Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin

MLRA Explorer Custom Report

C - California Subtropical Fruit, Truck, and Specialty Crop Region
17 - Sacramento and San Joaquin Valleys

MLRA 17 - Sacramento and San Joaquin Valleys

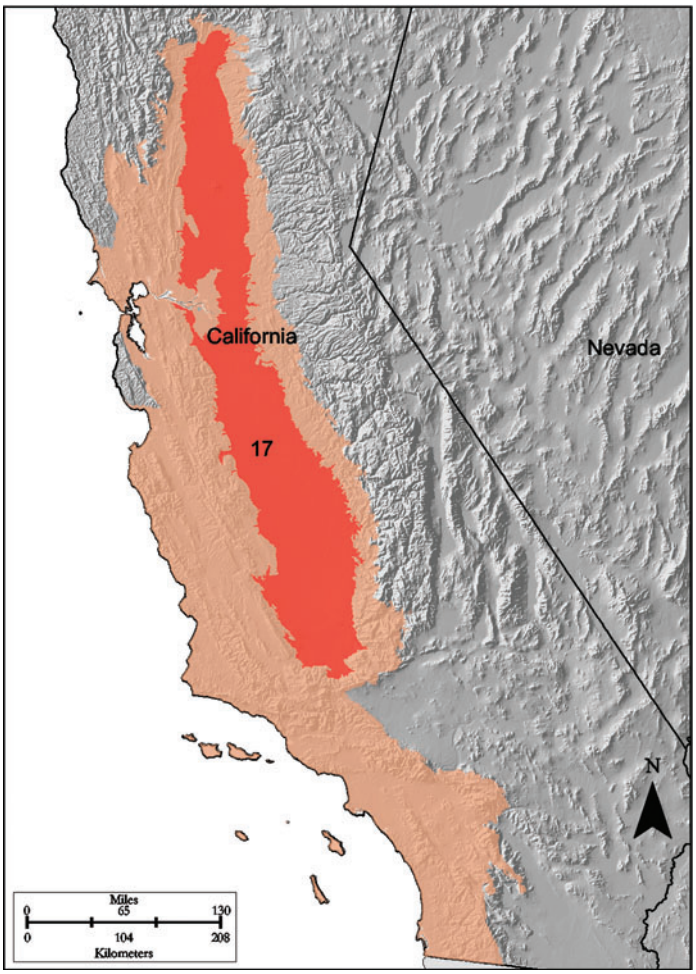


Figure 17-1: Location of MLRA 17 in Land Resource Region C

Introduction

This area is entirely in California (fig. 17-1). It makes up about 18,650 square miles (48,330 square kilometers). From north to south, the major towns or cities in this area are Redding, Red Bluff, Chico, Yuba City, Marysville, Woodland, Davis, Vacaville, Fairfield, Sacramento, Stockton, Modesto, Merced, Madera, Firebaugh, Fresno, Hanford, Visalia, and Bakersfield. Interstate 5 and California State Highway 99 both traverse the entire length of the area. Interstate 80 crosses the midpoint of the area in Sacramento. The MLRA includes Beale, McClellan, Mather, Travis, and Castle Air Force Bases; the Sacramento Army Depot, Lemoore Naval Air Station, and Naval Petroleum Reserves #1 and #2; and numerous national wildlife refuges. The area is locally known as the Central Valley and is part of the Pacific migratory waterfowl flyway.

Physiography

All of this area is in the Pacific Border Province of the Pacific Mountain System. Almost all of the area is in the California Trough Section. Small areas along the western border are in the California Coast Ranges Section. This area includes the valley basins adjacent to the Sacramento and San Joaquin Rivers, fans and flood plains of tributary streams, and terraces and foothills around the edge of the valleys. Elevation ranges from sea level to 660 feet (200 meters) in the foothills surrounding the Central Valley. The valley floor is almost flat, and relief is small even along the borders of the area.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Tulare-Buena Vista Lakes (1803), 42 percent; Sacramento (1802), 31 percent; and San Joaquin (1804), 27 percent. The Sacramento and San Joaquin Rivers are in this MLRA. The major water-supply reservoirs on the Sacramento River and its tributaries are just outside the north and east boundaries of the area. A stretch of the American River below Folsom Lake has been designated as a National Wild and Scenic River. Two major canals are in this area. The State-owned California Aqueduct and the Federal Delta-Mendota Canal move water from northern California, from the California Delta, to Buena Vista Lake directly southwest of Bakersfield.

Geology

California's Great Valley is underlain by as much as 8 or 9 miles of sediments derived from the adjacent uplands and deposited in a variety of marine and nonmarine environments. The Great Valley began to separate from the open ocean roughly 150 million years ago, when subduction of Franciscan marine sediments and volcanics beneath the edge of the old ocean floor jacked it up and created a barrier to movement of sediments. The oldest sediments were derived in large part from the early Sierra Nevada volcanoes and deposited in a deeper marine environment. The composition of the sediments shifted as the volcanic cover was stripped off, exposing the granites of the Sierra Nevada Batholith to erosion. At the same time, the valley started to fill and deposition was occurring in an increasingly shallow marine environment, particularly in the Sacramento Valley, where shallow marine environments started giving way to nonmarine depositional processes roughly 50 million years ago. The interbedded layers of clays, sands, silts, and gravel strongly influence subsurface hydrology and are a source of gas reserves in the Sacramento Valley and oil and gas reserves in the deeper San Joaquin Valley.

The uppermost sediments reflect a recent history of sedimentation in a variety of nonmarine depositional environments. The finer grained deposits are typically associated with flood plains, basins, and lakes. The coarser grained sands and gravel are deposited in stream channels and across alluvial fans. Erosional remnants of gravelly stream terraces and older sedimentary formations also occur, especially along the edges of the valley. Almost all of the surface of this area is covered by recent alluvial deposits. There are some sandy areas, but most of the deposits are flood-plain sediments with a texture of silt to clay. Some gravel occurs in terraces and abandoned channels along modern streams and rivers draining from the surrounding mountains down into this area. Some marine sediments are buried beneath these thick alluvial deposits. Sutter Butte, in the northern part of the Sacramento River Valley, consists of the eroded remnants of a volcano.

Climate

The average annual precipitation is 5 to 12 inches (125 to 305 millimeters) in the San Joaquin Valley. The Tulare Basin, at the southern end of this MLRA, typically receives less than 6 inches (150 millimeters) of rainfall per year. The average annual precipitation is 12 to 30 inches (305 to 760 millimeters) in most of the Sacramento Valley. It is 40 inches (1,015 millimeters) at the higher elevations on the edges of the valley at the north end. Summers are long, hot, and dry, and winters are cool and rainy. Most of the rainfall occurs as low- or moderate-intensity, Pacific frontal storms

from October to May. Snow is very rare in this MLRA but has occurred in the Sacramento Valley from Sacramento to points farther north. The average annual temperature is 59 to 67 degrees F (15 to 20 degrees C), decreasing from south to north. The freeze-free period averages 325 days and ranges from 280 to 365 days, decreasing in length with elevation and from south to north.

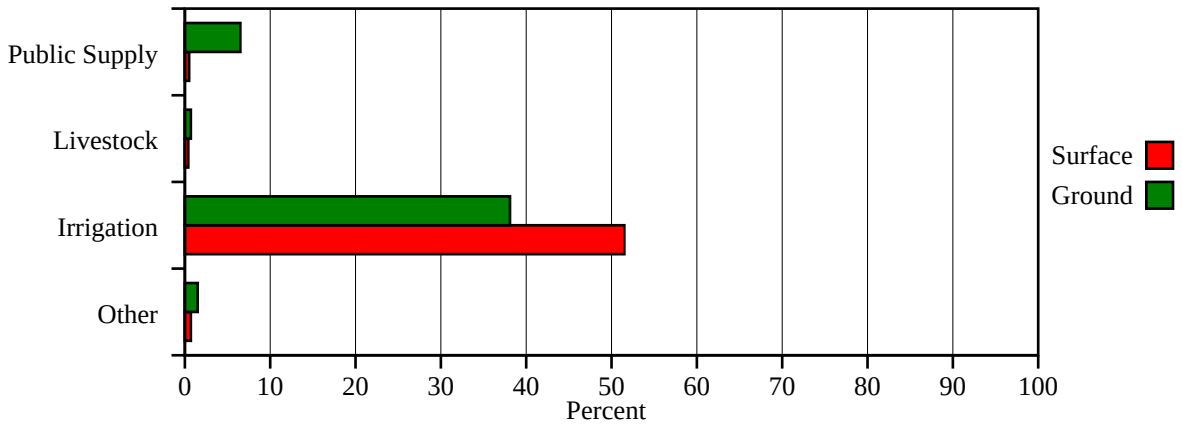
Water

The total withdrawals average 22,755 million gallons per day (86,240 million liters per day). This is the largest amount of water used in any MLRA. About 47 percent is from ground water sources, and 53 percent is from surface water sources. Because of the low rainfall and relatively small flow from streams, water is scarce in many parts of this area. Water for irrigated crops comes from stream diversions, wells, and canals of organized irrigation districts that obtain most of their water from State and Federal water systems. The Sacramento River supplies the most water for use in this area. The river water is hard but is of good quality and is suitable for drinking after minimal treatment. The tributaries of the San Joaquin River draining the Sierra Nevada Mountains to the east have water of excellent quality. Water in the lowland streams is often degraded by sediment and salts from agricultural irrigation and drainage and municipal and industrial waste discharges, especially during the summer low-flow season.

The deep alluvium and older sediments filling the Sacramento and San Joaquin Valleys are the sources of ground water in this area. Water beneath the Sacramento basin is hard and has a median concentration of about 300 parts per million (milligrams per liter) total dissolved solids. Boron concentrations exceed the national standard for drinking water in the southwest corner of the Sacramento basin. The boron comes from thermal springs in the Coast Range and upward seepage of ground water from marine sediments.

Water quality varies in the San Joaquin basin. The water is much fresher on the east side of the valley as it comes off the granite rocks in the Sierra Nevada Mountains. Total dissolved solids of 200 parts per million (milligrams per liter) are not uncommon on the east side of the valley, while levels 10 times higher typically occur on the west side, where recharge is from marine sediments in the Coast Range. A confining layer called the Corcoran Clay separates the water described above from deeper, confined ground water. The water below the Corcoran Clay has a more uniform level of total dissolved solids of about 1,000 parts per million (milligrams per liter). The ground water beneath the San Joaquin basin is hard, and boron concentrations may exceed the national standard for drinking water. The boron comes from thermal springs in the Coast Range and upward seepage of ground water from marine sediments. Ground subsidence has been significant (more than 20 feet in some areas) on the San Joaquin Valley floor because of historic excessive pumping of ground water aquifers, which has resulted in consolidation of the aquifers.

MLRA 17 Water Use by Category



Category (Surface,Ground): Public Supply (0.5, 6.5), LiveStock (0.4, 0.7),

Soils

The dominant soil orders in the MLRA are Alfisols, Aridisols, Entisols, Mollisols, and Vertisols. The soils in the area dominantly have a thermic soil temperature regime, an aridic or xeric soil moisture regime, and mixed or smectitic mineralogy. They generally are very deep, well drained or moderately well drained, and loamy or clayey. Some soils are shallow to a duripan. Durixeralfs (Redding and San Joaquin series) and Palexeralfs (Newville series) formed in alluvium on terraces. Haplocambids (Cerini and Panoche series) formed in alluvium on alluvial fans. Haplargids (Milham series) formed in alluvium on alluvial fans and terraces. Xeropsamments (Delhi series), Xerorthents (Hanford series), and Torriorthents (Hesperia and Kimberlina series) formed in alluvium on flood plains, fans, and terraces. Haploxerolls (Grangeville and Nord series) formed in alluvium on alluvial fans and flood plains. Haploxererts (Capay series) formed in alluvium on alluvial fans and flats. Very poorly drained Endoaquerts (Willows series) formed in alluvium in basins.

Biology

This area supports naturalized annuals and scattered trees. Wild barley, wild oats, soft chess, ripgut brome, red brome, foxtail fescue, burclover, and filaree are the dominant species.

Scattered oaks on terraces and oak, willow, and cottonwood grow along the rivers and streams and in overflow areas. Saltgrass, along with such shrubs as iodinebush and Australian saltbush, grow on saline-sodic soils on terraces and in basins.

The major wildlife species include jackrabbit, coyote, fox, ground squirrel, pocket gopher, and various songbirds. The species of fish include salmon, striped bass, steelhead, shad, sturgeon, largemouth bass, smallmouth bass, bluegill, and catfish. Portions of the area are extremely important for wintering waterfowl and seasonally neotropical migrants.

Land Use

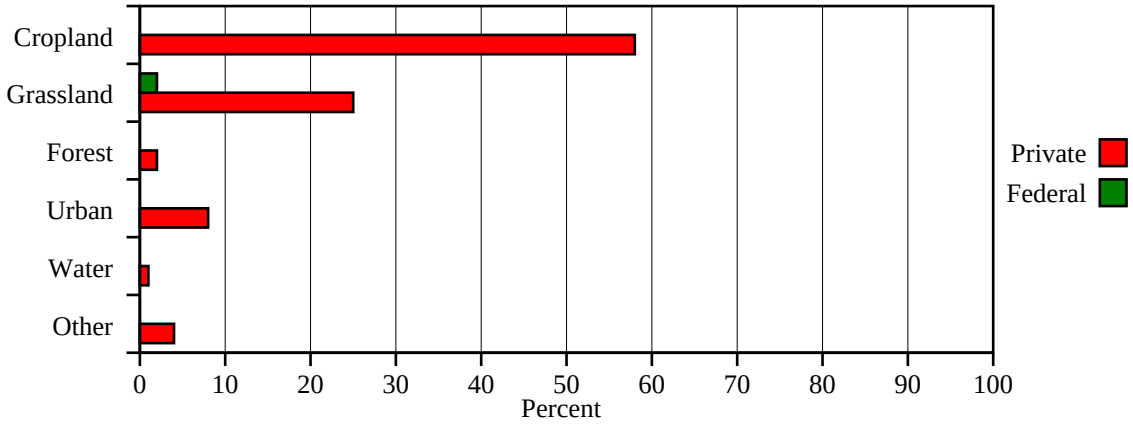
More than four-fifths of the area is in farms and ranches. The acreage used for urban development is increasing rapidly. Three-fourths or more of the cropland is irrigated. The cropland in this MLRA represents about one-third of the cropland in California, and the irrigated cropland represents more than four-fifths of the irrigated land in the State. Cotton, nuts, grapes, hay, grain, pasture, rice, alfalfa, citrus, and truck crops, including tomatoes, are the principal crops in irrigated areas. The more sloping nonirrigated cropland is used for dry-farmed grain. About a third of the MLRA is in areas of native grasses, brush, and open woodland used mostly for grazing.

The major resource concerns are maintenance of the content of organic matter in the soils, water quality, irrigation-induced erosion, wind erosion, and irrigation water management. If the plant cover is removed, water erosion is a hazard on the more sloping soils on terraces and the hazard of wind erosion is severe on the sandy, wind-modified soils in the San Joaquin Valley. In areas of low precipitation, maintaining a favorable salinity status in the root zone is a resource concern.

The conservation practices that are important on cropland are crop rotations, minimum tillage, and the utilization of crop residue to maintain good soil tilth and favorable soil structure. Wind abrasion is a critical problem during crop establishment on coarse textured soils. It can be controlled by crop residue management and windbreaks. In areas where the amount of rainfall is too low to leach salts from the soils, all leaching must be accomplished with the use of irrigation water.

The important conservation practices on dairy farms include manure-handling systems, including nutrient management. The important conservation practices on grazing land include prescribed grazing, fencing, and water management.

MLRA 17 Land Use by Category



Category (Private,Federal): Cropland (58.0, 0.0), Grassland (25.0, 2.0), Forest (2.0, 0.0), Urban (8.0, 0.0), Water (1.0, 0.0), Other (4.0, 0.0)