

3.0 PHYSICAL SETTING

3.1 CLIMATE

Precipitation averages just over 10 inches per year at MCAS Miramar, associated with low intensity storms in the winter and spring. Frosts are light and infrequent, with the growing season ranging from 345 to 360 days. Winds are usually gentle and come from the west, especially during summer afternoons. The average annual temperature is about 63 degrees Fahrenheit. The average daily high is 71 degrees, and the low 53 degrees. Weather patterns are dominated by a subtropical ridge with a shallow marine layer and pronounced low-level inversion, and the moderating effects of the California current off-shore. This Mediterranean climate creates a semi-arid condition, with warm, dry summers and mild winters. Fog is common during the summer. Weather data are available from the Naval Oceanographic Command Detachment on MCAS Miramar, and from the National Weather Service at Lindbergh Field, the commercial San Diego airport.

An important characteristic of local weather is its year-to-year variability. The native vegetation is adapted to periodic drought and flooding. Erosion and sedimentation patterns are influenced by this variability, with most of the soil loss occurring perhaps once every 20 years. The pattern of winter storms determines whether there is enough antecedent soil moisture before an intense storm to cause significant soil loss. Intense storms have little impact if the soil is dry enough to absorb water quickly.

Hazardous fire conditions occur during the fall when there are very dry, warm winds and vegetation is dry and cover is low. High erosion rates can result when intense storms follow a fire. Fire is a natural component of the southern California landscape, thus the vegetation at MCAS Miramar is adapted to occasional fires. However, the risk of large-scale, disastrous fire has increased with urbanization and past fire suppression policies.

3.2 GEOLOGY AND SOILS

Steep, eroded, gravelly, or cobbly terraces consisting of the Poway group of non-marine sandstone and coarse cobbly "Stadium" conglomerate predominate the upland areas of East Miramar. The conglomerate is overlain by softer, more erodible tongues of marine, lagoonal, and non-marine sandstone called the Mission Valley Formation, which is then overlain by Pomerado conglomerate (Figure 5) (Kennedy 1975). This area is highly dissected, with rugged divides, dendritic drainages, and V-shaped valleys (Figure 6).

In some parts of MCAS Miramar the loss of plant cover has resulted in severe erosion causing loss of topsoil and could cause siltation of streambeds. Landslides are common along valley walls in clay-rich portions of the Mission Valley and Friars formations. West Miramar encompasses gravelly marine terraces ("mesas") of the Lindavista formation with areas of terrace escarpment and alluvium. It was formed under fluctuating estuarine and beach conditions with subsequent uplift (Kennedy 1975).

More than three-quarters of MCAS Miramar soils are in the Redding group of shallow, cobbly, or gravelly loams that range from 2 to 50 percent slopes. Permeability is very slow due to a hardpan, and fertility is low. Erodibility of the Redding series is considered severe because of shallow depth to rock and, in some cases, steepness. Where these soils are more gently sloping, they form a hummocks topography known as "mima mounds," which harbor the vernal pools and associated Special Status Species.

In the extreme western portions of MCAS Miramar are three soil types with small acreages but characteristics appropriate for raising irrigated crops—Chesterton fine sandy loam, Carlsbad gravelly loamy sand, and Altamont clay (refer to Figure 5).

3.2.1 Erosion Hazard Ratings

Almost all MCAS Miramar's soils are severely erodible, according to the Natural Resources Conservation Service (formerly known as the Soil Conservation Service), because of either steepness, shallow depth to rock, shallow depth to a hardpan, or excessive silt in surface texture composition. Exceptions are 60 to 70 acres of clay-textured types. Also, in many areas the numerous soil cobbles reduce erodibility by self-sealing gullies or channels.

3.2.2 Topography

Elevations on MCAS Miramar range from just over 1,178 feet in the east to 240 feet in the west (refer to Figure 6). The gently sloping, eroded plateaus or mesas where the flight line and air operations are located are cut by southwesterly draining canyons. These give rise to a series of marine wave-cut terraces, which in turn grade to the steep and dissected hills of Sycamore Canyon. The hummocky topography that includes an impervious subsurface layer supports vernal pools in the western and central areas of MCAS Miramar. It consists of alternating well-drained to moderately well drained mounds and poorly drained swales.


























3.3 HYDROLOGY AND WATERSHEDS

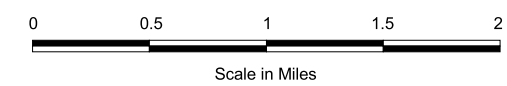
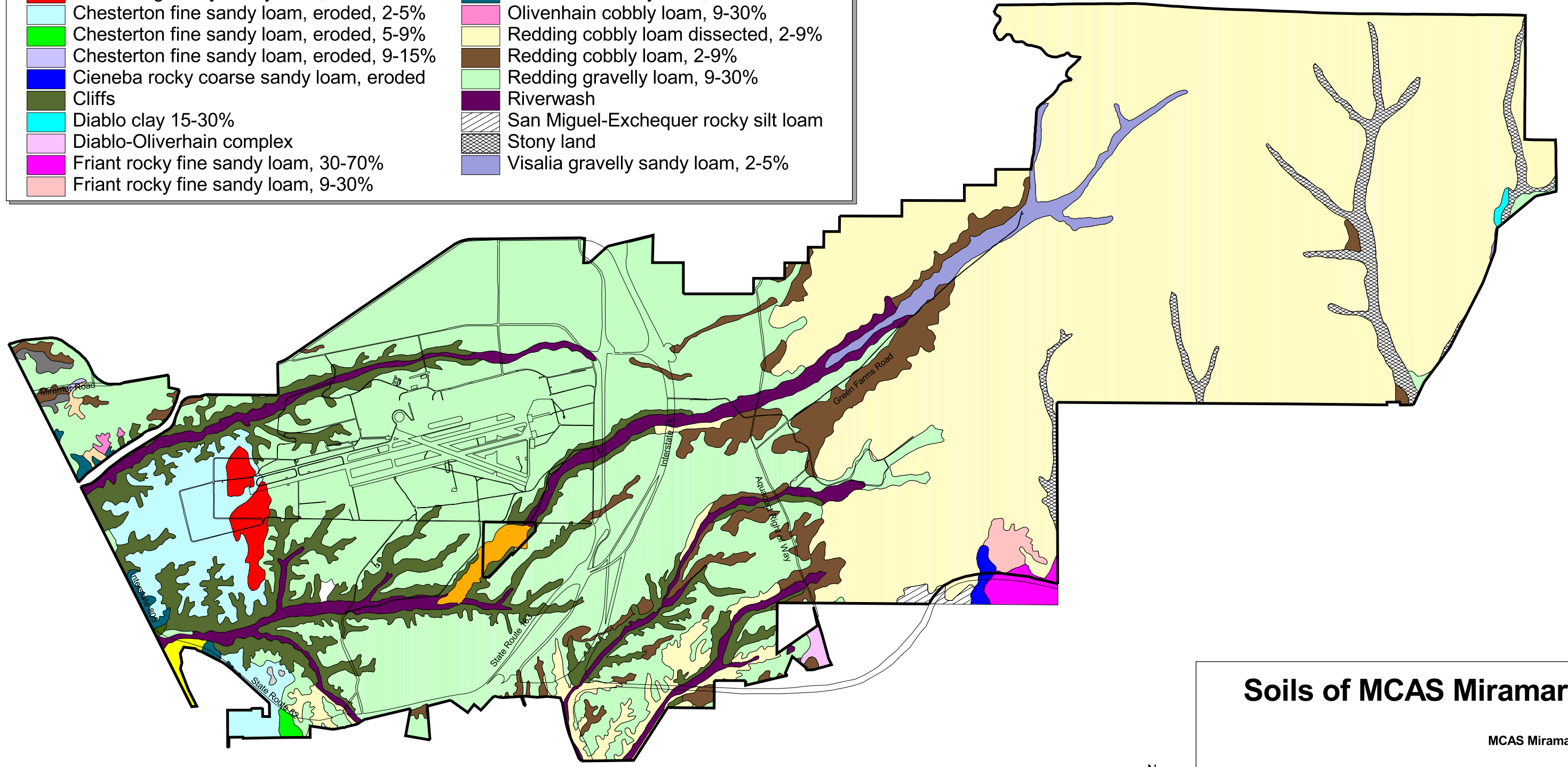
3.3.1 Watersheds

Local watersheds drain to the south or southwest (refer to Figure 6). Murphy, Elanus, Oak, Spring, Quail, Little Sycamore, West Sycamore, and Sycamore canyons drain into the San Diego River and then to the coast. San Clemente Canyon enters Rose Canyon and then Mission Bay. Carroll and Beeler canyons eventually end up in Soledad Valley and then proceed to the coast. Many of these watersheds wholly or partly originate on MCAS Miramar, the main exceptions being Sycamore and Beeler canyons. Most sub-basins are small, which contributes to a high sedimentation rate as particles have less opportunity for deposition before becoming part of a stream system.

Legend

Soil Types (Percentage of Slope)

- | | |
|---|---|
|  Alluvial-Huerhuero loam, severely eroded |  Gavoita fine sandy loam, 30-50% |
|  Altamont clay, 15-30% |  Gravel |
|  Altamont clay, 9-15% |  Olivenhain cobbly loam, 2-9% |
|  Carlsbad gravelly loamy sand, 2-5% |  Olivenhain cobbly loam, 30-50% |
|  Chesterton fine sandy loam, eroded, 2-5% |  Olivenhain cobbly loam, 9-30% |
|  Chesterton fine sandy loam, eroded, 5-9% |  Redding cobbly loam dissected, 2-9% |
|  Chesterton fine sandy loam, eroded, 9-15% |  Redding cobbly loam, 2-9% |
|  Cieneba rocky coarse sandy loam, eroded |  Redding gravelly loam, 9-30% |
|  Cliffs |  Riverwash |
|  Diablo clay 15-30% |  San Miguel-Exchequer rocky silt loam |
|  Diablo-Oliverhain complex |  Stony land |
|  Friant rocky fine sandy loam, 30-70% |  Visalia gravelly sandy loam, 2-5% |
|  Friant rocky fine sandy loam, 9-30% | |




Soils of MCAS Miramar

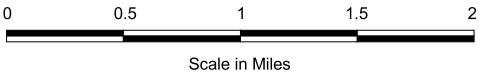
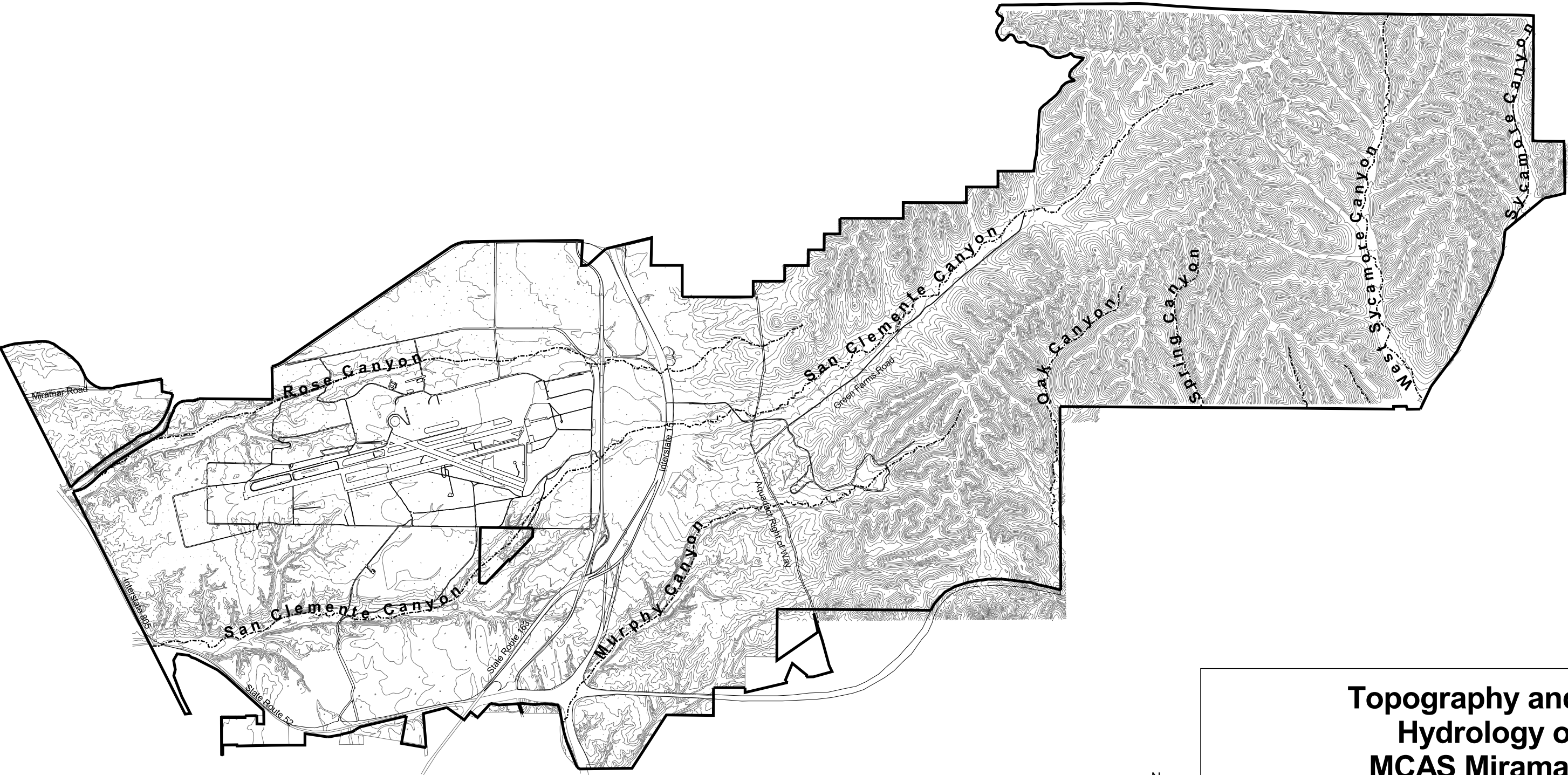
MCAS Miramar

Figure 5

Legend

 Streams

Note: Contour interval on topography is 20 feet west of Interstate 15 and 25 feet east of Interstate 15.



**Topography and
Hydrology of
MCAS Miramar**

MCAS Miramar

Source: City and County of San Diego Maps
1-200' and 1-400'
NAS Miramar Base Map
1-400'

Figure 6

3.3.2 Floodplains and Impoundments

One-hundred-year floodplains have not been completely mapped on MCAS Miramar. Work to delineate and map the 100-year floodplains on MCAS Miramar are planned to begin in 1999. Areas of potential flooding are narrow because of canyon topography, but may have significant flooding potential. Knowledge of peak discharges and velocities from the major canyons on MCAS Miramar can be important for floodplain and sedimentation planning and management. A single gauging station exists on San Clemente Canyon Creek just east of I-15. Peak flows (2-year, 24-hour) for Rose Canyon have been calculated at between 165 and 268 cubic feet per second (Woodward-Clyde 1986), and sedimentation to channels (based on estimates and confirmed by City of San Diego dredging records) at over 14,000 cubic yards per year.

3.3.3 Water Quality

MCAS Miramar water is supplied by the City of San Diego under contract. Water quality monitoring wells are in place but they do not monitor water that supplies the Station. The City gets its water from the Colorado River, the State Water Projects California Aqueduct, and other distant sources. In the 1991 erosion survey (Kellogg and Kellogg 1991), 51 active sites and 31 other sites with minor activity were identified. Sediment yield to channels was estimated at over 30,000 tons per year.

Streambank erosion problems along San Clemente and Rose canyons were identified in a sedimentation study commissioned by the City of San Diego (Woodward-Clyde 1986). Streambanks are typically 10 to 12 feet high but can be as high as 200 feet. Channel sides and bottoms are of cobble alluvium. Loose colluvial sand is apparently common in the canyon bottoms (Lloyd-Reilly 1987; Woodward-Clyde 1986). An earlier study (Tetratex Inc. 1983) had concluded that Rose Canyon was a source of high concentrations of organically rich fine sediments draining into Mission Bay, aggravating the silting of the bay and degrading bottom sediments. There have been documented sedimentation problems arising from the landfill in San Clemente Canyon and impacting Marian Bear Park downstream. In a comparison of stream channel conditions in 1928 and 1991 using aerial photos (Kellogg and Kellogg 1991), most channels were found to be well-defined, flowing with water and full of sediment in 1928. By 1991, these areas were almost completely vegetated with no defined channel, probably due to bed aggradation.

3.4 POTENTIALLY CONTAMINATED SITES AND UNEXPLODED ORDNANCE HAZARDS

There are some areas of MCAS Miramar that have been identified by various reports as sites where the disposal or discharge of hazardous wastes have resulted in potential environmental contamination. In addition, there are sites where unexploded ordnance is potentially and/or confirmed to be present. The primary concern with unexploded ordnance is the risk to public health and welfare associated with the potential presence of unexploded live ordnance (armed with exploding warhead). If disturbed, unexploded live ordnance can be deadly. Although not as dangerous as unexploded live ordnance, inert practice

ordnance with unexploded signal cartridges is also hazardous. The second concern with unexploded ordnance is the potential for environmental contamination. The hazardous constituents contained in munitions are usually consumed in a series of chemical reactions that occur upon detonation. Occasionally, the munitions do not fully detonate or do not detonate at all. If these undetonated munitions are not recovered and the munitions case is damaged or eventually corrodes, the hazardous constituents could potentially leach out into the environment.

Sites where hazardous materials disposal or discharge may have resulted in contamination were identified under the Installation Restoration Program, which addresses the identification, investigation, research, and cleanup of contaminated Installation Restoration (IR) sites. Nine IR sites on MCAS Miramar are listed below.

1. There are several areas within the **Fuel Farm Operation Area** where petroleum, oil, and lubricant products and underground storage tank bottom sludges were sprayed or spread on the ground between the early 1940s and 1975 for dust control. The majority of petroleum, oil, and lubricant wastes were disposed of on and around the fuel farm itself.
2. The **Rose Canyon Area** was used for the disposal of concentrated wastes including oils, greases, hydraulic fluid, fuels, solvents, paint thinners, plating wastewater, corrosive wastes, and beryllium dust during the 1940s and 1950s when the industrial waste reaching the main station sewer was discharged into Rose Canyon. An estimated 500,000 gallons of these wastes were discharged to Rose Canyon since the 1940s.
3. The **Fish Pond**, which was created during 1951 and 1952 to provide recreation for station personnel, received run-off from runways, aprons, and aircraft fueling stations from 1952 to 1976. The run-off contained compounds from fuels that are toxic and slow to degrade in the environment such as polycyclic aromatic, tetraethyl lead, and ethylene dibromide. There is no realistic estimate of how much fuel has entered the pond. The Fish Pond is no longer considered an IR site in that the Regional Water Quality Control Board has granted a Close with No Further Action at this site.
4. Between the 1940s and 1972 all of the refuse from the Station **Can** estimated 38 tons per year **C** was disposed/burned in the **San Clemente Canyon Disposal Area**. Hazardous materials disposed of in this area included waste paints, pesticides, solvents, and spent lead acid batteries.
5. The **Old Camp Elliot Impact Areas**, used during World War (WW) II for ammunition tank, anti-tank, and artillery exercises, may be contaminated with potentially hazardous munitions residue from unexploded ordnance.
6. The inactive **Sycamore Canyon Atlas Missile Facility** was contaminated with Polychlorinated Biphenyl (PCB) and Asbestos Containing Material (ACM). The PCB contamination was cleaned up in 1994. The ACM abatement was completed in 1997. This site is currently being reviewed for closure with no further action by the Regional Water Quality Control Board.

7. The **Supply Drum Storage Area** is a site that was once used as a hazardous waste storage area.

Sites on MCAS Miramar where ordnance hazards are potentially present or have been confirmed to be present are listed below. These sites were used during WW II for ammunition tank, anti-tank, and artillery exercises.

1. Miniature inert practice bombs are potentially present at the 72-acre **Naval Auxiliary Air Station (NAAS) Camp Kearny Bomb Target**. However, the area has been extensively paved and graded since the last use of this target in 1942, no unexploded ordnance has been reported at the site, and access to the site is strictly controlled.
2. Inert practice and high explosive bombs are potentially present at the 17-acre **Rose Canyon Dump**.
3. At the 1,470-acre **Atlas Missile Test Site** there is a potential for the presence of WWI artillery, WWII inert practice bombs, and WWII training items.
4. Inert practice bombs and rockets are confirmed to be present at the 60-acre **East Miramar Bomb Target**. There is also the potential for WWI artillery and WWII training items to be present at the site.
5. Canopy initiator and inert bomb components are confirmed to be present at the 702-acre **Green Farm Camp**. Other ordnance potentially present is WWI artillery and WWII infantry training items, explosives research residue, and other explosive ordnance disposal range kick-outs.
6. Live 75mm ammunition and solid 37mm slugs are confirmed to be present at the 250-acre **Figure 8 Anti-Tank Range**. Also potentially present are WWI artillery projectiles and additional anti-tank projectiles, grenades, and/or rockets.
7. Live trip flares, practice rockets, fragments of HE projectiles and shrapnel are confirmed to be present at the 3,420-acre **Camp Elliot Impact Area**. Infantry training items are also potentially present.
8. Hand grenades, rockets, and mortars are potentially present at the 3,375-acre **Western Camp Elliot**.
9. Expended smoke grenades are confirmed to be present at **Central Camp Elliot**. Artillery, hand grenades, rockets, mortar mines, and demolition items may also be present at this site.
10. Artillery, hand grenades, rockets, mortar mines, signals, and demolition items may be present at the **Eastern Camp Elliot** site.