventory

In order to understand the potential opportunities and constraints associated with cultural resources throughout the RCW an inventory of known site was conducted. Components of this inventory included: a record search at South Coastal Information Center (SCIC) to identify previously recorded archaeological sites within the project area; research at the San Diego Historical Society archives to identify historical resources; contacting the Native American Heritage Commission (NAHC) to see if any traditional properties or sacred sites are in or near the project area; based on the recommendations of the NAHC, contact local Native American groups to identify concerns; and reviewing documents provided by MCAS Miramar.

The Environmental Management Department (EMD) manages cultural Resources on MCAS Miramar. EMD completed the final version of the Integrated Cultural Resources Management Plan (ICRMP) in January of 2004. The ICRMP is being used as a five-year plan to manage cultural resources by maximizing the benefits on resources, minimizing adverse affects and impacts on resources, while supporting the continued mission of MCAS Miramar. The document provides guidance on actions to be taken if a proposed project will have an effect on a cultural resource. Typically, survey or excavation work would be performed by qualified contractors to meet National Historic Preservation Act (NHPA) requirements. Regulations outlined by the National Advisory Council on Historic Preservation (ACHP) and the National Park Service (NPS) provide additional guidance and instruction on managing cultural resources. The ICRMP has not been made public due to sensitivity of resources on station.

In addition to reviewing the historic and cultural resource information provided by MCAS Miramar, the project team conducted research in the Rose Canyon and San Clemente Canyon west of Interstate 805. The research resulted in a finding of 47 recorded archaeological sites (Table 3-9) ranging from prehistoric pottery to railroad siding. Historic sites located in Rose Canyon include the Union Brick Company and features associated with the railroad line. The terraces and banks of Rose Canyon have not been surveyed for cultural resources. San Clemente Canyon was last surveyed in 1968. It would benefit from a new survey since many conditions have changed over the past 37 years and the survey done in 1968 took place on one day.

Table 3-9: Known Archaeological Sites

Site Number	Description
I-165	Isolated artifact (no information)
Ladrillo Siding	Railroad siding
Union Brick Company	Site of Union Brick Company factory
P-13710	Prehistoric stone flake made of felsite
P-13711	Prehistoric stone flake made of porphyry
P-13712	Prehistoric stone flake made of rhyolite
P-13713	Prehistoric stone flake made of felsite
P-13714	Prehistoric stone flake made of felsite
P-13715	Prehistoric pottery fragment
P-13716	Prehistoric stone flake made of quartzite
P-13717	Prehistoric stone flake made of quartzite
P-13718	Two prehistoric stone flakes
P-13719	Two prehistoric stone flakes
P-13720	Two prehistoric stone flakes
P-13721	Prehistoric stone flake made of quartzite
P-16179	Railroad bridge built in 1928
P-24692	Prehistoric stone flake made of quartzite
SDI-4956	Prehistoric quarry site; may have been destroyed by high school construction
SDI-4957	Prehistoric artifacts manufacturing area; may have been destroyed by high school construction
SDI-5017	Village of La Rinconada, a large Late Prehistoric settlement occupied for over 2,500 years
SDI-5494	Prehistoric artifact scatter
SDI-5495	Small prehistoric site with stone tools and shell
SDI-8089	Small scatter of prehistoric stone artifacts
SDI-8207	Possible cobble hearths and stone tools
SDI-9287	Surface scatter of prehistoric stone artifacts
SDI-10081	Prehistoric site, probably destroyed by road construction
SDI-10437	Prehistoric site, potentially eligible for the National Register of Historic Places
SDI-10781	Prehistoric stone artifacts and possible midden deposit
SDI-11783	Historic site probably associated with the Elvira railroad siding.
SDI-12416	Prehistoric stone artifacts on surface
SDI-12417	Prehistoric stone tools, small subsurface deposit
SDI-12418	Prehistoric camp site with midden and stone tools
SDI-12419	Prehistoric stone artifacts, small subsurface deposit
SDI-12420	Small scatter of prehistoric stone artifacts
SDI-12421	Prehistoric camp site with stone artifacts and midden deposit
SDI-12422	Scatter of prehistoric stone artifacts on the surface
SDI-12423	Small site with stone artifacts; destroyed by Nobel Drive extension
SDI-12424	Scatter of prehistoric artifacts on the surface
SDI-12425	Scatter of prehistoric artifacts, including stone tools and flakes; possible subsurface component
SDI-12426	Scatter of prehistoric artifacts on the surface, including ground stone artifacts (metate and mano fragments)
SDI-12427	Scatter of prehistoric artifacts on the surface; partially destroyed
SDI-12433	Scatter of prehistoric artifacts on the surface with slight potential for subsurface midden deposits
SDI-12434	Scatter of prehistoric artifacts on the surface
SDI-12435	Scatter of prehistoric artifacts on the surface
SDI-12556	Prehistoric camp site with stone artifacts and possible midden deposit
SDI-12557	Prehistoric camp site with stone artifacts and midden deposit; site area includes SDI-12560H which is the remains of Fischer Ranch
SDI-12558	Prehistoric midden deposit with shell remains
SDI-12559	Prehistoric camp site with stone artifacts and shell

3.5 Recreational Resources

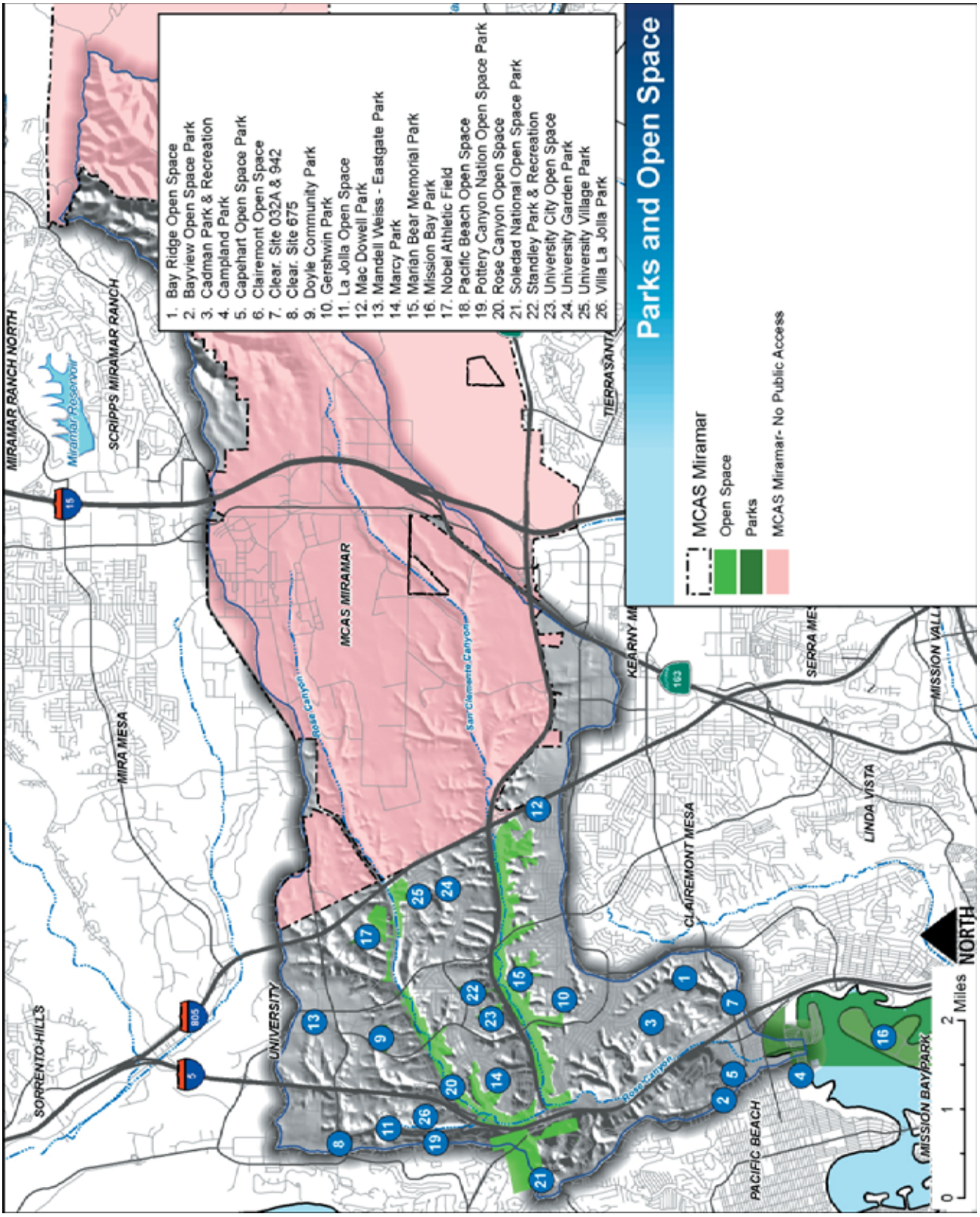
The RCW offers a multitude of recreational opportunities for local residents and visitors alike. There are 16 parks and 11 open space preserves within the RCW, all of which are owned by the City of San Diego. They provide many recreational opportunities such as nature viewing, hiking and cycling. A network of 37 miles of designated bikeway facilities allows users from the area access into these parks and open spaces. Two open space parks reside within the RCW that offer activities such as hiking, jogging, mountain biking and bird watching on over 14 miles of trails. The numerous active recreation parks offer facilities for soccer, baseball and softball. Accessibility to these parks and opens spaces are obtained through main arterial roads and residential streets.

3.5.1 Parks

There are approximately 949 acres of open space within the RCW. Open space within the City of San Diego is generally defined as areas free from development or developed with low intensity uses that respect the natural characteristics. Open space is used for the preservation of natural and cultural resources, outdoor recreation, health and safety, and as a form of urban growth control. The largest area of open space lies within the Marian Bear Memorial Park just south of State Route 52 between Interstates 5 and 805 (Figure 3-18). Marian Bear Memorial Park encompasses 467 acres or 49% of open space while the Rose Canyon Open Space Park contributes 312 acres to the overall open space land. The Rose Canyon Open Space Park spans from the westernmost edge of Marian Bear Memorial Park and heads northeast following Rose Canyon towards Interstate 805 to the border of MCAS Miramar. The Soledad Natural Open Space Park west of Interstate 5 is the third largest open space area at 197 acres with 121 acres within the RCW. The Nobel Athletic Field off of Nobel Drive is the largest community park within the University community, currently at 31 acres. This park offers open fields for recreational activities such as soccer, baseball and softball. With the development of the Nobel Athletic Area and Library, this acreage may change. Mission Bay Park encompasses over 4,000 acres, approximately 46% land and 54% water. It offers a wide range of recreational activities such as boating, volleyball, basketball and bicycle/walkway paths throughout the park. It boasts 27 miles of shoreline, including 19 miles of beaches.

Figure 3-18: Parks and Open Space

Existing Conditions Report - Figure 10-1



3.5.2 Trails

There are about 42 miles of hiking and mountain biking trails within the Rose Creek Watershed, predominantly traversing the larger Rose Canyon and Marian Bear Open Space Parks. Many of these trails are multi-use and provide benches along the trail for rest stops and in some cases, informative kiosks and restrooms. The main trails of Rose Canyon and Marian Bear also serve as utility access paths that span almost the entire length of the parks. Connecting to these utility access paths are miles of foot trails or single-tracks that meander in and out of the adjacent vegetation and either connect back to the main utility access paths or into nearby neighborhoods. In some instances, access to the trail system is via sidewalks and bike lanes on busy arterials, such as Genesee or Regents, creating a less than optimal situation for public safety and aesthetic experience. Improved access from adjacent neighborhoods could reduce the pedestrian and recreation bicycle traffic along these arterials. Some of these trails are volunteer (unofficial) trails whose long-term use should be assessed as use of these volunteer trails may cause erosion, threaten public safety, or impact sensitive habitats. The greatest challenge will be to create an off-road trail system that connects the neighborhoods near Interstate 805 with Mission Bay Park. This is primarily due to the need for legal railroad crossings, as all of the existing recreational trail routes require at least one illegal crossing and as many as three, depending on the route taken.

3.5.2.1 Bikeway Facilities

There are 37 miles of designated bikeway facilities on city streets within the RCW (Figure 3-19). The largest class of bicycle facilities found in the RCW is the 17-miles of Class 2 bike lanes. A Class 2 bike lane on Genesee Avenue provides access to both Rose Canyon Open Space and Marian Bear Memorial Park. Both parks can also be accessed from the Rose Canyon Bike Path, a Class 1 bikeway facility, at the northern end of Santa Fe Street in Clairemont Mesa. However, it should be noted that access to the open space parks from the Rose Canyon Bike Path currently requires recreational users to illegally cross the railroad tracks. For this violation, an individual can be fined $1,000.

- **Class 1** – Paved “Bike Path” with an exclusive right-of-way, physically separated from vehicular roadways and intended specifically for non-motorized use.
- **Class** 2– Signed and striped “Bike Lane” within a street right-of-way.
- **Class 3** – “Bike Route” within a street right-of-way identified by signage only.
- **Undesignated** – An additional category defined as locally recommended on-street routes that appear on area bikeway maps only.

Class 1 Bike Path: Lower Rose Creek

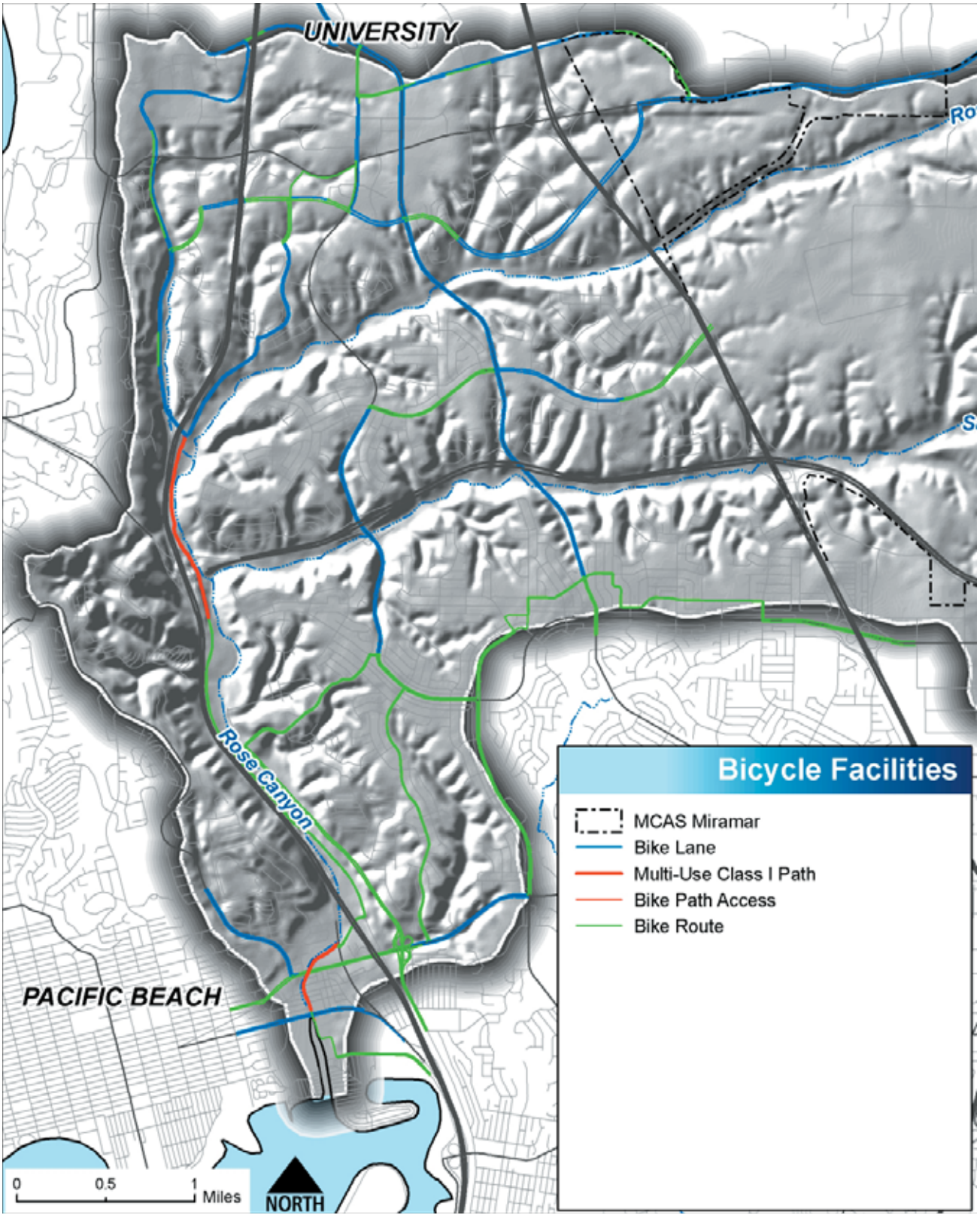
Class 2 Bike Lane: Genesee Avenue

There are roughly 15 miles of designated off-road bike trails within the RCW. Three miles lie within the Rose Canyon Open Space Park and another nine miles in Marian Bear Memorial Park. These off-road bicycle trails are a shared-use facility with hikers. In addition to these designated trails, there are approximately three miles of utility access paths on the north side of the railroad tracks in Rose Canyon. This access road extends from where Gilman Drive and Rose Canyon Bike Path merge eastward to Interstate 805. This road is proposed as a Class I bike path as part of the Coastal Rail Trail intended to connect from Oceanside to the Santa Fe Depot in downtown San Diego.

3.5.2.2 Planned Bikeway Facilities

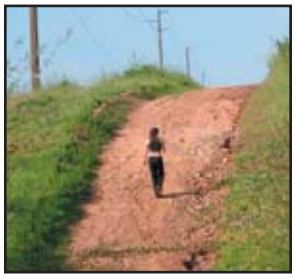
The various community plans within the RCW recommend that bikeway signs should include directional signage to lead bicycles to their destinations; that secure bicycle racks should be placed in visible locations near building entrances; and employers should provide bicycle lockers for employees that commute by bicycle. The plans also recommend that bicycle facilities should be directed to serve future trolley and bus transit stations with bicycle racks and lockers at each location. The plans also suggest the inclusion of a Bicycle Commuting Encouragement Program in a future Transportation System Management Program. It is also suggested that existing and proposed routes should be separated whenever possible for motor vehicle and bicycle safety. The plans also recommend two significant Class I bike paths: the San Clemente Canyon Bikeway (I-805 to I-5) along the northern boundary of Marian Bear Memorial Natural Park in order to ensure that the bikeway will not interfere with biological resources in the canyon park; and the proposed Coastal Rail Trail that is planned to go through Rose Canyon to north of Eastgate Mall where a Class I path is planned to connect to Sorrento Valley Road.

Figure 3-19: Existing Bikeway Facilities *Existing Conditions Report - Figure 10-2*



3.5.2.3 Official Trails

In both the Rose Canyon Open Space Park and Marian Bear Memorial Park, cyclists and hikers share the use of the designated 15 miles of trails. Designated trails throughout the Rose Canyon Open Space and Marian Bear Memorial Park are typically 3-6 feet in width and meander throughout the parks. These trails are designated for pedestrian and cycling use only.



Maintenance roads (also known as utility access paths) are typically the main trail type throughout these parks due to their heavy use and easy accessibility. The maintenance roads serve dual purpose in that they provide access for authorized vehicles for park management and recreational use for pedestrians and cyclists. These utility access paths also provide access to Metropolitan Wastewater Department and San Diego Gas & Electric utilities. In many cases, these paths provide reasonable trail connections and linkages. As these paths are normally linear and bisect open space boundaries, they provide excellent connections between developed areas.

3.5.2.4 Un-official Trails

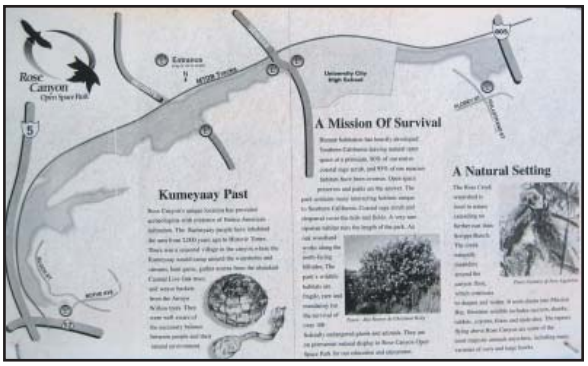
There are numerous miles of volunteer trails within the RCW particularly within the Rose Canyon Open Space Park and Marian Bear Memorial Park (Figure 3-20). These trails do not show up on official park maps or general plans and are not officially designated for “use”. These volunteer trails are mainly created by local residents who use these trails as access into the park. Many of these trails can be found parallel to the main trails as another means of recreation to avoid the main trails and utility access paths. Some volunteers trails are used as detours over obstacles such as fallen trees and will either become covered by vegetative growth if not regularly used or become a well-used un-paved trail through compaction by bicycle tires and hikers. As part of the City’s Master Trail Plan effort, all of the trails (including volunteer trails) will be evaluated to determine suitability for continued use. Those that are determined to be inappropriate for continued use will be closed and actively or passively restored. Continued coordination with City staff on this effort should be maintained to ensure additional opportunities and constraints are included in the evaluation process.

3.5.2.5 Trail Amenities

Trail amenities can be found in both Marian Bear Memorial Park and Rose Canyon Open Space Park, although they are very sparse in Rose Canyon (Figure 3-20). Restrooms, picnic tables, and informational kiosks can be found at the Genesee Avenue parking lot and both Regents Road parking lots in Marian Bear Memorial Park. Individual trail maps can be found at the eastern parking lot of Regents Road before users head east on the main trial. The other kiosks at Genesee Avenue and west Regents Road provide an outdated trail map for users. The kiosks at all of the Marian Bear parking lots range in educational information from California’s biodiversity to the wildlife and history of the Marian Bear Memorial Park. Plastic bags for picking up dog feces can be found at these entrances, as well as drinking bowls for the dogs. Along the main utility access paths, benches

are spread about for users needing a quick break. The current signage of Marian Bear Memorial Natural Park is barely adequate for trail users. Additional trail signage and information kiosks along the main trail could inform and educate users as they pass connecting trails, cultural resources and sensitive habitats.

Within the Rose Canyon Open Space Park, primary access is from Genesee Avenue, Regent Road, Bothe Avenue and La Jolla Colony Drive. Benches and kiosks are rare throughout Rose Canyon and can be found at the trailhead off Genesee Avenue (associated with the La Jolla Golden Triangle Rotary Club Nature Trail) and the Regents Road access trail. The kiosks at these two entrances do not provide as much educational information as those of Marian Bear and lack trail maps for users to orient themselves in the park. The kiosk at the Bothe Ave entrance does provide a trail map and some informational materials. There are no public restrooms in Rose Canyon but plastic bags for dogs are present at all the kiosks. Kiosks near the La Jolla Colony entrance would help orient and inform users entering the park from the west. More signage, informational kiosks, benches, picnic tables and a public restroom should be considered in the future to promote the use and preservation of the Rose Canyon Open Space Park.



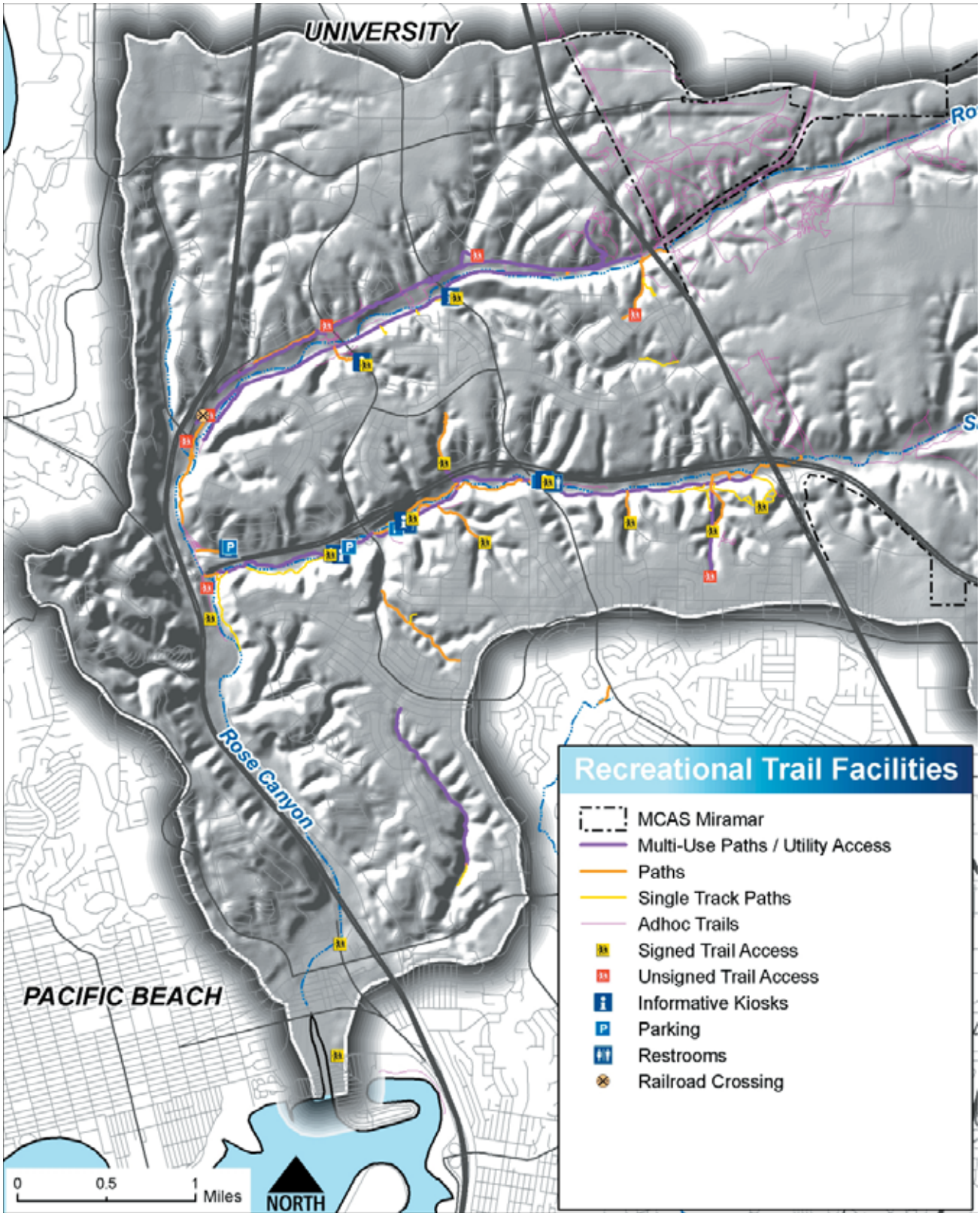
3.5.2.6 Park Accessibility

Marian Bear Memorial Natural Park has numerous entrances into the park from both residential neighborhoods and designated parking areas off of Santa Fe Street, Regents Road and Genesee Ave. Rose Canyon Open Space Park can be accessed from the same streets as Marian Bear but at different locations. Marian Bear Memorial Natural Park has three residential access trails on its southern slopes. One is the Biltmore Trail that is about one-third of a mile in length and can be accessed from Biltmore Street in Clairemont Mesa. A concrete staircase off Cobb Place, also in Clairemont Mesa, provides access to Cobb Trail. It is roughly 900 feet in length from Cobb Place to the main trail in Marian Bear Memorial Natural Park. Both the Cobb and Biltmore Trails are highly shaded by a thick canopy of willows and oaks, keeping the trails moist and protected from direct rainfall. This has helped keep erosion to a minimum. The third access point is the Kroc Trail, which is the eastern most designated access into Marian Bear Memorial Natural Park. The Kroc Trail follows a highly eroded tributary into San Clemente Creek and outlets onto a SDG&E power line maintenance road. The Kroc Trail can be accessed from Lehrer Drive. Erosion can be found along certain sections of the Kroc Trail, making it challenging for cyclists, but not for hikers. The Kroc Trail is almost void of any canopy and the adjacent tributary is eroding towards the trail, making the long-term stability of the trail uncertain without management intervention. The Standley Trail is the single northern access trail into Marian Bear Memorial Natural Park. It originates from Standley Community Park along Governor Drive, crosses Syracuse Avenue, and then runs under State Route 52 to enter the park on the north side of San Clemente Creek.

Access from Cobb Place

Access from Lehrer Drive and SDG&E maintenance road

Figure 3-20: Trail Facilities *Existing Conditions Report - Figure 10-3*



There are no dedicated parking lots or staging areas for the Rose Canyon Open Space Park. There is no parking at the Genesee Ave entrance so users must either commute by foot or bicycle or park at University City High School across the street. Limited parking is available at the Regents Rd and the Bothe Ave entrances, and no parking is readily available near the La Jolla Colony entrance. Three additional unofficial access points also occur: Regent Rd on the north side of Rose Canyon; Genesee Ave north of the railroad tracks; and from the University Village Park near Interstate 805. From the secondary Regents and Genesee access points users can either stay on the north side of the railroad tracks and use the access road, or illegally cross the railroad tracks and utilize one of many narrow trails that cross Rose Canyon and Rose Creek to intersect with the main trail on the southern edge of Rose Canyon. The access trail from University Village Park is narrow and eroding and required users to immediate cross Rose Creek and illegally cross the railroad tracks to connect to the access road on the northern edge of Rose Canyon. From the La Jolla Colony entrance users must can either illegally cross the railroad tracks to use the main trail in the southern edge of Rose Canyon, or remain on the northern side of the railroad tracks and use the access road. An existing private railroad crossing does exist, but is posted as 'Closed'. Access from the Bothe Ave entrance requires users to either remain on the south/east edge of Rose Canyon and cross Rose Creek twice before access the main trail, or cross Rose Creek and illegally cross the railroad tracks near the Interstate 5 and State Route 52 interchange.

3.6 Land Uses & Planning

Watershed assessment calls for developing an understanding of the many processes and interactions occurring within a watershed. Information gathered during a watershed assessment is typically organized into separate distinct topics such as biological resources, hydrology and land use. This information needs to be integrated in order to discover the processes and interactions occurring between the different topics. Existing and planned land uses, along with the jurisdictions and planning documents governing them are critical pieces in understanding the historical character of the RCW, including potential assets and liabilities; today's community and land use character; and what tomorrow's character may be like if the existing planning documents are implemented in their current form. By gaining an in-depth perspective on the past, current, and future land use planning environment affecting the RCW; historical assets can be protected and interpreted; current opportunities can be leveraged; and future land use decisions can be modified to help enhance and protect the natural, cultural and recreational resources within the RCW.

3.6.1 Land Use Jurisdictions

The public entities having land use jurisdiction within a watershed are key stakeholders to engage in the planning and assessment process. Their early and continued involvement can streamline the vetting process for action recommendations, thus developing the support necessary for funding and implementation. To initiate the involvement of these entities, a Memorandum of Understanding (MOU) was developed with the City of San Diego for cooperative information sharing and review. The MOU with the City of San Diego identifies the Storm Water Pollution Prevention Division (SWPPD) of the Metropolitan Wastewater Department as the lead for the MOU. The overall lead of the project is the City of San Diego's Park and Recreations Department. Additionally, the MOU also establishes data sharing agreements with the Open Space Division regarding ownership data within Rose and San Clemente Canyons and with the SWPPD regarding water quality monitoring data from the dry-weather stations within the RCW. A data sharing agreement was established with MCAS Miramar that allowed the use of their physical and environmental data within this Assessment and identified the Environmental Management Department as the primary point-of-contact for all communication. Through this protocol, initial contact has been made to schedule a meeting with MCAS Miramar personnel to discuss some of the preliminary action recommendations contained within this Assessment to determine if the Station could support the identified action and possibly enter into a cooperative arrangement for its implementation.

3.6.1.1 MCAS Miramar

The United States Governments has owned the site of MCAS Miramar in one form or another since World War I. The Station is bisected by Interstate 15 and bordered on the west by Interstate 805 and occupies several parcels that extend south of State Route 52. Of the 23,194 acres under federal jurisdiction at MCAS Miramar, 12,201 acres are within the RCW, which represents 52.6% of MCAS Miramar and 52.1% of the RCW. The percentage of the RCW under MCAS Miramar's jurisdiction reinforces the need for ongoing coordination to determine opportunities for cooperative implementation actions.

3.6.1.2 City of San Diego

The City of San Diego has land use jurisdiction over all of the lands within the RCW that are not a part of MCAS Miramar. Land use planning within the City of San Diego occurs primarily at two levels: city-wide and community plan.

At the citywide level the City of San Diego adopted its Strategic Framework Element and Action Plan in 2002, which lays out a strategy for updating all of the remaining Plan elements by 2008. It incorporates water quality and watershed protection into the Conservation and Environment section, and identifies the use of BMPs within the development sections of the Plan. One of the key features of the Strategic Plan is the "City of Villages" concept that focuses future development and redevelopment around transportation nodes, creating smaller higher density communities aimed at providing a strong localized live/work relationship with streetscapes focused on the pedestrian experience. Within the RCW study area there are three types of village destinations; Multifamily Redesignation, Neighborhood Village Center and Urban Village Center (Figure 3-21). (*http://www.sandiegogov/cityofvillages/index.html*)

Within the RCW lie seven community plan areas centered on the communities of Clairemont Mesa, Kearny Mesa, La Jolla, Mira Mesa, Pacific Beach, Scripps Miramar Ranch and University (Figure 3-21), which combined represent about 47 percent of the watershed. In addition to the seven Community Plan areas, Mission Bay Park is a major feature and recreation destination.

3.6.2 Land Ownership

The largest physical landowner within the RCW is the federal government with its holdings at MCAS Miramar (Figure 3-22). Of the 12,201 acres under federal ownership within the RCW, over 2,600 acres are leased to other entities, including nearly 2,300 acres to the City of San Diego being primarily operated as the Miramar Landfill. Private owners (primarily individual residences) are the second largest landowners within the RCW with 5,937 acres or 25% of the entire watershed. Ownership by the City of San Diego (1148 acres) is focused in the two large open spaces of Rose Canyon Open Space Park and the Marian Bear Memorial Natural Park, which occur within the communities of University and Clairemont Mesa respectively. The University of California owns 839 acres of land within the RCW occupied by the University of California San Diego in the community of University, Alliant University is a private college located in the community of Scripps Miramar Ranch. Two of the larger tributary canyons, Stevenson and Lakehurst, are currently under primarily private ownership and represent potential acquisitions and additions to the formal open space being managed by the City of San Diego. Stevenson Canyon would be a stand-alone area in the southwestern portion of the watershed that could act as an off-road connector for residents within Clairemont to reach lower Rose Creek and Mission Bay. Lakehurst Canyon would be a southern extension to Marian Bear Memorial Natural Park along the east side of Regent Rd and provide an opportunity for another community trail connection from Clairemont.

Figure 3-21: City of San Diego – City of Villages & Community Plan Areas *Existing Conditions Report - Figures 3-1/3-2*

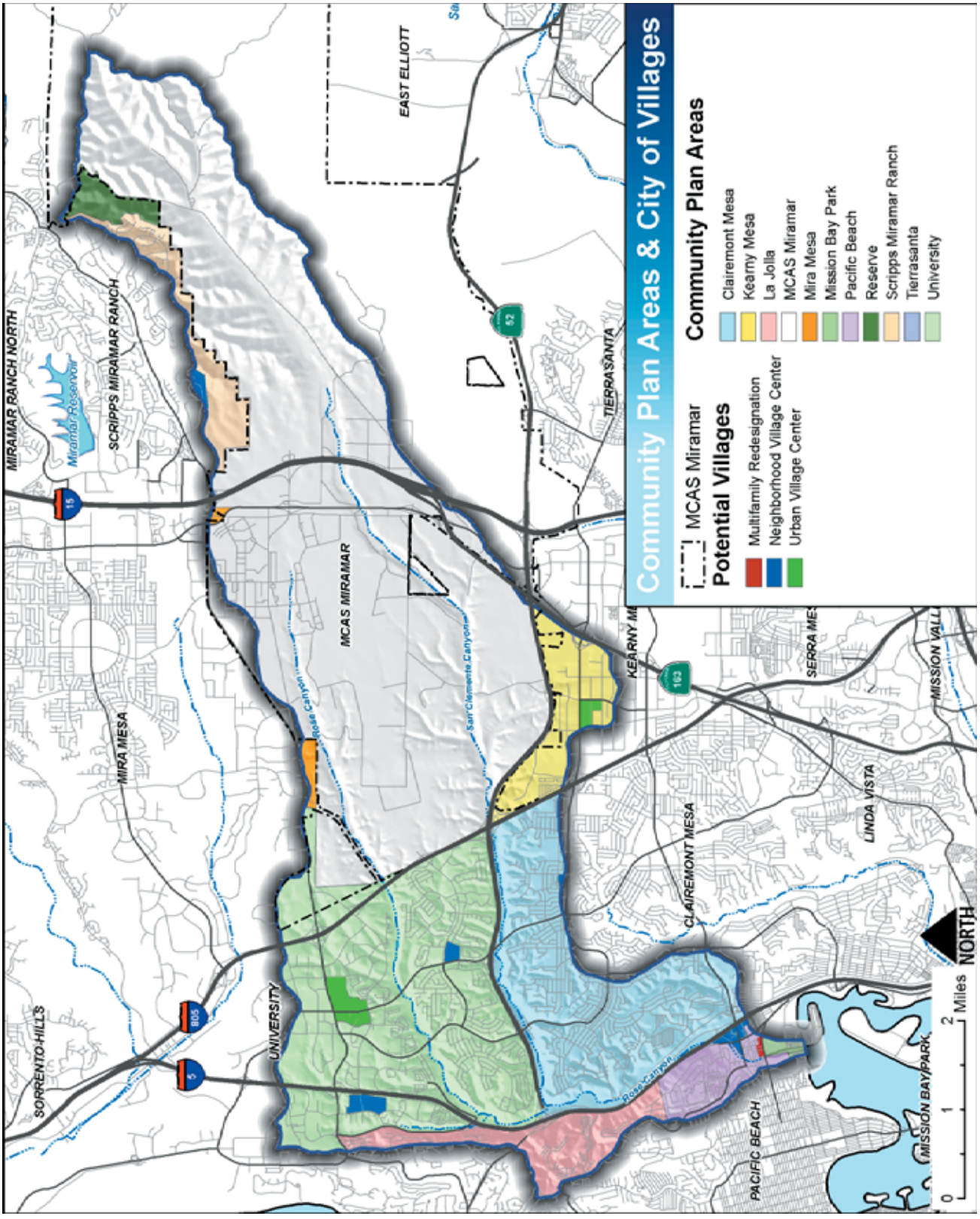
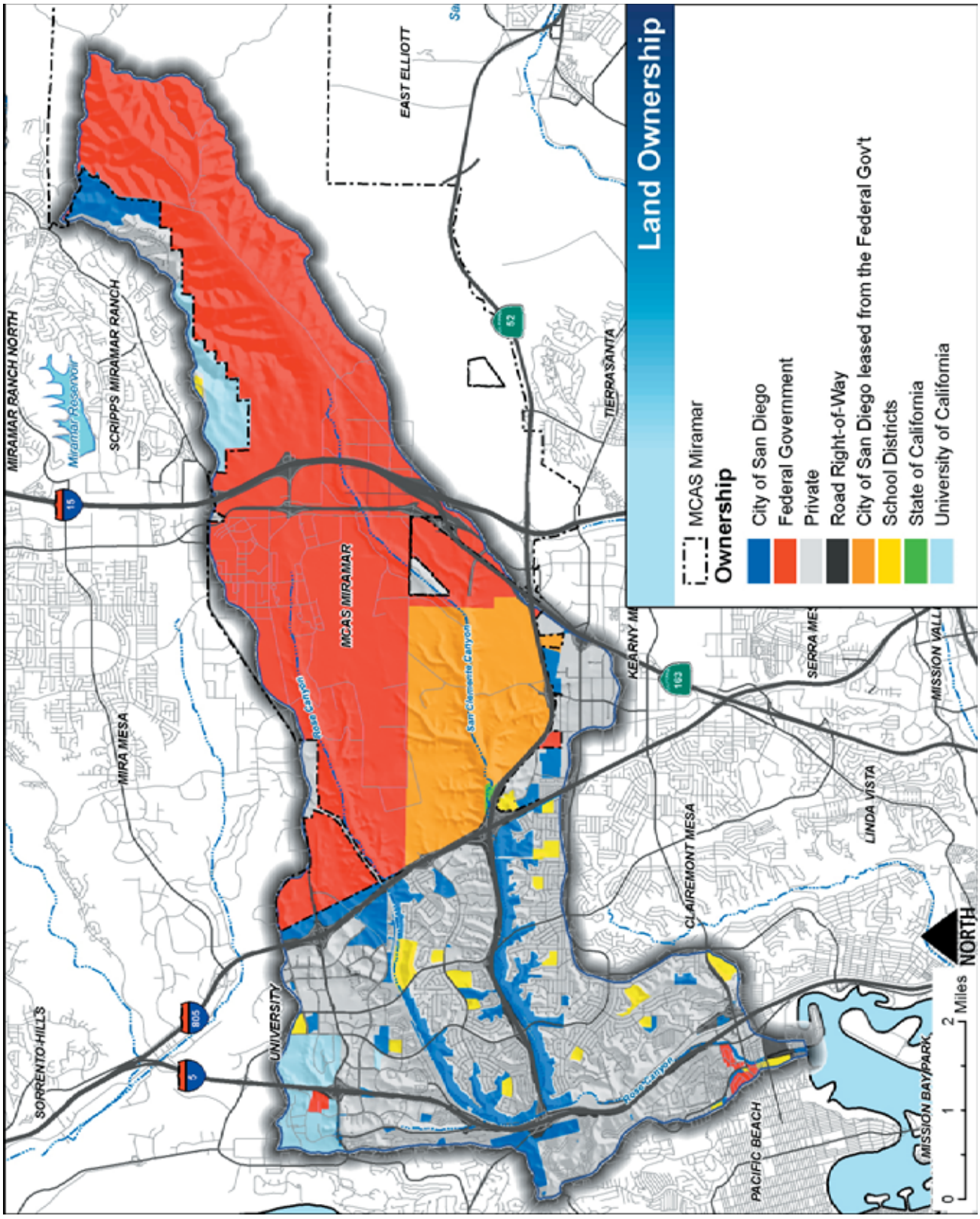


Figure 3-22: Land Ownership

Existing Conditions Report - Figure 3-3



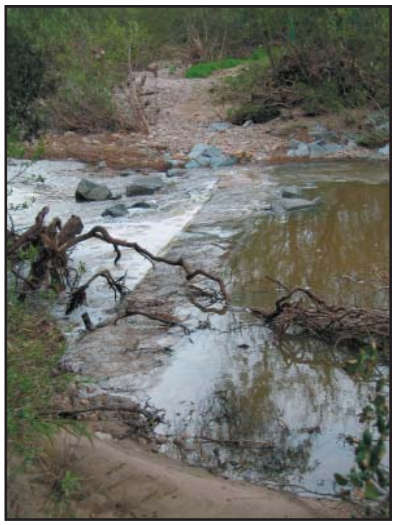
3.6.3 Existing Land Uses

Based on the 2002 Existing Land Use data collected from SANDAG (Figure 3-23), undeveloped land is the most dominant land use within the RCW covering 8,393 acres (36%) of land, with 7,477 acres being found within MCAS Miramar which is designated for military training purposes on an as-needed basis. The second largest land use category is family housing, which encompass 3,840 acres (16%) of the RCW. Lands dedicated to transportation uses cover the third largest area at just over 3,100 acres. Much of this area is contained within the rights-of-way for Interstate 5, 805, and 15, as well as State Route 52 and 163 that crisscross through the watershed. Parks and Open Space areas account for 2,640 acres, and Commercial and Industrial areas account for 1,354 acres.

3.6.4 Planned Land Uses

Based on the 2020 Planned Land Use data collected from SANDAG (Figure 3-24), military undeveloped remains the most dominant land use within the RCW covering 6,035 acres (26%) of land. The second largest planned land use category becomes family housing encompassing 5,003 acres (21%) of the RCW. Lands identified for Military use become the third largest planned land use category covering 4,659 acres (20%) of the RCW. After these three main categories of planned land uses, the next most significant planned land uses each cover nearly equal portions of the RCW. Agriculture, Schools, and Transportation each covers between 1,200 and 1,300 acres. Two categories of land uses show significant increases from the existing land use to planned land use data sets; family housing and recreation. Family housing shows an increase of over 1,000 acres and recreation of 500 acres.

3.7 Utilities



There are a variety of utility systems that criss-cross through the RCW. Some of these systems, such as the high-voltage electrical lines, provide opportunities for habitat protection as the parcels they own or the easements they maintain are often in natural habitats. Other systems, such as the sewer system, can act as constraints when considering habitat creation or restoration opportunities as the main trunk lines are often aligned in the bottom of finger canyons or cross main tributaries making significant grading for wetland creation impracticable. Other utility systems within the RCW include fiber optic lines, television cable and phone lines. Whether they provide opportunities or constraints, understanding the utility systems occurring within the RCW and their locations are important aspects to understand before making recommendations about restoration opportunities. The utilities on MCAS Miramar are currently owned, maintained and operated by the station's Public Work Center. Southwest Division (SOUTHWESTDIV), Naval Facilities Engineering Command, Public Works Support and Utilities Management Branch is currently exploring the potential for privatization of the utility systems.

3.7.1 Water System

The San Diego County Water Authority maintains a portion of its second aqueduct across MCAS Miramar and through the base of the foothills in the upper portion of the RCW. The aqueduct provides interconnections with Olivenhain Reservoir, Lake Hodges, and Miramar Reservoir in the north with Lake Murray and its associated filtration plant in the south. Additionally, the City of San Diego operates 24 miles of reclaimed water distribution lines within the RCW that provide landscape irrigation and some industrial supply water to users throughout its service area. Both of these systems are depicted in Figure 3-25.

3.7.2 Sewer System

The Metropolitan Waste Water Department of the City of San Diego operates and maintains over 228 miles of sewer lines, comprised of nearly 182 miles of collector lines, 35 miles of trunk lines, and 11 miles of overflow lines and miscellaneous (Figure 3-26). The sewer and wastewater on MCAS Miramar is collected on base and discharges to the City of San Diego system. MCAS Miramar's sewer system consists of approximately 38 miles of 6" to 15" vitrified clay lines built from 1953 to 1960 and are not shown in the figure. Sewer laterals or sewer overflows only occur in two locations in the RCW. They are located within 100 feet of each other on the western border of the RCW off of Desert View Drive, which is approximately 1,000 feet from Soledad Road north of on Soledad Mountain Road. These overflows divert dry weather runoff from Rose Creek into the sewer system preventing it from flowing into Mission Bay. The sewer system crosses the creeks in numerous locations, many of which are eroding and exposing the sewer lines and posing a serious public health risk if the lines are damaged.

3.7.3 Storm Water Conveyance

Most of the storm drain systems servicing the developed areas of the watershed have outfalls in tributary canyons that then drain into Rose or San Clemente creek (Figure 3-27). In certain locations, the storm drain systems have their outlets directly into Rose or San Clemente Creek. This is particularly true within the lower portions of the watershed. The vast majority of the storm drain outfalls are characterized by immediate downstream erosion and gully formation, with some of the gullies being as larger as 40 feet across and 20 feet deep.

The Stevenson Canyon drainage did not naturally converge with Rose Creek but has been connected via storm drains along Balboa Ave. Historically, Stevenson Canyon drained directly to Mission Bay near De Anza Cove. However, in 1981 the City of San Diego implemented a new storm drain program to ensure the water quality and habitat protection for Mission Bay. Interception of pollutants before they reach the Bay was predicted by Tetra Tech, Inc. to provide the most effective means of long-term improvement of bay water quality (Figure 3-27). This recommended approach was subsequently implemented with the construction of eight diversion systems on two contributory drainage control channels (Rose and Tecolote Creeks) and nine storm drains on the east side of Mission Bay and was completed in 1986 at a cost of $1 million and provided low flow storm drain diversion of runoff to the Point Loma Treatment Plant for treatment from 90 percent of the area tributary to Mission Bay and the San Diego River Channel west of Interstate 5.

Figure 3-23: 2002 Existing Land Use

Existing Conditions Report - Figure 3-4

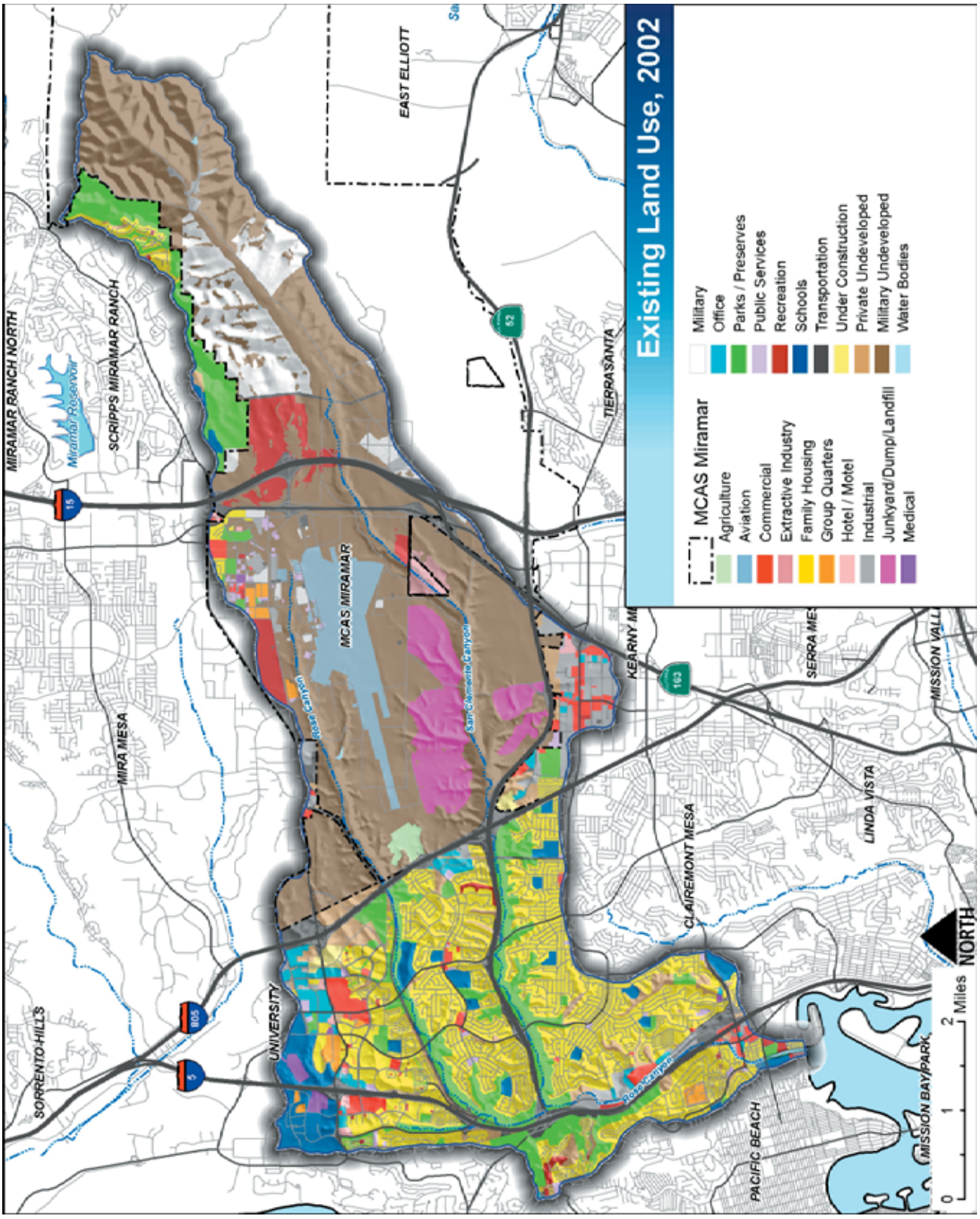


Figure 3-24: 2020 Planned Land Use *Existing Conditions Report - Figure 3-5*

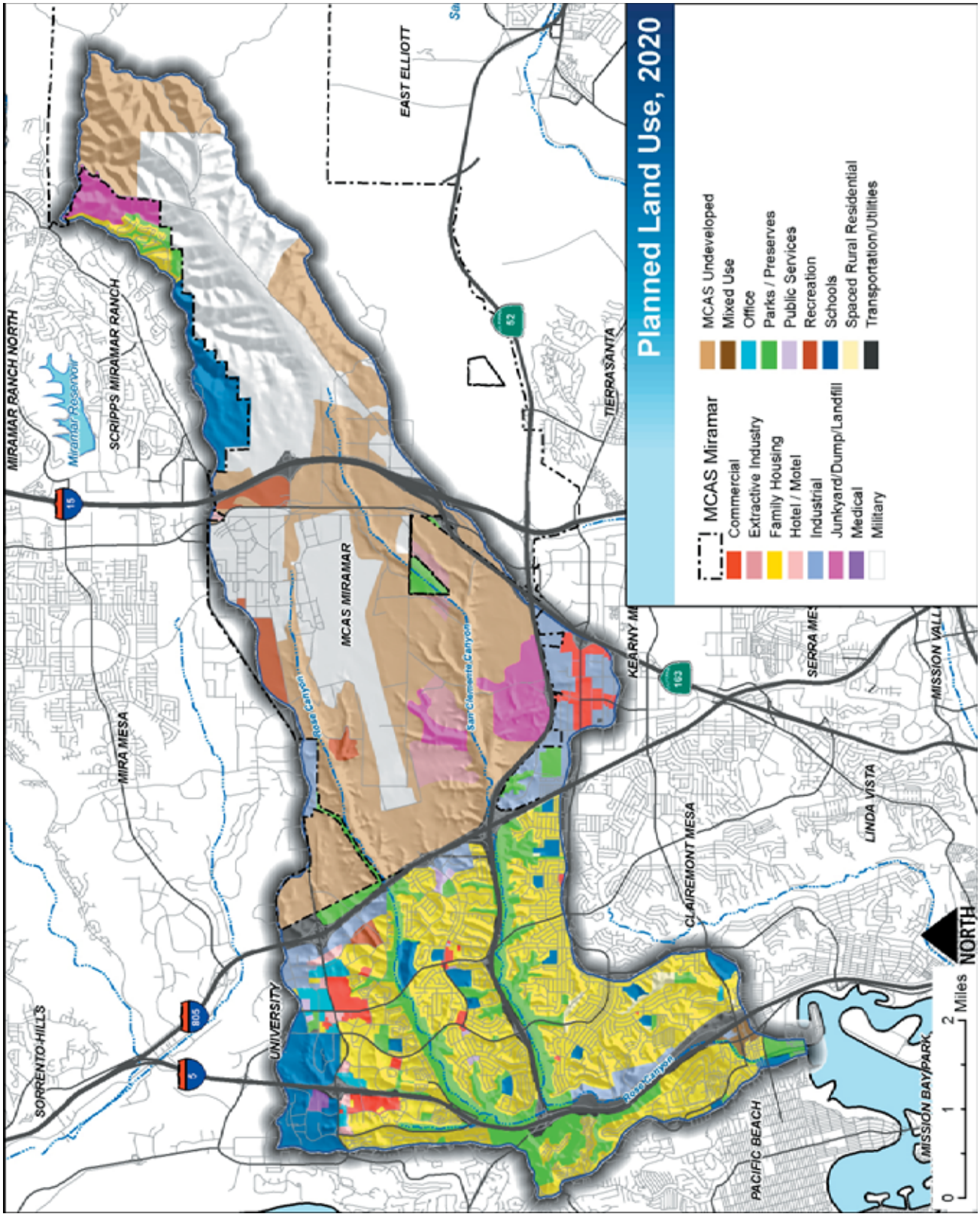


Figure 3-25: Reclaimed Water and SDCWA Aqueduct

Existing Conditions Report - Figure 7-1

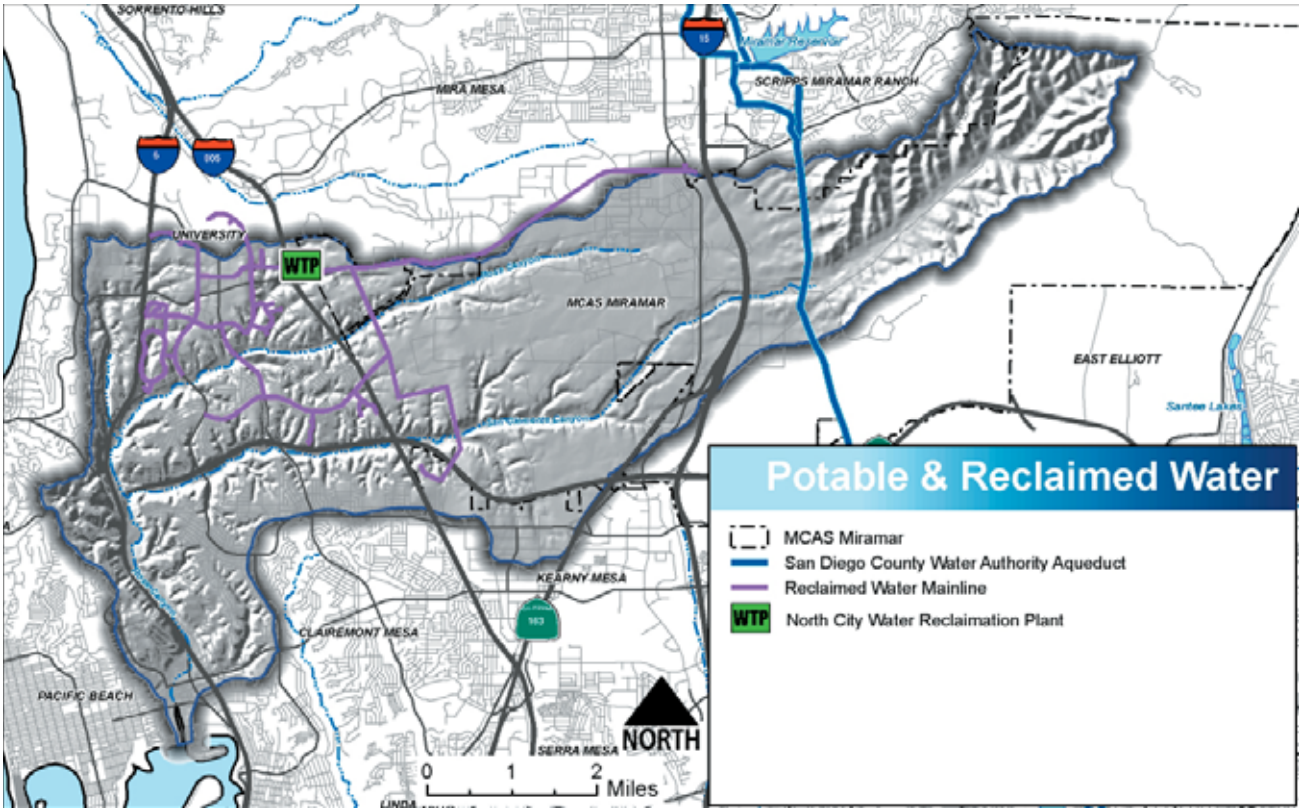


Figure 3-26: Sewer System

Existing Conditions Report - Figure 7-2

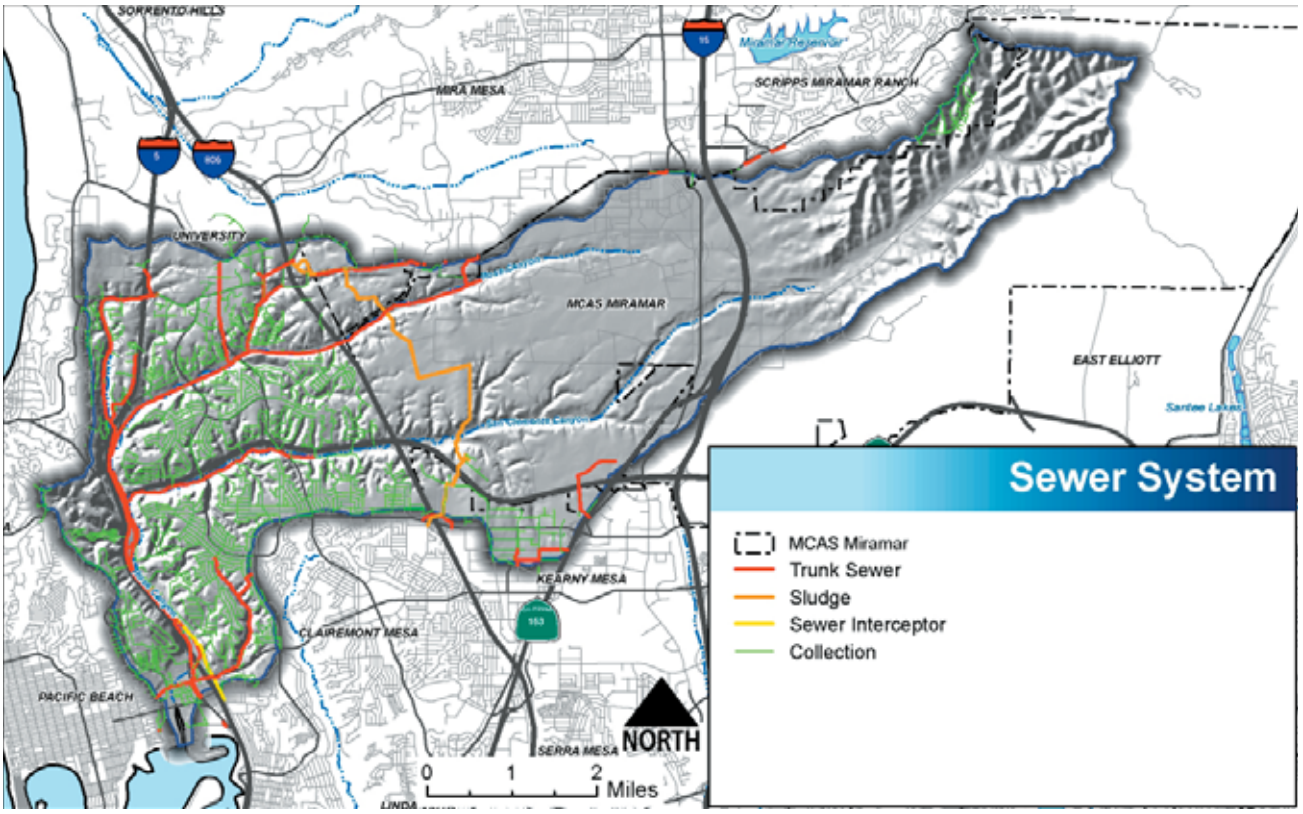
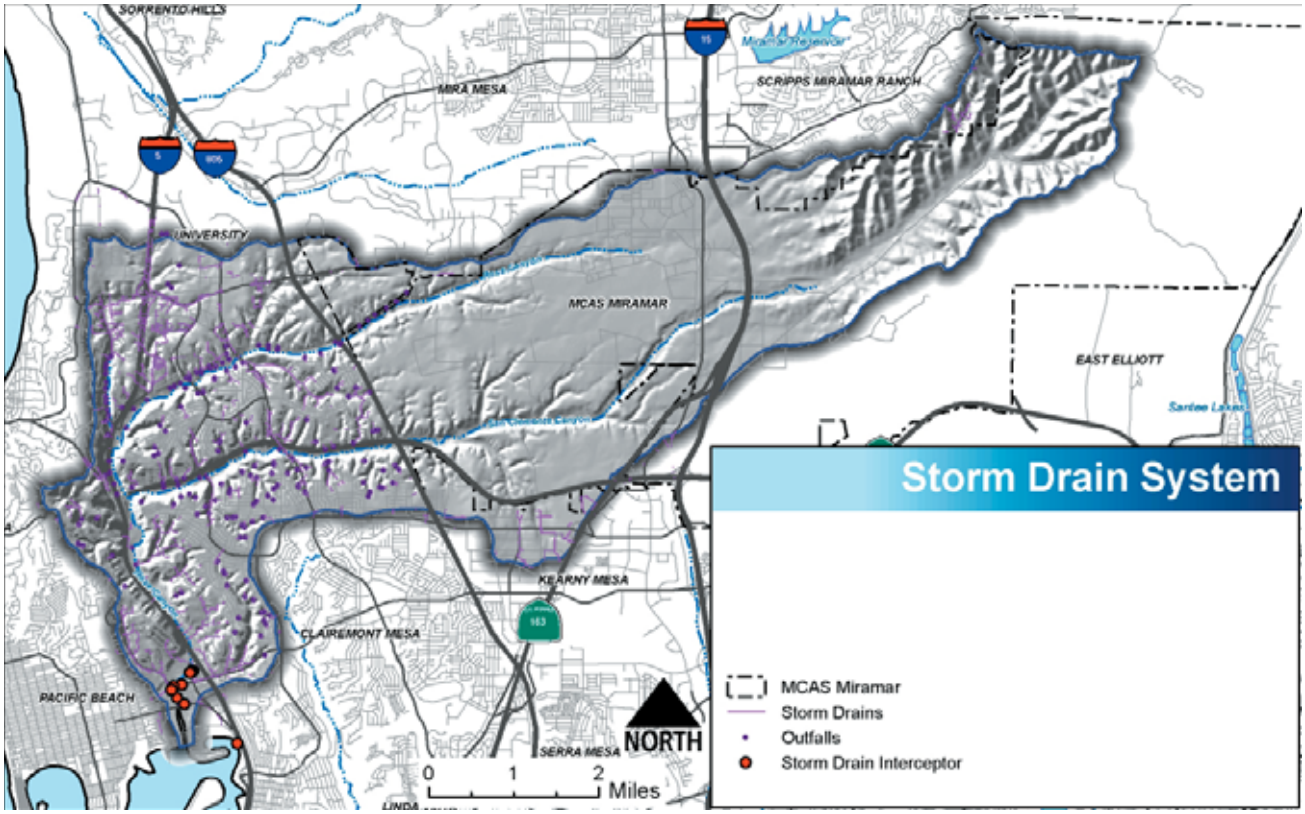


Figure 3-27: Storm Water Conveyance *Existing Conditions Report - Figure 7-4*



3.7.4 Electrical Distribution

San Diego Gas and Electric (SDG&E) operates and maintains four high-voltage transmission lines that cross the RCW (Figure 3-28). The high voltage transmission lines run predominantly east – west throughout the watershed with one main line running north – south along Interstate 805 and at Miramar Road directs east towards a SDG&E Substation just across the road from MCAS Miramar. A second SDG&E Substation is located in the northwest portion of the watershed in Sycamore Canyon off of Spring Canyon Road. The rights-of-way and easements associated with these high-voltage transmission lines could provide an opportunity for multi-use trails. Smaller community and neighborhood distribution lines are not shown in the figure.

3.7.5 Gas Distribution

San Diego Gas & Electric (SDG&E) operates and maintains a number of gas lines that distribute gas across the RCW (Figure 3-28). The main operating location of the gas lines is almost entirely between Interstate 5 and Interstate 805 excluding one line that runs west underneath Interstate 805 near Miramar Ranch North. Smaller community and neighborhood distribution lines are not shown in the figure.

3.7.6 Freeways and Roads

There are a total of 307 miles of road right-of-ways throughout the RCW, which include freeways, major arterial streets and local streets (Figure 3-29). Local streets are the dominant form and total 264 miles, or 86 percent of the transportation system and typically have less than 2,500 cars

Figure 3-28: Gas and Electrical Distribution *Existing Conditions Report - Figure 7-5*

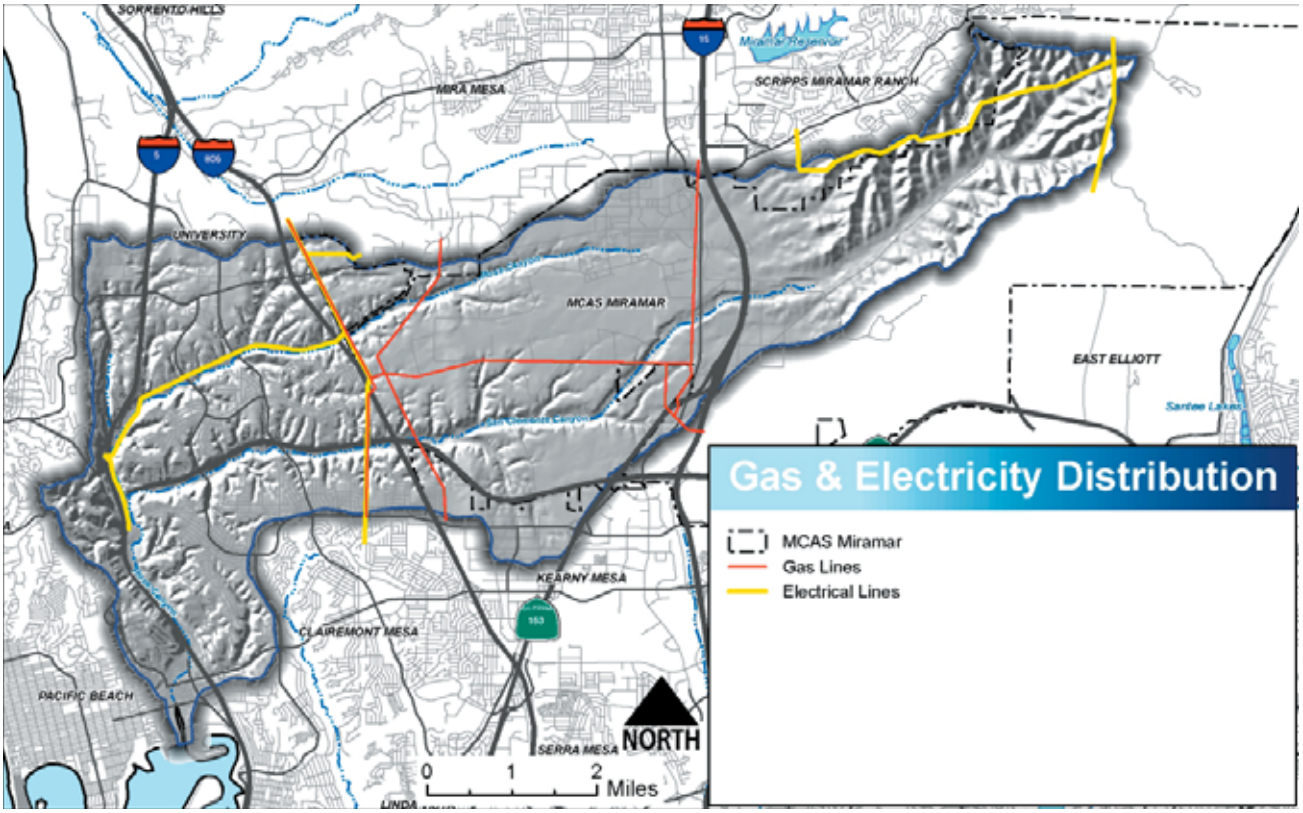
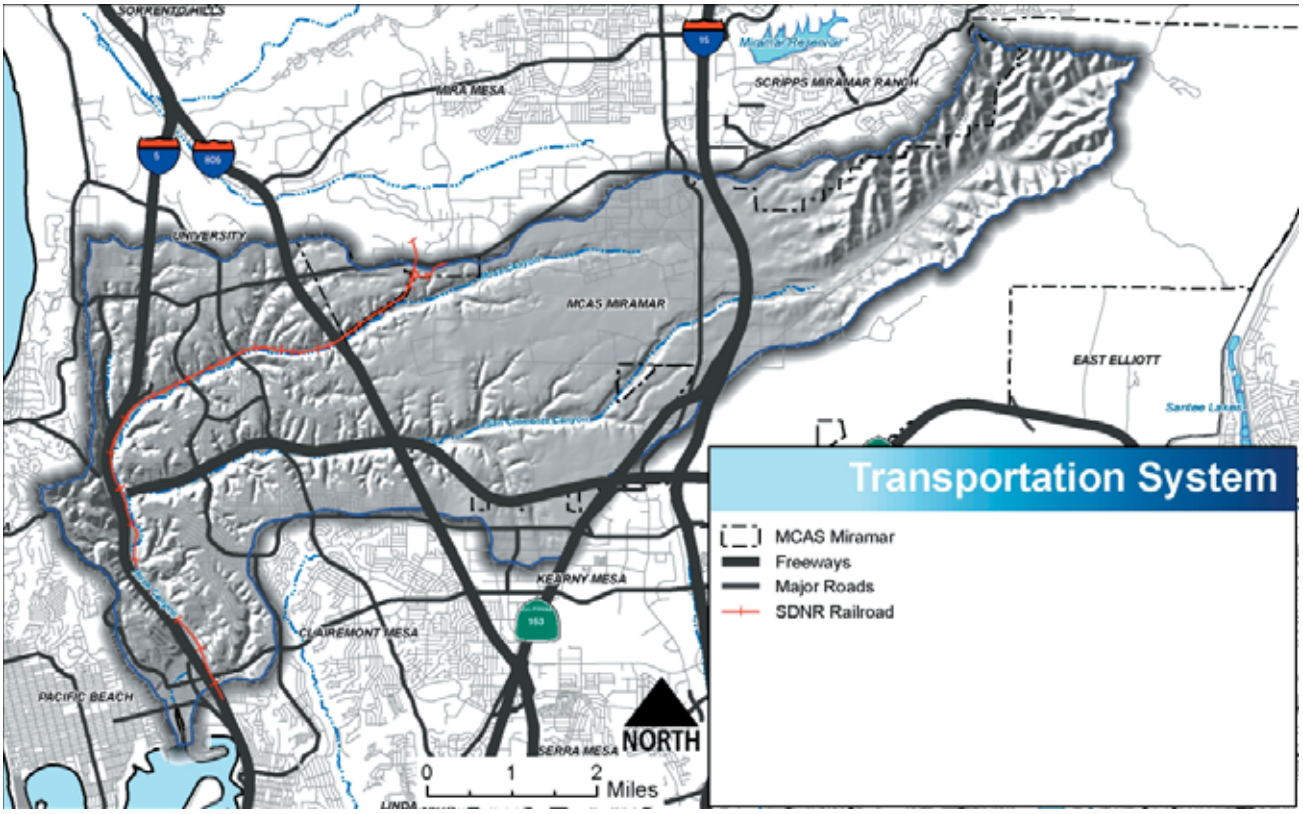


Figure 3-29: Major Transportation Systems *Existing Conditions Report - Figure 7-7*



use them any given day. Major arterial roads occupy 23 miles and freeways occupy 20 miles throughout the RCW. Interstate 5 (I-5) runs north-south in the western portion of the RCW and intersects with State Route 52 at the confluence of San Clemente Creek and Rose Creek. This ten-lane freeway (five northbound and five southbound) traverses approximately 6 miles through the watershed. Interstate 805 (I-805) is also a ten lane north-south corridor that eventually merges with I-5 just north of the RCW and acts as westernmost boundary between the City of San Diego and MCAS Miramar. The easternmost freeway that crosses the RCW is Interstate 15 (I-15), also running north-south. This ten to twelve lane freeway traverses 2.7 miles through the RCW in MCAS Miramar. State Route 163 (SR-163) is an eight-lane freeway that connects to I-15 just inside the southern boundary of the RCW and still within MCAS Miramar. State Route 52 (SR-52), is the only east-west freeway within the RCW. This freeway begins as a four-lane freeway from I-5 to I-805 then expands to an eight-lane freeway and back to a four lane after it crosses I-15. SR-52 intersects with all the major freeways within the RCW except for I-15, which intersects just outside the southern edge of the watershed.

The average daily trips (ADT) of the freeways through the RCW are approximately over 187,000 trips per day and roughly 50,000 trips per day for major arterials. Of the all the freeways through the RCW, Interstate 5 is the most heavily used averaging over 312,000 cars per day while State Route 52 only averages about 121,000 cars per day. The north-south freeways experience the most traffic due to their connection with the growing population of San Diego's North County and downtown San Diego.

Table 3-8: Average ADTs by Road

Transportation Route	Ave Daily Trips
Interstate 15	312,900
Interstate 5	213,400
Interstate 805	197,600
State Route 163	168,300
State Route 52	121,200
Miramar Rd	69,300
La Jolla Village Dr	66,900
Garnet Ave	61,800
Ardath Rd	52,900
Balboa Ave	43,140
Grand Ave	38,800
Clairemont Mesa Blvd	37,200
Genesse Ave	32,300
Kearny Villa Rd	28,500
Regents Rd	25,600
Convoy St	25,210
Soledad Mountain Rd	24,350
Nobel Dr	23,800
Towne Centre Dr	22,400
Governor Dr	20,160
Morena Blvd	19,300
Villa La Jolla Dr	17,900
Gilman Dr	16,300
Lebon Dr	11,900
Eastgate Mall	10,100
La Jolla Colony Dr	7,700
Moraga Av	6,530
La Jolla Scenic Dr	5,700
Jutland Dr	4,600

3.7.7 Rail Service

Within San Diego County the coastal rail travels to and from Oceanside and follows the coast southward and eventually into Mexico. The railroad system traverses roughly 10 miles within the RCW through MCAS Miramar and Rose Canyon (Figure 3-29). The railroad then follows the I-5 corridor south through the communities of University and Clairemont Mesa on its way to downtown San Diego. This coastal rail corridor, a predominantly double-track railway throughout the RCW, is shared by commuter (Coaster), intercity passenger (Amtrak) and freight (BNSF) rail services. On an annual basis, 1.8 million commuters ride Coaster trains south or Metrolink trains north from Oceanside using the LOSSAN (Los Angeles – San Diego) coastal rail corridor. The corridor is part of Amtrak's second busiest intercity rail corridor nationwide. It comes second only to the Northeast Corridor on the east coast. The rail corridor is also served by the Burlington Northern Santa Fe freight rail service. The 2030 Regional Transportation Plan from SANDAG includes substantial improvements to the corridor including the completion of double tracking the rail line between Orange County and Center City San Diego and tunnels at Del Mar and University with a new Coaster station off Nobel Drive. These proposals are conditional upon appropriate environmental impact analysis.




3.8 Water Quality

Water quality concerns in the RCW both affect and are affected by the water quality of Mission Bay as it is the receiving water for the watershed. As such, in-stream water quality throughout the RCW is not only important as it relates to the potential impacts along the stream, but also as it relates to the overall contribution of pollutants to Mission Bay.

As described in the Mission Bay and La Jolla Watersheds Urban Runoff Management Plan (2004), water quality pollution in Mission Bay, particularly bacterial contamination, has been the focus of investigations by various entities, since the early 1980s. Results of the initial comprehensive investigation indicated that the interception of pollutants before they reached the Bay would likely provide the most effective means of improving water quality within the Bay during the dry season. As a result of these studies, the City of San Diego constructed a low-flow interceptor system that diverts dry weather urban runoff out of the storm drain system into the sanitary sewer system at a cost of approximately $10 million over 3 phases. Additionally, the City made significant improvements to the sewer system within the area, replacing and upgrading old pipes and pump stations, to help prevent future sewer overflows as well and cost over $200 million. Over the last two decades since the initiation of these efforts, postings due to bacterial contamination have continued to occur.

In 2002, the City of San Diego developed the Mission Bay Water Quality Management Plan that identified seven individual projects, including the Rose and Tecolote Creeks Water Quality Improvement Project, which is the first project to extend beyond the Bay and its adjacent land uses up into the tributary drainages of the two primary watersheds draining to the Bay. Other projects recently undertaken by the City of San Diego include: Mission Bay Bacteria Source Identification Project; Mission Bay Water Quality Survey; Mission Bay Epidemiology Study; Mission Bay Contaminant Dispersion Study; Mission Bay Water and Sediment Testing Project; Coastal Low Flow Storm Drain Diversion Project; Tecolote Creek Treatment Wetland Project; and the aforementioned Rose and Tecolote Creek Water Quality Improvement Project. Information on these projects have been collected and reviewed to determine how there findings, recommendations, or project configurations may provide insight, opportunities, or constraints to the analyses and recommendations associated with this Assessment.

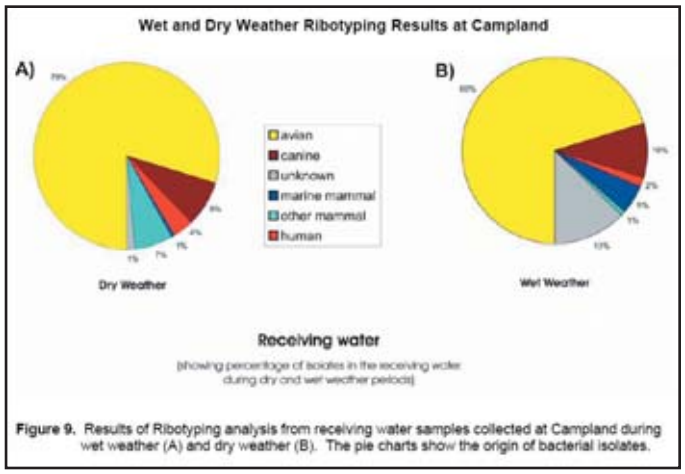
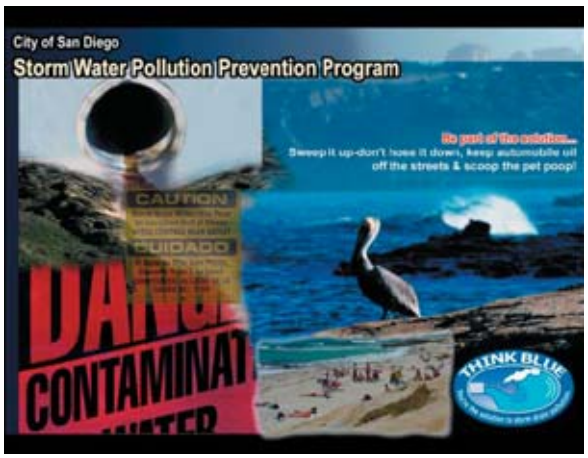


Figure 9. Results of Ribotyping analysis from receiving water samples collected at Campland during wet weather (A) and dry weather (B). The pie charts show the origin of bacterial isolates.

Understanding the pollutants of concern within Mission Bay and the RCW and how they are being addressed by the City of San Diego and others is important. Understanding which pollutants they are, what the likely sources are, and how they are transported can identify opportunities for indirect benefits (source control, filtering of nutrients, sequestering of metals/sediments) within this assessment's recommendations as they are developed and refined. Additionally, it is important to ensure that the recommendations generated by this assessment do not exacerbate the conditions that are contributing to the water quality issues to begin with.

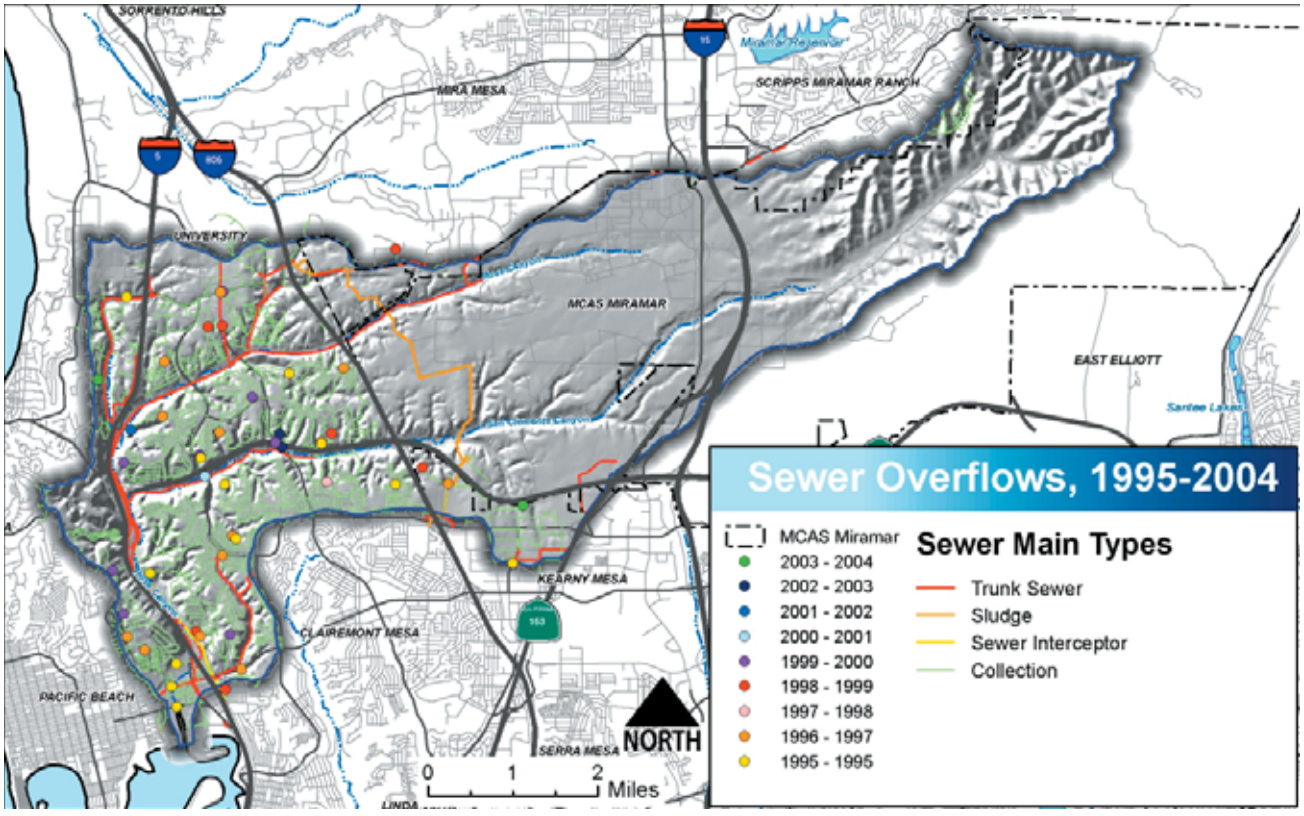


3.8.1 Sewer Overflows

Since 1995, there have been 68 sewer overflow spills throughout the RCW recorded by the San Diego Regional Water Quality Control Board (Figure 3-30). Of these spills, 41% have been caused by root intrusion and 22% by grease buildup and the remaining 37% by other factors. In 1995-1996, there were 14 recorded spills in City of San Diego owned land of the RCW. Another 14 spills were recorded in between 1996-1997 throughout the same area. The 68 incidents collectively spilled nearly 525,000 gallons of sewage into the streams and only 8.4% of it was recovered before flowing completely downstream and entering Mission Bay. In May of 1996, the Regional Board adopted Order No. 96-04 which are waste discharge requirements prohibiting sanitary sewer overflows by sewage collection agencies. This order was adopted in response to what the Regional Board had been seeing as a serious and growing sewage problem in the region. The Board was very concerned and wanted a way to reduce the number and volume of spills and protect water quality, the environment and public health.

Figure 3-30: Sanitary Sewer Overflows

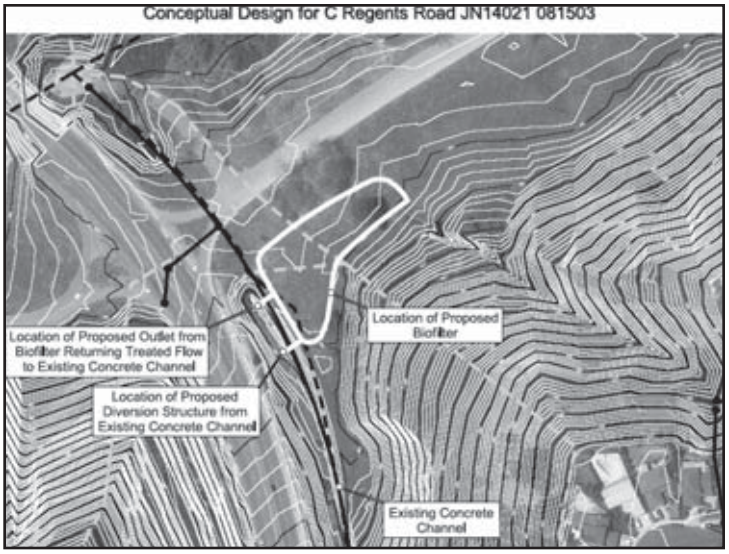
Existing Conditions Report - Figure 7-3



3.8.2 Identified Water Quality Issues

The Clean Water Act, Section 303(d) requires each state to identify those waters that do not meet water quality standards after the application of technology-based controls. Applicable water quality standards include the designated beneficial uses, the established water quality objectives identified, and an anti-degradation policy under Section 303(d). Waters that do not attain the applicable standards are designated as Water Quality Limited Segments (WQLSs). Section 303(d) requires the establishment of a priority ranking of these WQLSs for purposes of developing Total Maximum Daily Loads (TMDLs), and establishing Waste Load Allocations (WLAs), and Load Allocations (LAs). The Total Maximum Daily Load (TMDL) is the amount of a pollutant that can be discharged into a water body and still maintain water quality standards. Pollutant loadings above the TMDL are expected to adversely affect water quality by causing receiving waters to exceed applicable water quality standards.

The San Diego Regional Water Quality Control Boards (SDRWQCB) has, through the CWA 303(d) Listings, identified the mouth of Rose Creek as being impaired by Lead and Eutrophic conditions, and all of Mission Bay with Bacterial contamination. These have been on the 303(d) list since 1996 and are identified as medium and low priorities for TMDL develop within the 2002 303(d) list. In addition to these pollutants the Rose and Tecolote Creeks Water Quality Improvement Project also referred to the Standard Urban Storm Water Mitigation Plan for San Diego County and determined that due to the land uses present within both the Rose and Tecolote Creeks watersheds that sediment, nutrients, other heavy metals, organic compounds, trash and debris, oxygen demanding substances, oil and grease, and pesticides should also be considered pollutants of concern.



The Rose and Tecolote Creek Water Quality Improvement Project focused on identifying potential locations for the installation of structural water quality treatment devices and then evaluate several alternate treatment devices for each site. Eight categories of structural treatment devices were considered: biofiltration, constructed wetlands, extended detention basins, infiltration, filtration, hydrodynamic separators, inlet filters, and off-line treatment plants. A total of 34 potential treatment locations were identified in the RCW and were processed through an evaluation procedure to determine which treatment alternatives would work best at each site. A ranking of these sites helped in identifying potential implementation phases and then rank the sites to establish which sites should be further evaluated for potential implementation. Three potential locations were identified within the RCW for further evaluation: 1) Clairemont- Regents Road; 2) University City- La Jolla Colony; and 3) University City- Marcy Park West Outfall. After further evaluation, only the Clairemont Regents Road location was recommended for further design and implementation as a biofilter. The project has currently been put on hold due to community opposition voiced during initial public meetings.

The Mission Bay Water Quality Survey, initiated by the City of San Diego Metropolitan Wastewater Department in 2001, collected data from 14 stations within the RCW (Figure 3-31). The focus of this monitoring has been on bacterial contaminants, but other physical and chemical analytes have been collected as well. This program collected weekly samples during both dry and wet weather conditions for 36-months. Additionally, as part of the MOU with the City of San Diego for this Assessment, the City has continued to collect dry weather monitoring data within the RCW at 24 stations. Sixteen of these stations are being used as field screening stations only and eight are being used for both field screening and laboratory analysis. The purpose of this monitoring is to detect and eliminate illicit connections and illegal discharges into the storm drain system. When tests reveal elevated levels of pollutants, follow up investigations are conducted as soon as possible to identify the source of pollution. Once the source is found, monitoring staff coordinate with the Storm Water Code Enforcement to eliminate the source so that they do not continued to contribute to lower water quality in Rose Creek. The monitoring data is evaluated annually to compare water quality data between the Rose Creek and other watersheds in the City and across the county. This assessment is included in the City of San Diego's annual Municipal Storm Water Permit report to the San Diego Regional Water Quality Control Board. As the results from these monitoring efforts are completed and released additional coordination with City staff will be required to determine what how to best incorporate any identified water quality specific actions with the actions recommended in this Assessment.

Figure 3-31: City of San Diego Dry and Wet Weather Monitoring

Existing Conditions Report - Figure 8-1