Appendices
Appendix 1A Flood Management
Appendix 1B Water Quality
Appendix 2C Agriculture and Other Information
Tables
PLACEHOLDER Table 4-1 Population for Central Coast Hydrologic Region, 1960 through projected 2050 ................................................................. 4-4
PLACEHOLDER Table 4-2 Central Coast Hydrologic Region water balance summary ................................................................. 4-7
PLACEHOLDER Table 4-3 Central Coast Hydrologic Region water use and distribution of dedicated supplies ........................................................................................................................................... 4-7
Table 4-4 Strategies in integrated regional water management efforts, Central Coast Hydrologic Region ................................................................. 4-13
Table 4-5 Proposed desalination plants in California (Status Update May 2007) ................................................................................................. 4-18
PLACEHOLDER Table 4-6 Central Coast Hydrologic Region water portfolios ................................................................................................. 4-21

Figures
PLACEHOLDER: Figure 4-1 Central Coast Hydrologic Region .................................................................................................................. 4-1
PLACEHOLDER Figure 4-2 Central Coast Hydrologic Region water balance for water years 1998—2005 ......................................................... 4-7
Figure 4-3 Central Coast integrated regional water management plans ........................................................................................................... 4-14
Figure 4-4 Local area representative contacts, Central Coast region ........................................................................................................... 4-15
PLACEHOLDER Figure 4-5 Central Coast Hydrologic Region – illustrated water flow diagram ................................................................. 4-21
PLACEHOLDER Figure 4-6 Central Coast Hydrologic Region – schematic flow diagram ................................................................. 4-21

Boxes
Box 4-1 Flood Management Agencies .............................................................................................................................. 4-11
Chapter 4 Central Coast Hydrologic Region

The Central Coast Hydrologic Region is one of 10 hydrologic regions that are part of Volume 3 Regional Reports. Two areas of interest—the Sacramento-San Joaquin Delta and Mountain Counties Area are also included. In this chapter, we present a general description of the area, water supplies and demands and water resources management issues.

Setting

The Central Coast Hydrologic Region extends from southern San Mateo County in the north to Santa Barbara County in the south (Figure 4-1 Central Coast Hydrologic Region). The region includes all of Santa Cruz, Monterey, San Benito, San Luis Obispo and Santa Barbara counties and parts of San Mateo, Santa Clara, and Ventura counties. Many attributes define the Central Coast region including the topography, many microclimates, the variety of agricultural products, and the picturesque coastline, valleys and communities that drive a thriving tourism economy. Most of the Central Coast region is within the Coast Range from its the northern part into San Luis Obispo and Santa Barbara counties to the south.

PLACEHOLDER: Figure 4-1 Central Coast Hydrologic Region

The southern Central Coast region extends along the Pacific Ocean from the Monterey-San Luis Obispo county line in the north to the Santa Barbara-Ventura County line in the south. The region is full of oak-dotted, grass-covered hills and valleys whose color shines green in winter and hues of brown in summer and fall. Bays and coves mark the coast, some of which meld into large, flat coastal terraces and plains that back up to craggy hills and mountains. Much of the region is hilly and mountainous. The region’s interior boundary runs northeast to southwest along the hills bordering the San Andreas Fault Zone to the Kern County border. A few square miles of Kern County are included in the region and a few square miles of San Luis Obispo and Santa Barbara counties are excluded. To the south, a small portion of Ventura County is included in the region.

The portion of the Coast Range nearest to the ocean is the Santa Lucia Range, where elevations of a few peaks exceed 4,000 feet. The inland Coast Range comprises the Gabilan and Diablo ranges in the north, the Cholame Hills in the center, and the Temblor and La Panza ranges in the south. The San Rafael and Sierra Madre mountains cover nearly three-quarters of Santa Barbara County. The southernmost quarter of Santa Barbara County is covered by the Santa Ynez Mountains, which are a component of another landform, the east-west trending Transverse Ranges. The mountains in eastern Santa Barbara County attain elevations of about 7,000 feet.

Watersheds

The Central Coast region is divided into four watershed management areas (WMA): the Northern, Central, Coastal, and Southern. Following is a summary of the descriptions of each area as defined by the Watershed Management Initiative of the State Water Resources Control Board and a description of the principal flood-producing streams. The Northern WMA includes the San Lorenzo and Pajaro rivers. The Central WMA includes the Salinas River, the region’s largest targeted watershed. The Coastal WMA includes the watersheds of Morro Bay and San Luis Obispo Creek. The Southern WMA includes the Santa Maria and Santa Ynez rivers, as well as the South Coast watersheds of Santa Barbara County. Flood information can be found later in this chapter and in Appendix 4A Flood Management. See Table 4A-1 Flood parameters for principal streams, Central Coast Hydrologic Region.
Northern Watershed Management Area
The Northern WMA includes portions of San Mateo, Santa Cruz, Santa Clara, and San Benito counties. The Pajaro, Big Basin, and River hydrologic units are located within the Northern WMA. The Big Basin Hydrologic Unit consists of a number of coastal streams, including the San Lorenzo River watershed, draining 138 square miles. The Pajaro River watershed encompasses four counties and drains approximately 1,300 square miles into the Pajaro River. It commences in San Benito and southern Santa Clara counties, and eventually forms the boundary between Monterey and Santa Cruz counties before it empties into the Monterey Bay National Marine Sanctuary.

The Northern Watershed area includes a high level of habitat, climate, and geological variation. The Santa Cruz Mountains contain vast redwood forests that support one of the highest concentrations of endangered species in California, including coho salmon. The Pajaro River is one of the Central Coasts largest watersheds. The Pajaro watershed is well known for its world-class agricultural soils and powerful flooding characteristics.

Central Watershed Management Area
The Central WMA includes Monterey County and parts of San Luis Obispo County. The centrally located Salinas Hydrologic Unit covers the majority of the Central WMA and drains to the Pacific Ocean through Monterey Bay. The Bolsa Nueva Hydrologic Unit lies in the northern area of the Central WMA and drains to the Pacific Ocean through Elkhorn Slough.

The Salinas River watershed, which drains more than 40 percent of the hydrologic region, is the largest individual watershed in the Central Coast area. It originates 4,000 feet above sea level in the Santa Ynez Mountains and encompasses an area of approximately 3,950 square miles. The watershed includes the Salinas Valley, which extends from the Salinas River headwaters in the La Panza and Garcia Mountains in southern San Luis Obispo County to Monterey Bay, a length of approximately 170 miles. Major tributaries of the Salinas River are the Nacimiento and San Antonio rivers and Arroyo Seco, all of which originate west of the Salinas in the Santa Lucia Range, and the Estrella River and San Lorenzo Creek, which begin east of the Salinas River in the Diablo Range.

Coastal Watershed Management Area
The Coastal WMA encompasses the coastal portions of San Luis Obispo and Monterey counties. The major watershed areas in the Coastal WMA include Monterey Peninsula, Carmel River, Santa Lucia and Estero Bay Hydrologic Units. The Santa Lucia Hydrologic Unit and most of the Estero Bay Hydrologic Unit drain to the Pacific Ocean through small coastal streams. The Carmel River drainage basin begins 3,500 feet above sea level on the western slopes of the Sierra de Salinas mountain range and drains 225 square miles into the Carmel River, which extends 25 miles, through Carmel Valley, and into the Monterey Bay National Marine Sanctuary at Carmel Bay.

Southern Watershed Management Area
The Southern WMA falls within portions of San Luis Obispo, Santa Barbara, and Ventura counties. The major hydrologic units include four principal watersheds: Santa Maria, which includes the Carrizo Plain; Cuyama, and Sisquoc watersheds; San Antonio Creek; Santa Ynez; the South Coast, which is composed of approximately 50 short, steep watersheds (ranging from
162 acres to 30,572 acres in size); and the Santa Barbara Channel Islands Hydrologic Unit. The Santa Maria, San Antonio, and Santa Ynez hydrologic units drain to the Pacific Ocean through rivers that originate 10 or more miles inland to the east. The South Coast Hydrologic Unit drains to the Pacific Ocean through coastal streams. The Santa Barbara Channel Islands Hydrologic Units drain to the Pacific Ocean through streams and minor drainages on each of the islands.

**Ecosystems**

The Santa Cruz Mountains region is defined as a bioregion. Best known for its redwood forests, it is also home to plant communities such as sand hills and sand parklands, found nowhere else in the world. This biological diversity also characterizes the San Lorenzo River watershed. Human disturbance over the last 200 years has created significant, chronic impacts to plant communities, wildlife, and fisheries habitats.

Scientists have recognized Santa Cruz County as an important center for biological diversity. Seven animal species are listed as in danger of extinction and at least three species are endemic to Santa Cruz. Eight plant species are federally listed as endangered, and six of the species considered to be rare or endangered are endemic. The northern Santa Cruz County planning region includes the southernmost range for coho salmon, and contains three of the five streams where these fish occur south of San Francisco. Santa Cruz County watersheds also support populations of steelhead, which are federally listed as threatened on California’s Central Coast. In addition, coastal watershed areas in the county have been designated as critical habitat for the California red-legged frog, listed as federally threatened.

The Pajaro River watershed supports a multitude of biotic habitats and special status plant and animal species, including 22 federally or State listed threatened or endangered species that have been documented as occurring or potentially occurring in the region.

The Monterey Peninsula includes a diverse assemblage of plant and animal species. A preliminary assessment in the region shows there are 121 special status species; of these, 15 plant species and 10 animal species are formally listed as threatened or endangered under State or federal endangered species laws.

The Salinas River tributaries provide natural habitat for steelhead trout. Riparian habitat is widely distributed in narrow strands along the banks of the Salinas River but rarely exists as extensive, mature stands, having been severely reduced and fragmented by agricultural conversion, urban development, grazing, and flood control activities.

San Luis Obispo County’s size and geographic diversity support a wide variety of landscapes including maritime chaparral, serpentine habitats, grasslands and juniper and oak woodlands that provide habitat and migration corridors for a wide variety of native species.

Santa Barbara County is located at a point of transition between the Southern California and Northern California ecozones and is characterized by rare plant assemblages. The county has a range of climatic zones, ranging from Mediterranean to Alpine to high desert, resulting in considerable ecological diversity. More than 1,400 plant and animal species are found in the county. Of these, 54 are federally or State-listed threatened or endangered species (22 plant and 32 animal species), and another 60 species are considered rare or of special concern.

Several salt marshes occur in the Santa Barbara county and provide habitat for a number of estuarine invertebrates and fish, migratory birds, and rare and endangered animal species.
Elkhorn Slough harbors one of the largest tracts of tidal salt marsh in California. This ecological area provides much-needed habitat for hundreds of species of plants and animals, including more than 340 species of birds. There are more than 7,000 acres of protected lands in the Elkhorn Slough watershed. Moss Landing Wildlife Area is in Monterey County adjacent to Elkhorn Slough. There are 728 acres of salt ponds and salt marsh, just north of Monterey. This is part of the largest unaltered salt marsh along the California coast.

Climate
The climate of the Central Coast region remains temperate all year because of its location adjacent to the Pacific Ocean. The Central Coast has a Mediterranean climate characterized by mild, wet winters, and warm, dry summers. The regional climate is dominated by a strong and persistent high-pressure system that frequently lies off the Pacific coast.

Annual precipitation—usually rain—in the region ranges from 14 to 45 inches. Most of the rain occurs between late November and mid-April. The average annual precipitation near Salinas is about 14 inches. The southern interior basins usually receive 5 to 10 inches per year, with the mountain areas receiving more rainfall than the valley floors. The vineyard-growing areas throughout the region generally have summers that are long and cool due to the influence of the ocean. High-quality wine grapes thrive in this environment with very moderate climate all summer, foggy mornings, bright sunshine through the afternoon, and very windy afternoons and early evenings.

Demographics
Population of the Central Coast Hydrologic Region increased about 4.2 percent from 1,459,205 in 2000 to 1,524,719 in 2005; it is slightly more than 4 percent of California’s total population. About 65 percent of the Central Coast population lives in incorporated cities, which include Salinas (143,800), Santa Barbara (89,600), Santa Maria (77,400), Santa Cruz (54,600), San Luis Obispo (44,200), Lompoc (41,100), Watsonville (44,300), Hollister (34,400), Seaside (33,500), Monterey (29,700), Atascadero (26,400), and Paso Robles (24,300). Several communities in the region have populations of fewer than 20,000. (See Table 4-1 Population for Central Coast Hydrologic Region, 1960 through projected 2050.)

PLACEHOLDER Table 4-1 Population for Central Coast Hydrologic Region, 1960 through projected 2050

Senate Bill 18 (Chapter 905, Statutes of 2004) requires cities and counties to consult with Native American Indian Tribes during the adoption or amendment of local general plans or specific plans. A contact list of appropriate Tribes and representatives within a region is maintained by the Native American Heritage Commission. The following is a list of the Tribes in this region, according to the commission. A Tribal Consultation Guideline, prepared by the Governor’s Office of Planning and Research, is available online at http://www.opr.ca.gov/programs/docs/09_14_05%20Updated%20Guidelines%20(922).pdf.

- Amah Mutsun Tribal Band
- Amah/Mutsun Tribal Band
- Costanoan Ohlone Rumsen-Mutsen Tribe
- Indian Canyon Mutsun Band of Costanoan
Land Use Patterns
The busy topography of the Central Coast region and its distance from California’s major population centers results in a landscape that is primarily pastoral and agricultural. Major economic activities include tourism, agriculture-related processing, as well as government and service-sector employment.

Northern Watershed Management Area
Northern Santa Cruz County is dominated by residential land use, including rural and mountain residential zoning; timber harvest preserve; and a mix of commercial and special districts. The lower portions of the watersheds, close to Monterey Bay, are more urbanized with residential, commercial, light industrial, and special districts land use. Upper watershed land use consists predominantly of rural residential, timber harvest preserve and/or open space, some mining, and limited agriculture. On the north coast, the coastal terraces are used for agriculture and grazing. Santa Cruz County is largely dependent upon tourism and recreation, which generate roughly $525 million annually. Agriculture is the county’s second largest industry; Santa Cruz County crops were worth $450 million in 2004. The southern area of the county, including Watsonville Sloughs, is a productive agricultural district yielding strawberries, raspberries, landscape plants, flowers, and vegetables. North coast agriculture includes brussel sprouts, strawberries, lettuce, and specialty crops.

Coastal Watershed Management Area
The Monterey Peninsula and its surrounding areas are composed of a wide range of land uses that serve residential, commercial, industrial, recreational, and open space uses. Urban development is concentrated primarily in the coastal cities. Outside of the cities, low to rural density residential areas dominate. Land use in the 255-square mile Carmel River watershed includes wilderness, viticulture, grazing, recreation (golf courses and park areas), and sparse residential, suburban, commercial, and light industrial. Very little of the watershed is in traditional agricultural use. Resource conservation represents another important land use throughout the region, with parts of the planning area including the Ventana Wilderness and Los Padres National Forest.

Central Watershed Management Area
The predominant land use in the Salinas Valley is agriculture and rangeland, with discrete areas of urban development in the cities and towns along the Salinas River. The highest density areas of urban development are clustered to the north in the vicinity of Monterey Bay. Along the Salinas River are several urban and residential centers, including the City of Salinas in which resides more than 60 percent of the valley’s population. The former military installation of Fort Ord in the northwestern portion of the county is being redeveloped into an education, technology, and
housing center. The Salinas Valley has such a strong agricultural economy that it is called the Salad Bowl of the World.

**Southern Watershed Management Area**
Agriculture comprises two-thirds of the land use in San Luis Obispo County, with the vast majority of this acreage used for livestock grazing. Other land uses include rural lands, open space, and residential, commercial, and urban uses. Major land use in Santa Barbara County includes agricultural preserves (land zoned for 100-acre or greater lot size) or other agriculturally zoned land. Less than 3 percent of the county is within incorporated cities and 2 percent is within unincorporated urban areas. The south Central Coast is primarily pastoral and agricultural with scattered population clusters developed on coastal terraces and interior lowlands. Agriculture in the region has been growing significantly in the last several years, thanks largely to vineyard expansions.

**Tribal Lands**
The tribes of Native Americans may be federally recognized or otherwise. The federal government may set aside public lands for these tribes as reservations. In California these reservations are often named “Rancherias.” One interpretation of the Spanish term Rancheria is small Indian settlement. In Central Coast Hydrologic Region, Chumash Indians own the Santa Ynez Reservation, which comprises about 100 acres.

**Regional Water Conditions**
Two of the primary water management problems in the north Santa Cruz County planning region are the lack of adequate surface water supply during droughts and depletion of aquifers. Other than the City of Santa Cruz’s single storage reservoir, all surface water sources are dependent on available flow and are used at maximum capacity for a significant portion of the year. Current water needs exceed available supplies in significant parts of each of the four basins of the region. Additional water is not available from these sources to support current levels of demand or even modest future growth.

**Water in the Environment**
- Waterways, storage (ground and surface) - major source of water, amount of water naturally available vs. amount imported, water uses, major consumers of water
  - Top 2 major industries are Agriculture and Tourism
  - Largest city - Salinas?
- Issues with growth, hydrologic and ecosystem function, and water availability

**Water Supplies**
In California, both water supply and land-use planning are local responsibilities, in the hands of hundreds of utilities and city and county governments. The Central Coast distinguishes itself by long-standing concerns over water supply issues, given its limited access to imported water. Water supply sources and conditions differ considerably across the rural counties.

The water balance table for the Central Coast Hydrologic Region (see Table 4-2 Central Coast Hydrologic Region water balance summary, 1998-2005) summarizes all of the water supplies,
uses, and outflows for years 1998 through 2005 and is supplemented by the detailed regional water accounting information in Table 4-3 (Central Coast Hydrologic Region water use and distribution of dedicated supplies (thousand acre-feet)). Table 4-6 (Central Coast region water portfolios, 1998-2005) (in large format at the end of this chapter) provides specific information about the developed or dedicated component of water supplies for agricultural, urban, and environmental purposes, as assembled from actual data for 1998 through 2005. In an average water year, about XX percent of the Central Coast region’s developed water supply came from local surface sources, XX percent was from imported surface supplies, and groundwater provided about XX percent of the water supply.

[Data to be provided]

PLACEHOLDER Table 4-2 Central Coast Hydrologic Region water balance summary

PLACEHOLDER Table 4-3 Central Coast Hydrologic Region water use and distribution of dedicated supplies

About XX percent of the developed supply, excluding surface water and groundwater reuse, was used for dedicated natural flows to meet instream flow requirements. Figure 4-2 (Central Coast Hydrologic Region water balance for water years 1998-2005) summarizes all of the developed urban, agricultural, and dedicated environmental water uses in this region for years 1998 through 2005.

PLACEHOLDER Figure 4-2 Central Coast Hydrologic Region water balance for water years 1998—2005

Northern Watershed Management Area. In this WMA, streams provide supply for agricultural users, the town of Davenport and the City of Santa Cruz. Groundwater in the area also supplies individual wells and small water companies for rural residents in Bonny Doon and other areas of the basin. Surface water from the San Lorenzo River watershed contributes to the supply for the City of Santa Cruz and for the communities of the San Lorenzo Valley. Groundwater from the Santa Margarita Groundwater Basin provides the water supply for the Scotts Valley Water District and the San Lorenzo Valley Water District. Most of the water supply for the coastal urban areas of Soquel and Aptos in this subbasin is provided by groundwater. Water supply reliability for both agriculture and municipal use is a concern in the Watsonville area. Inland wells have become too brackish for domestic or agricultural use due to seawater intrusion. Groundwater is the primary source of agricultural water supply at this time for the area.

Coastal Watershed Management Area. Nearly all of the region’s water supply comes from the Carmel River and groundwater in the Carmel Valley aquifer, which underlies the alluvial portion of the Carmel River downstream of the San Clemente Dam, and groundwater in the coastal subareas of the Seaside Groundwater Basins. About 70 to 80 percent of the surface runoff in the Carmel River watershed is generated from rainfall within the Los Padres National Forest and Ventana Wilderness. The remaining watersheds (about 92 square miles) within the region do not currently provide municipal water supply from surface runoff, although groundwater recharge in these basins is an important source for municipal supply.

Southern Watershed Management Area. Water supplies for the area include groundwater, surface water, imported State Water Project water, and recycled water; water supplies also are enhanced by the conjunctive use of surface and groundwater supplies and cloud seeding. The Santa Ynez River Basin is the largest drainage system that is wholly located in Santa Barbara County, draining about 40 percent of the mainland part of the county. It is the primary source of
water for about two-thirds of Santa Barbara County residents. Three dams have been constructed on the river to store and divert water to the south county (Cachuma, Gibraltar, and Jameson). Surface water supplies are an important part of the regional water supply. Lake Cachuma on the Santa Ynez River and Gibraltar Reservoir provide the majority of the south coast’s water supply annually. Twitchell Reservoir on the Cuyama River is important to both the water supply and the flood protection of the Santa Maria Valley; the reservoir supplies recharge to the Santa Maria Groundwater Basin.

Central Watershed Management Area. The Monterey County Water Resources Agency has been releasing water from the Nacimiento Reservoir through its hydroelectric power plant and low-level outlet in routine, seasonal conservation releases to maintain flows on the Salinas River and recharge of the river basin. Spillway modifications are proposed which will allow greater release of water from the dam during heavy-rain times and more flow on the Salinas River during dry times. Spillway modification is scheduled to begin April 2008.

Groundwater Supplies
Groundwater is an important source of water supply to the region. Twenty-three ground water basins underlie the northern part, and 28 groundwater basins underlie the southern part the Central Coast Hydrologic Region. Groundwater production is concentrated mainly along the coast, though a few prominent inland valleys that have high groundwater production. Groundwater beneath large extensive alluvial valleys—such as the Salinas, Paso Robles, and Santa Maria valleys—occurs in thick and sometimes confined aquifers. In contrast, groundwater underlying smaller valleys—such as Huasna Valley inland and the San Simeon, Cayucos, and Morro valleys along the coast—occurs in thinner, unconfined aquifers.

Conjunctive use of surface water and groundwater is a long-standing practice in the region. Several reservoirs, including Twitchell, Lopez, and Nacimiento, are operated primarily for the purpose of groundwater recharge.

Water Uses
AGRICULTURAL WATER USE (To be developed and included in next draft)
San Benito County uses water purchased from the U.S. Bureau of Reclamation via the San Felipe Project in addition to groundwater supplies. The majority of San Felipe water is consumed by irrigation; and the remainder is consumed for domestic, municipal, industrial purposes, and for groundwater recharge.

Urban Water Use
Urban water use accounts for about _____ percent of the total applied and net water uses in the Southern Central Coast Region. Total urban applied and net water demands for the Southern Central Coast Region in Water Year _____ were _____ thousand acre-feet and _____ thousand acre-feet respectively. For water year _____, these demands were increased slightly to _____ and ____. For water year _____, they were _____ and ____. Most of the region’s urban water demands occur in the coastal zones of San Luis Obispo and Santa Barbara counties. These demands are clustered into corridors bounded by following cities and communities: (1) San Luis Obispo and Santa Maria and (2) Goleta and Carpentaria, which is the most significant and includes the City of Santa Barbara. In the warmer interior of the region, one major corridor exists. This is bounded
by the Cities of El Paso de Robles and Templeton. Outside of these centers, urban land use activities and demands decrease significantly. The demands come from small communities, widely scattered residential housing and farmsteads and a few commercial establishments.

Add Urban Water Use Northern Coastal Region

**Environmental Water Use**
Data to be available later

**Water Quality**
The Central Coast Regional Water Quality Control Board (Regional Water Board) is responsible for the protection and enhancement of all the waters in the Central Coast region. The Central Coast region extends from Santa Clara County south to northern Ventura County. The region encompasses 11,274 square miles of land, 2,360 miles of streams, 25,040 acres of lakes and has 378 miles of coastline, including Santa Cruz and the Monterey Peninsula, the agricultural Salinas and Santa Maria Valleys, and the Santa Barbara coastal plain.

**Central Coast Vision**
The Regional Water Board is moving in a fundamentally new strategic direction, based upon the vision for Healthy Watersheds\(^1\) and measurable goals\(^2\) including healthy aquatic habitat, sustainably managed land, and clean groundwater. The Regional Water Board has identified some of the critical tasks necessary to achieve its goals. Some examples include:

**Groundwater Recharge Area Protection.** Prioritize groundwater protection efforts to achieve the measurable goal for clean groundwater, rather than rely simply on cleaning up contamination. Groundwater recharge area protection provides effective prevention from groundwater degradation, especially where groundwater is the primary source of drinking water. Preservation of groundwater quality in source areas will be accomplished by identifying and protecting groundwater recharge locations.

**Riparian Buffer Zone Designation and Protection.** Riparian lands adjacent to streams, lakes, or other surface water bodies that are adequately vegetated provide an important environmental protection and water resource management benefit. To protect and maintain the beneficial character and function of riparian areas in the Central Coast region, the Regional Water Board is implementing specifications for the establishment, protection, and maintenance of riparian vegetation.

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\(^1\) Healthy Watersheds function well ecologically and are sustainable; support healthy, diverse aquatic habitat; have healthy riparian areas and corridors; and have near natural levels of sediment transport and near natural levels and quality of groundwater. A Healthy Watershed sustains these characteristics through measures that ensure the dynamics that provide these healthy factors and functions are protected. Additional information is available at [http://www.waterboards.ca.gov/centralcoast/Vision/vision.htm](http://www.waterboards.ca.gov/centralcoast/Vision/vision.htm)

\(^2\) Three Measurable Goals: 1) **Healthy Aquatic Habitat** - By 2025, 80 percent of Aquatic Habitat is healthy, and the remaining 20 percent exhibits positive trends in key parameters. 2) **Proper Land Management** - By 2025, 80 percent of lands within any watershed will be managed to maintain proper watershed functions, and the remaining 20 percent will exhibit positive trends in key watershed parameters. 3) **Clean Groundwater** - By 2025, 80 percent of groundwater will be clean, and the remaining 20 percent will exhibit positive trends in key parameters.
Low Impact Development. One of the most important issues in the Central Coast region is watershed degradation due to urban sprawl. The Regional Water Board has made implementation of Low Impact Development (LID) design standards and the development of effective and long-term institutional capacity for LID top priorities to reduce urban pollutant loading, erosion, sedimentation, and stream modifications, and to maintain the natural recharge of groundwater. Additional information is available at: http://www.waterboards.ca.gov/centralcoast/stormwater/low%20impact%20devel/lid_index.htm

Irrigation and Nutrient Management. The Central Coast region has ubiquitous nutrient and toxicity water quality problems. Farming practices contribute much of this pollution within the Central Coast region.

Ongoing Focused Efforts to Improve Water Quality
Some of the Regional Water Board’s ongoing efforts to improve water quality on a regional scale and meet measurable goals are summarized in Appendix 4B Water Quality. These programs include:

- Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands.
- Central Coast Ambient Monitoring Program
- Storm Water Management.
- 303 (d) Investigations and Total Maximum Daily Load Projects.
- Basin Planning and Permitting Waste Discharges.
- Land Disposal.
- Department of Defense.
- Underground Storage Tanks and Site Cleanup.
- Grants.
- 401 Certifications.

Water Governance

Flood Management
See Appendix 3A Flood Management for more information on this hydrologic region.

Historic Floods
Major floods occurred in 1907, 1914, February and March, 1938, January 1952; December 1955, April 1958, December 1966, January 1970, January 1974, January and February 1978; and January and February 1980. The 1938, 1955, 1969, and 1978 floods were the most significant and widespread; the 1969 flood was the most severe.

Flood Hazards
Many aspects of flood protection need improvement in the Central Coast area. Significant flood problems still exist in the Pajaro, Salinas, and Carmel river basins, streams in the Santa Barbara
area, and in many populated downstream sections of various coastal streams (e.g., the Santa Ynez River).

**Flood Governance**

Counties are the main agencies responsible for the regulation of floodways. Of the six major counties in the Central Coast region, the following three have adopted the Cobey-Alquist Floodplain Management Act: Santa Barbara, Santa Clara, and Monterey. Santa Barbara County has adopted a flood-hazard zoning ordinance and uses building permits and subdivision restrictions to control development in flood-prone areas. Santa Clara County has a water district ordinance for establishing a floodplain management program, while Monterey County has a floodplain zoning ordinance and subdivision review process. San Luis Obispo County’s ordinance defines zones of flood hazard and severely regulates building in flood-prone areas. Santa Cruz County has building codes and an attending permit system regulating development in flood-hazard areas. San Benito County regulates development in floodways via a county zoning ordinance and building permit process.

Flood management is a cooperative effort for which federal, state, and local agencies all play significant parts. The principal participants are listed in Box 4-1 Flood Management Agencies. For more information on the agencies’ roles, see Table 4A-2 Flood management participants in Appendix 4A.

**Box 4-1 Flood Management Agencies**

**Federal**
- Federal Emergency Management Agency
- Natural Resources Conservation Service
- US Geological Survey
- US Army Corps of Engineers

**State**
- California Conservation Corps
- Department of Corrections
- Department of Forestry and Fire Protection
- Department of Water Resources
- Office of Emergency Services

**Local**
- County emergency services units
- County planning departments
- County building departments
- Local conservation corps
- Local initial response agencies
- San Mateo County Flood Control District
- Santa Cruz County FCWCD
- Ventura County Watershed Protection District
Institutions
The Central Coast Region is the site of many flood control works, including floodwater storage facilities, levees, and channel improvements. Existing flood control infrastructure includes levees and channel modifications on the Pajaro, San Lorenzo, and Santa Maria rivers, the Arroyo Grande, and Upper and Lower Llagas creeks. Other flood-control works consist of reservoirs with flood control reservations along the San Antonio, Nacimiento, and Cuyama rivers.

Existing Flood Damage Reduction Measures
There is a moderate degree of flood protection on streams within the area. The existing flood-damage reduction facilities include reservoirs, debris basins, levees, and channel modifications.

Constructed Flood Protection Facilities
A number of structural works limit the threat of floods in the region. These flood control facilities are listed in Table 4A-3 Flood control facilities, Central Coast Hydrologic Region in Appendix 4A Flood Management.

The region has three multipurpose reservoirs with flood reservations. See Table 4A-x Flood control reservoirs in Appendix 4A for features of these reservoirs. The California Data Exchange Center provides access to an extensive array of telemetered hydrometeorological gages via its internet facility. For more information, see Chapter 1 State Summary.

Relationship with Other Regions

Regional Water and Flood Planning and Management

Integrated Regional Water Management
The hydrologic region is engaged in Integrated Regional Water Management (IRWM) planning through multiple planning regions that empower stakeholders to collaboratively develop integrated solutions and diversified water management portfolios to meet regional water management challenges. The IRWM efforts serve a vital role, in combination with local and statewide planning, to provide for sustainable water use, water quality and environmental functions.

IRWM planning regions within this hydrologic region cover the major watersheds and geopolitical boundaries of the hydrologic region. The area of the hydrologic region falling outside current IRWM planning efforts represents opportunities for expansion of IRWM planning efforts. Table 4-4 (Strategies in integrated regional water management efforts in Central Coast Hydrologic Region) and Figure 4-3 present the IRWM planning regions within the hydrologic region. Local area representative contacts for the Central Coast region are shown in Figure 4-4,
### Table 4-4 Strategies in integrated regional water management efforts, Central Coast Hydrologic Region

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Pajaro River Watershed IRWMP</th>
<th>Northern Santa Cruz Co. Prelim IRWMP</th>
<th>Monterey Peninsula, Carmel Bay, and South Monterey Bay IRWMP</th>
<th>Salinas Valley IRWMP (Monterey Co)</th>
<th>San Luis Region IRWMP</th>
<th>Santa Barbara Countywide IRWMP</th>
</tr>
</thead>
<tbody>
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Note: The summary information contained in these tables was obtained from various IRWM plans. For additional details or information related to a specific plan, please consult the current version of the plan or its authors.
Figure 4-3 Central Coast integrated regional water management plans
Accomplishments

- Brief descriptions of significant flood management accomplishments, particularly recent accomplishments. Include years of completion or establishment.
- Flood Management Additions for Central Coast Regional Report, Text, reference to SS

- County of San Luis Obispo Hazard Mitigation Plan - 2005
- Multi-Jurisdictional Hazard Mitigation Plan, Monterey County - 2007
- Santa Barbara County Multi-Jurisdictional Hazard Mitigation Plan - 2004
- Multi-Jurisdictional Hazard Mitigation Plan for Ventura County, California – 2005
- Pajaro River Basin Project – pre 1955
- San Lorenzo River - 1959
- San Antonio Dam and Reservoir - 1965
- Nacimiento Dam and Reservoir – 1961
- Santa Maria River Basin – 1954
- Santa Maria River Levees - 1963
- Twitchell Dam and Reservoir – 1958
- Santa Ynez River Flood Forecast and Warning System - late 1970’s
- Arroyo Grande Creek Watershed – 1956
- Establishment of SAFCA, 1989
- Establishment of SJAFCFA, 1995
Abandoned Well Destruction Program, Northern Santa Cruz County - Identifies and destroys old wells which can act as conduits for contaminants to enter groundwater.

Enhance and Protect Groundwater Recharge Areas - Implement projects, acquire key properties and establish policies and ordinances to protect and restore groundwater recharge.

Watsonville Sloughs Integrated Watershed Restoration Program - Restores wetland habitats and natural function in Watsonville Slough by improving the existing system of agricultural and stormwater drainage and other enhancements. The recently completed Watsonville Sloughs Resource Conservation and Enhancement Plan recommends a diverse set of projects to be carried out with willing landowners.

Four Recycled Water Distribution System Extensions in the Scotts Valley Area - Extends an existing recycled water line to four new areas around Scotts Valley, reducing pumping in the Santa Margarita Groundwater Basin to satisfy major landscaping water demands.

Recycled Water - Santa Clara Valley Water District, South County Regional Wastewater Authority, Gilroy, and Morgan Hill are partners in the South County Recycled Water Program. Existing customers use approximately 1,000 acre-feet per year of recycled water for landscape irrigation, crop irrigation and industrial use within the Gilroy area.

New water system in works- By fall 2009, residents of the farm-worker cooperative in San Jerardo will have a permanent source of clean drinking water.

Pajaro Watershed Integrated Water Resources Management Plan. This activity is a joint effort between the District, Santa Clara Valley Water District, and the Pajaro Valley Water Management Agency to develop a conceptual integrated water resources management plan, drawing from existing planning efforts of the latter two agencies.

San Juan Valley Water Management Plan. The objective of this multi-year effort is a specific plan to address storm water management.

Challenges

San Lorenzo Onsite Sewage Disposal System Upgrades - Provides grants for individual septic system upgrades in order to reduce the input of nitrates and pathogens into the San Lorenzo River.

Relocate Sewer Main From New Brighton State Beach - Moves a main sewer line off New Brighton State Beach to avoid sewage spills onto the public beach and into Monterey Bay.

Seaside Groundwater Basin Aquifer Storage and Recovery Project Expansion - The Monterey Peninsula Water Management District manages and regulates the use, reuse, reclamation, and conservation of water within its boundaries.

Los Osos Community Wastewater Project - In 1983 the Central Coast Regional Water Quality Control Board established a wastewater prohibition zone in the coastal community of Los Osos, located on the southern boundary of Morro Bay National Estuary.
Salinas Reservoir. The City of San Luis Obispo has been pursuing a Salinas Reservoir expansion project to supplement its water supply.

Recovery Planning under Environmental Species Act - Coho Recovery Strategy. The coho salmon (Oncorhynchus kisutch) range for California is coincident with coastal draining watersheds from the Oregon border down to northern Monterey Bay.

Flood Management has identified challenges that include:

- A lack of topographical maps based on digital elevation model data limits the precision to which floodplain boundaries can be delineated.
- Increased development promises to enlarge the area of impervious surfaces, which will require upgraded infrastructure that can convey larger floodflows.
- Many repetitive flood loss structures in Santa Barbara County are luxury homes. However, improving flood control infrastructure for these houses is not economically justified. Additionally, grants for increasing flood resiliency by retrofitting the homes will likely elicit political controversy. As a result, there is a high probability that no structural improvements will be made and these residences will continue to suffer from flooding.
- Lack of cooperation between landowners and agencies charged with flood control duties has precluded or hampered needed infrastructure improvements.
- Future flood control infrastructure is still designed to contain current 100-year floodflow stages, despite climate change and increased development threatening to increase 100-year floodflow stages.

Drought and Flood Planning

In 2000 Congress enacted the Disaster Mitigation Act, which provided funding for development of Hazard Mitigation Plans (HMPs) and additional federal financial assistance in the event of a disaster for entities that had adopted HMPs. The plans were to provide a framework for local partnerships, identify and assess risks, evaluate resources of local entities for mitigating hazards, and develop strategies for minimizing the effect of disasters. Currently, San Luis Obispo, Santa Barbara, Ventura, and Monterey counties have adopted HMPs that discuss in depth and present measures for reducing the chance of flood damages.

Looking to the Future

Decisions are needed on water management options that will make up shortfalls in supplies. In Appendix 4C are descriptions of potential responses. Some water districts have implemented studies and projects that could provide partial or complete solutions. Water conservation programs, water recycling, and groundwater recovery, as well as water marketing and other water supply augmentation responses are being examined and implemented.

With Central Coast's limited surface supply and few surface water storage facilities, the growing demand for water is causing an increased dependence on the region's groundwater resources.
### Table 4-5 Proposed desalination plants in California (Status Update May 2007)

<table>
<thead>
<tr>
<th>Operator</th>
<th>Location</th>
<th>Co-located?</th>
<th>Max Capacity (MGD)</th>
<th>Intake</th>
<th>Discharge</th>
<th>Status</th>
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<tr>
<td>Montara Water and Sanitary District</td>
<td>Montara</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>conducting feasibility study; draft sometime this summer</td>
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<tr>
<td>City of Santa Cruz</td>
<td>Santa Cruz</td>
<td>No</td>
<td>2.5, possible expansion to 4.5</td>
<td>Surface</td>
<td>Mixed with WW</td>
<td>pilot plant to begin in summer '07 and continue for 12 months; technical review/design in 2008; EIR in 2009; if approved, construction in 2010-2011</td>
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<tr>
<td>California American Water Company</td>
<td>Moss Landing</td>
<td>Yes</td>
<td>11 to 12</td>
<td>42,000 to 45,000</td>
<td>Surface</td>
<td>EIR expected this summer; received permits for pilot plant; desal response group sued but didn't get injunction to stop the pilot plant; got permits from Central Coast Regional Water Quality Control Board</td>
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<td>Pajaro-Sunny Mesa/Poseidon</td>
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<td>Yes</td>
<td>20 to 25</td>
<td>76,000 to 95,000</td>
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<tr>
<td>City of Sand City</td>
<td>Sand City</td>
<td>No</td>
<td>0.3</td>
<td>1,100</td>
<td>Subsurface</td>
<td>received Prop. 50 for construction; have Coastal Development Permit but will need to get extension; engineer working w/State Water Resources Control Board and awaiting permit from DHS</td>
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<tr>
<td>Monterey Peninsula Water Management District</td>
<td>Sand City</td>
<td>No</td>
<td>8</td>
<td>30,000</td>
<td>Subsurface</td>
<td>still on-hold; put on-hold b/c wasn't large enough to meet SWRCB Order 95-10</td>
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<td>Marina Coast Water District</td>
<td>Marina</td>
<td>No</td>
<td>1.5</td>
<td></td>
<td>Subsurface</td>
<td>have pilot plant that was constructed a while back, but don't plan on firing it up; completed pre-design report; do not need water right away and thus is sitting back to see if a regional plant with Cal-Am makes more sense</td>
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<tr>
<td>Operator</td>
<td>Location</td>
<td>Co-located?</td>
<td>Max Capacity MGD</td>
<td>Max Capacity (m3/d)</td>
<td>Intake</td>
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<tr>
<td>----------</td>
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<tr>
<td>Ocean View Plaza</td>
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From: Desalination, With a Grain of Salt, A California Perspective, Pacific Institute, Heather Cooley, Peter Glick, Gary Wolff, June 2006
New Reservoirs and Conveyance Facilities – San Luis Obispo County Flood Control & Water Conservation District has an annual 17.5 thousand acre-feet entitlement from Nacimiento Reservoir, only about 1.3 thousand acre-feet of which is now used.

Modify Existing Reservoirs Operations - There is one proposal for reservoir enlargement in the Southern PSA. In Santa Barbara County, local water users propose surcharging US Bureau of Reclamation’s Bradbury Dam (Cachuma Reservoir) up to 3 feet for additional water supply to enhance downstream fish habitat.

Water Marketing – In the Salinas Valley, State Water Project water from the Coastal Branch could be purchased and either traded with San Luis Obispo County for that county’s existing entitlement to Nacimiento reservoir water or delivered directly through a pipeline constructed at the aqueduct’s crossing of the Salinas River.

Water Recycling - For the Southern PSA, recycled water projects have been proposed in conjunction with construction of new or expanded municipal wastewater treatment plants.

Precipitation Enhancement - San Luis Obispo began a three-year cloud seeding program in January 1991 to produce more runoff in the Salinas and Lopez Watersheds. This program has ended, but future programs may be a possibility.

Future Scenarios
- Cambria Community Service District Master Plan for the future.

Climate Change
The effects of climate change on floods could be significant. With less total rainfall and higher mean annual temperatures, watersheds could become more susceptible to wildfires. The consequent loss of vegetative cover would lower capacity and interception rate, allowing more runoff of a higher velocity to enter watercourses earlier in a storm event.

Sea level rise will also present new challenges to the Central Coast Hydrologic Region. Seawater intrusion into groundwater basins will be exacerbated by a sea level rise as the freshwater/saltwater transition zone would move inland under the increased pressure from the sea. Floods from tidal surges would become more frequent as the ocean moves further inland and closer to residences and businesses.

Seawater Intrusion
Seawater intrusion in the northern Salinas Valley was first documented in 1933 by the California State Water Commission. Seasonal groundwater withdrawals for agriculture in Santa Cruz and Monterey counties were recognized in the early 1940s as a contributing factor to seawater intrusion. Groundwater pumping is contributing to seawater intrusion along several coastal basins in San Luis Obispo County. Seawater intrusion is problematic in the community of Los Osos, where the impact of intrusion has been estimated to be migrating 100 feet per year. Recent studies show strong potential for seawater intrusion into the Nipomo area.

Several of the Santa Barbara County’s groundwater basins are in a state of potential overdraft; notably, the Cuyama Groundwater Basin and the San Antonio Groundwater Basin. Santa Barbara...
and areas near Santa Maria have experienced signs of seawater intrusion but at this time do not pose a threat to drinking water supplies.

Response Strategies

Implementation Next Steps
Since record keeping on most streams in the Central Coast area began less than 100 years ago, there is little doubt that the 100-year floodplain boundaries delineated on Flood Insurance Rate Maps by the Federal Emergency Management Agency do not represent true 100-year floodplains. Additionally, not demarcating 100-year floodplains within the context of climate change promises to underestimate the area inundated by 100-year floodflows. As a result, planning and managing based on such projections will only result in higher maintenance and rehabilitation costs over the long term. Thus, protection provided by flood control infrastructure should be raised to at least the 200-year level in order to accommodate the inherent inaccuracies in floodplain delineation and the challenges put forth by climate change.

Water Portfolios

PLACEHOLDER Figure 4-5 Central Coast Hydrologic Region – illustrated water flow diagram

PLACEHOLDER Figure 4-6 Central Coast Hydrologic Region – schematic flow diagram

PLACEHOLDER Table 4-6 Central Coast Hydrologic Region water portfolios