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About this draft: This is an initial draft, an expanded outline for the regional report. This very preliminary presentation contains placeholders and editorial comments in highlighted text. **It is meant to solicit your comments.** This is the first of several drafts to be circulated in 2008 before the public review draft is distributed in December.

Chapter 5 South Coast Hydrologic Region

Within the South Coast Hydrologic Region, water wholesalers and retailers, groundwater agencies, and watershed planners and managers are becoming increasingly successful in working together to implement a large and diverse array of local water supply and water quality projects. In turn, this increased level of cooperation and integrated planning is making the region more flexible and less dependent on imported water, particularly during dry years.

This regional profile, after describing the characteristics of the region, provides examples of the South Coast's challenges, accomplishments, and plans to meet the water needs of the future. There are many more examples of water issues and accomplishments than those presented in this chapter. It is important to note that in the highly developed South Coast region many major water interest groups and agencies play important roles in providing reliable, affordable, high quality water. The jurisdictions and common areas of interest for these stakeholder interest groups often overlap, such that shared communication and integrated regional planning are becoming increasingly important to successful water planning and management. [From California Water Plan Update 2005]

Setting

The South Coast Hydrologic Region comprises the southwest portion of the state and is California's most urbanized and populous region. It contains slightly more than half of the state's population (54 percent) but covers only 7 percent of the state's total land area. The topography includes a series of nearly flat coastal plains and valleys, many broad but gentle interior valleys, and several mountain ranges of low and moderate elevation.

The region extends about 250 miles along the Pacific Coast from the Ventura-Santa Barbara County line in the north to the international border with Mexico in the south (Figure 5-1). The region includes all of Orange County and portions of Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties.

PLACEHOLDER Figure 5-1 South Coast Hydrologic Region

Several prominent rivers are in the region, including the Sespe, Ventura, Santa Clara, Los Angeles, San Gabriel, Santa Ana, San Jacinto, Santa Margarita, San Luis Rey, San Dieguito, Sweetwater, and Otay rivers. Segments of some of these rivers have been extensively lined and in other ways modified for flood control. Natural runoff of the region's streams and rivers averages about 1.2 million acre-feet annually. [From CWP 2005]

[Develop tribal content: total sq-miles of federal tribal trust lands. Large reservations (e.g, Tule River , Round Valley, Hoopa, and the Riverside/San Diego area tribes) should be noted. This info can come from the Bureau of Indian Affairs GIS data which we have, or by contacting the nearest BIA office. BLM also maps these and other categories of federal lands. May be placed under Land Use Patterns.]

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Watersheds

Watersheds within the South Coast Hydrologic Region include Santa Clara, Ventura River, Oxnard Plain (Impaired), Callegues Creek (Impaired), Santa Monica Bay (Impaired), Los Angeles River (Impaired), San Gabriel River, Santa Anna River, Dominguez Channel (Impaired), San Juan (Impaired), Santa Margarita (Impaired), San Luis Rey, and San Jacinto Valley (Impaired). (See Box 5-xx Description of Watersheds within South Coast Hydrologic Region). [Summarize overall region and watersheds.]

PLACEHOLDER Box 5-xx Description of Watersheds within South Coast Hydrologic Region

[Text to be added by flood team:]

- Introduction of principal streams of the region.
  - **Subject:** Santa Clara R at Montalvo, Santa Clara R near Piru, San Gabriel R near Baldwin Park, San Gabriel R above Whittier Narrows Dam, Big Tujunaga Cr below Hansen Dam, Santa Ana R at Santa Ana, Santa Ana R below Prado Dam, Santa Ana R near San Bernadino, San Jacinto R near Elsinore, San Diego R at San Diego, San Luis Rey R at Oceanside
  - **Source:** (DWR1980), (USGS 2001) General Knowledge (GK).
- Origin of floods in the region.**:**
  - **Subject:** Rainfall, Tidal Surge, Snowmelt, Lake Overflow
  - **Source:** (DWR 1980), GK.
- **Table**, "Flood Parameters for Principal Streams" outlined in *General Instructions.doc* (GI).
  - **Source:** (USGS 2001).

Ecosystems

[Will collect information and develop text for later drafts.]

Climate

The region has a mild, dry subtropical climate where summers are virtually rainless, except in the mountains where late summer thunderstorms sometimes occur. About 75 percent of the region's precipitation falls from December through March. The coastal plains and the interior valleys receive on average 12 to 18 inches of annual precipitation, depending on location, but the climate allows for a much wider variation from year to year. Much of the 20 to 40 inches of annual average precipitation in the higher mountains falls as snow. [From CWP 2005]

Demographics

The region's 2005 population was 25,708,000. The Inland Empire, which includes the western portions of Riverside and San Bernardino counties, continues to develop quickly. The region contains seven of the state's fastest-growing cities in terms of percentage change in growth. The city of Los Angeles is the state's biggest city. Its population grew from 3,694,800 to in 2000 to 3,934,700 in 2005. Other notable areas of population growth in the region include the Thousand Oaks-Moorpark area in Ventura County, the Santa Clarita Valley in Los Angeles County, the coastal plain of Orange County, and the interior valleys of San Diego County (Table 5-xx Notable areas of population growth in South Coast Hydrologic Region). [Update from CWP 2005.] Figure 5-2 South Coast Hydrologic Region population, 1960 to projected 2050) [Text from CWP 2005; update]

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PLACEHOLDER Table 5-xx Notable areas of population growth in South Coast Hydrologic Region

PLACEHOLDER Figure 5-2 South Coast Hydrologic Region population, 1960 to projected 2050

[Develop tribal content: Include, enumerate (somehow acknowledge tribal communities). All federally recognized tribes have sovereign governments. BIA map indicates locations of landless tribes, which may be in process of acquiring land. Many non-federally recognized tribes are petitioning for federal status, but may be harder to identify and locate. Contact the California Native American Heritage Commission for a list of tribal governments in a given area (county, zip codes, etc.).]

Land Use Patterns

The mild climate and ample expanse of gentle landscapes in the South Coast region have encouraged a variety of land uses since the first great development boom of the late 1880s. The expansion of new single- and multi-family homes, commercial services, businesses, and highway systems into the warmer sections of the region continues onto lands that were historically pastoral, if not agricultural. Although pockets of open space and agricultural uses still exist, the urban area now extends southward from Ventura County to the international border with Mexico and eastward from the coast to beyond Riverside and San Bernardino. Irrigated agriculture now occupies only one-seventh as much land as urban uses. Environmental water uses are mostly limited to relatively small, managed wetland areas, wildlife areas, lakes, and riparian habitats. [From CWP 2005; update.]

Although agricultural acreage has continued to decline in recent years, agriculture is still economically important to the region. In 2005, the estimated gross value of agricultural products in San Diego County was $1.5 billion; in Ventura County, that value was $1.2 billion. The total crop acreage in year 2005 was about 240,000 acres, which produced a variety of crops that included high-valued citrus and subtropical fruits, fresh-market vegetable crops, and assorted nursery products. Although agricultural uses occur throughout the region, the major areas continue to be the Oxnard Plain (for vegetables) and the adjacent hills and valleys (for citrus and subtropical fruits) in Ventura County; the coastal (for nursery) and interior valleys (for citrus and avocado fruits) in San Diego County; and the Chino area (for dairies) in San Bernardino County. [From CWP 2005; update.]

Regional Water Conditions

Water in the Environment

Environmental water use is limited in the South Coast Hydrologic Region. Managed wetland areas include the San Jacinto Wildlife Area and Hemet/San Jacinto Multi-Purpose Constructed Wetlands in western Riverside County; Balboa Lake, Wildlife Lake, and Japanese Tea Garden in the Sepulveda Basin area of Los Angeles County; and several sites along the Santa Ana River including Prado Dam and Seven Oaks Dam. Other areas are the San Joaquin Marsh adjacent to San Diego Creek and Newport Bay in Orange County, Santee Lakes in San Diego, and an area on Temescal Creek near Corona in western Riverside County. In 2005, environmental water demands were estimated to be _____ taf. [From CWP 2005; update.]

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[Consider map: Figure 5-xx Managed and constructed wetland areas in South Coast Hydrologic Region]

PLACEHOLDER Figure 5-xx Managed and constructed wetland areas in South Coast Hydrologic Region (map)

In addition, requirements for in-stream flows are limited to Sespe Creek in Ventura County. Annual flow requirements are _____. [From CWP 2005; update.]

Water Supplies

The region has developed a diverse mix of local and imported water supply sources. Local water resources development over the last 20 years has included water recycling, groundwater storage and conjunctive use, conservation, brackish water desalination, water transfer and storage, and infrastructure enhancements ~~to complement imported water supplies~~. The region imports water through the State Water Project (SWP), the Colorado River Aqueduct (CRA), and the Los Angeles Aqueduct (LAA) (see Box 5-xx for acronyms used in this report). This diverse mix of sources provides flexibility in managing supplies and resources in wet and dry years. Figure 5-3 provides a graphical presentation of all of the water supply sources that are used to meet the developed water uses within this hydrologic region for Years 1998 through 2005. [From CWP 2005; update.]

[Develop tribal content: Is this where pending water rights issues would be discussed? BIA knows what tribal water rights proceedings are in progress, for example Cahuilla Band of Mission Indians (Riverside County).]

PLACEHOLDER Box 5-xx Acronyms and Abbreviations Used in South Coast Report

PLACEHOLDER Figure 5-3 South Coast region water balance for water years 1998–2005

The Metropolitan Water District of Southern California (MWD) imported an average of 703,000 acre-feet per year of water from the SWP from 1972 to 2005 and 680,000 acre-feet or more of water from the CRA (depending on the availability of surplus water). (The contracted amount is currently 1,811,000 acre-feet per year; actual imports have been closer to this amount for the last few years.) MWD wholesales the water to a consortium of 26 cities, water districts, and a county authority that serve 18-million people living in 6 counties stretching from Ventura to San Diego. [From CWP 2005; update.]

Fifteen percent of the region's water supply is developed by water agencies located outside of the service area of MWD and its members agencies. These agencies also import water from the SWP or use local supplies, usually groundwater. Agencies that import SWP water include Castaic Lake Water Agency, San Bernardino Valley Municipal Water District (SBVMWD), Ventura County Flood Control District, San Gorgonio Pass Water Agency, and the San Gabriel Valley Municipal Water District. [From CWP 2005; update.]

PLACEHOLDER Table 5-1 South Coast Hydrologic Region water balance summary (taf), 1998–2005

PLACEOLDER Table 5-2 South Coast Hydrologic Region water use and distribution of dedicated supplies (taf), 1998–2005

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Groundwater and groundwater agencies are important to the water supply picture of the region, meeting about 23 percent of water demand in normal years and about 29 percent in drought years. The region has 56 groundwater basins. In some California groundwater basins, as the demand for groundwater exceeded supply, landowners and other parties turned to the courts to determine how much groundwater can rightfully be extracted by each user. In a process known as court adjudication, the courts study available data to arrive at a distribution of groundwater that is available each year, usually based on the California law of overlying use and appropriation. There are 19 court adjudications for groundwater basins in California, mostly in Southern California. In 15 of these adjudications, the court judgment limits the amount of groundwater that can be extracted by all parties based on a court-determined safe yield of the basin. The basin boundaries are also defined by the court.

[From CWP 2005; update.] [Check with DWR Legal or refer to Legal's water write-up.]

Most basin adjudications have resulted in either a reduction or no increase in the amount of groundwater extracted. As a result, agencies often import surface water to meet increased demand. The original court decisions provided watermasters with the authority to regulate extraction of the quantity of groundwater; however, they omitted authority to regulate extraction to protect water quality or to prevent the spread of contaminants in the groundwater. Because water quantity and water quality are inseparable, watermasters are recognizing that they must also manage groundwater quality. [From CWP 2005; update.]

The use of recycled water, which brings wastewater agencies into partnerships with surface and groundwater managers, is playing an increasingly significant role in meeting the region's water needs. The best recent data are from the 2002 Statewide Recycled Water Survey by the State Water Resources Control Board (SWRCB), which estimated that recycled municipal water delivery was about 275,000 acre-feet per year in Southern California. By the year 2010, MWD expects that its service area will produce about 410,000 acre-feet of water through water recycling, groundwater recovery, or seawater desalination. [From CWP 2005; update.]

West Basin Municipal Water District (WBMWD), the largest water recycler in the region, has developed more than 31,000 acre-feet of recycled water. Within the San Diego County Water Authority (SDCWA) service area there is roughly 13,000 acre-feet per year of incidental groundwater recharge resulting from wastewater disposal operations, of which 95 percent is used for agriculture and landscape irrigation.

Water use efficiency measures, which are partnering wastewater treatment agencies with wholesale and retail water districts, will continue to have important impacts on the region's supplies and demands. A combination of active and passive measures has contributed to decreases in urban demands in the region. Recent examples of active water use efficiency programs include the installation of ultra-low-flush toilets and other water efficient appliances for residential, industrial, and institutional uses and the promotion of water efficient landscaping and irrigation. Even greater water supply savings are being achieved from passive water use efficiency measures. Passive water measures involve changes in the water code that require manufacturers to offer customers water-saving devices. MWD reports that its member agencies have urban programs that conserve about 65,000 acre-feet annually through active programs, and inclusion of passive conservation measures would make the total savings much larger [From CWP 2005; update.]

About 15 percent of the South Coast region's developed water is used for agricultural activities. The sources of water supplies that are available for irrigation operations differ throughout the region. Groundwater is the primary source of water for the agricultural activities on the coastal

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plain of Ventura County. In the middle segment of the region, varying combinations of groundwater and imported water are used. In the southern portion, primarily San Diego County, imported water supplies and a small amount of local surface water are the primary sources. [From CWP 2005; update.]

MWD initiated several agricultural water conservation and transfer programs, including a program with the Imperial Irrigation District (IID) that conserved _____ acre-feet in 2005 and a crop rotation and water supply program with Palo Verde Irrigation District that saved about 186,000 acre-feet of water from 1992 through 1994. In addition, SDCWA is in the initial stage of an agreement with IID in which IID delivers conserved water to SDCWA. Thirty-thousand acre-feet will be delivered in 2005, and deliveries will increase annually toward 200,000 acre-feet of conserved water by 2021. [From CWP 2005; update.]

Various water rights in the South Coast Region include Pueblo Rights, appropriative rights (first in time, first in right), riparian rights (English Law), Mutual Prescription (Groundwater), and adjudicated rights (Central Basin, West Coast Basin, Raymond Basin, Santa Ana River, Santa Margarita and others. [From CWP 2005; update.]

Water Uses

As discussed earlier, the South Coast Hydrologic Region is the most populous and urbanized region in California. The urban area stretches from Oxnard Plain in Ventura County, through Los Angeles, Orange, and San Diego Counties, and extends eastward into western Riverside and San Bernardino Counties. This broad urban area is responsible for the largest annual supply and municipal and industrial requirements in the state for the water portfolio year of 2005. Total applied water for Municipal and Industrial uses for the region in water year 2005 was estimated at _____ taf. This represented ____ percent of the statewide total applied water for urban uses.

Climatological conditions in the drier, warmer interior valleys of the region are playing a role in the increases in annual demands.

(Expansion of discussion on water use efficiency programs and activities to be developed)

[Reference: Metropolitan Water District of Southern California, The Regional Urban Water Management Plan. November 2005.]

Despite its sprawling metropolitan areas and population, about 240,000 acres of irrigated crops were planted and harvested in 2005. Agricultural activities accounted for approximately ____ percent of the overall use in the region. In water year 2005, agricultural demands were estimated to be _____ taf. [From CWP 2005; update.]

In the major agricultural areas in the region, most on-farm irrigation operations are or are striving to be efficient. Farmers are continuing to use the latest equipment to handle crop irrigations, conserve water supplies, and decrease costs. Micro-jet sprinklers and drip emitters are being used for the irrigation operations of most citrus and subtropical fruit orchards in San Diego and Ventura counties. Although furrow systems are still in use, drip irrigation systems are also used to irrigate the fresh market vegetables produced in Ventura County. [From CWP 2005; update.]

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Water Quality

Overarching Water Quality Issues: Given the size of the South Coast region and the diverse sources of water supply, the challenges to the region's water quality are varied. Three Regional Water Quality Control Boards have jurisdiction in the South Coast Hydrologic Region: Los Angeles, Santa Ana, and San Diego. Each regional board establishes priorities for the protection of water quality in its jurisdiction.

As with many regions in the state, water quality and water supply challenges are intertwined. The South Coast region must manage for uncertainties caused by population and economic growth. Growth not only affects demand, but it adds contamination challenges from increases in wastewater discharges and urban runoff as well as increased demand for water-dependent recreation. Outside the region, environmental and water quality needs in the Delta, Colorado River, and Owens River/Mono Basin systems affect imported water supply reliability and quality. The region must also assess and plan for impacts of climate variations and global climate change, as well as the cost of replacing aging infrastructure. [This last discussion may become part of Relationship with Other Regions]

As stated above, there are numerous water quality issues in the various watersheds within the South Coast region. This chapter section is intended to identify the highest priority water quality issues and watersheds within this region. Some of the regional specific issues and watersheds which have been identified but not prioritized are:

Issues:

- Beach closures
- Contaminated sediments
- Habitat loss/restoration (wetland and riparian habitat)
- N-nitroso-dimethylamine (NDMA)
- Quality of imported water
- Regional salt management/salt imbalance
- Shipping, ports, and harbors

Los Angeles Regional Water Quality Control Board watersheds:

- Ballona Creek watershed
- Calleguas Creek watershed
- Channel Islands
- Dominguez Channel/LA-LB Harbor
- Los Angeles River watershed
- Los Cerritos Channel/Alamitos Bay
- Malibu Creek watershed
- San Gabriel River watershed
- Santa Clara River watershed
- Santa Monica Bay
- Ventura Coastal Area
- Ventura River watershed

Santa Ana Regional Water Quality Control Board watersheds:

- Santa Ana River (Upper, Middle, and Lower)

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- Lake Elsinore/San Jacinto
- Big Bear Area
- Mountain Water Management Area
- Newport Coast
- Coyote Creek and Carbon Creek
- Chino Basin
- SAWPA

San Diego Regional Water Quality Control Board watersheds:

- San Diego Coast
- South San Diego Bay

[Text to be developed by WQ team for later draft]

Project Operations

[Will collect information and develop text for later drafts.]

Water Governance

[Will collect information and develop text for later drafts.]

Flood Management

[Information and text to be developed by flood team. See elsewhere in report regarding flood management information.]

Historic Floods

- Early flooding history:
  - **Subject: 1810, 1862, 1938**
  - **Source:** (DWR 1980).
- Significant historic floods:
  - **Floods of Importance: 1969** (DWR 1980); **1978** (DWR 1980), **1980** (DWR 1980), **1985-86** (DWR 1988), **1994-95** (DWR 2003), **1996-97** (Flood Center), 2003 (Flood Center).

Flood Hazards

- Flood Hazard List:
  - **Source:** GK, Local Government Staff (LGS).
- List of Flood Management Challenges.
  - **Subject:** urban protection, Non-urban protection, floodplain regulation, mapping, uncontrolled runoff, bridge failure, levee failure, alluvial fans, lake overflow
  - **Source:** (DWR 1980) Tabulated text on pp. 162-169, GK, Author.

Institutions

- Flood Control Types
  - **Subject:** Structural works, hydromet networks, emergency response, recovery
  - **Source:** (DWR1980) pp. 194-200, DFM Hydrology staff, GK.

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- Ownership, Sponsorship, Participation and Maintenance of Major Projects
  - **Subject:** Agency list summarizing role in ownership (project initiation), financial participation, and maintenance
  - **Source:** (DWR 1980), GK.
- Emergency Response
  - **Subject:** Responsibility of SEMS, Flood Center, Corps of Engineers, FEMA
  - **Source:** Flood Center, GK, reference to SS.

Existing Flood Damage Reduction Measures

- Type of facilities found in the Region
  - **Source:** Author, (DWR 1980).

<u>Constructed Flood Protection Facilities</u>

- Flood Control Projects
  - **Subject:** LA River Channel, San Gabriel River Channel, Rio Undo Channel, Bollona Creek Channel, Laguna Dominguez System Channel, Tributary Channels, LA River Flood Prevention Project, Santa Ana River Basin Project, San Antonio and Chino Creeks Channel, Lytle and Warm Creeks Project, Cypress Creek Channel, City Creek Levee, Main Street Wash Watershed, Stewart Canyon Project, Ventura River Levee, Calleguas Creek Watershed Project, Revolon Slough Watershed Project, Beardsley Wash Project, San Diego River Levee and Channel, Rose Creek Channel, Buena Vista Creek Watershed Project, Escondido Creek Watershed Project, Los Coches Creek, Telegraph Canyon Creek Project, Cucamonga Creek and Tributaries, San Jacinto River Levee, Santiago Creek and Oak Street Drain, Kenter Canyon Conduit and Channel, Sweetwater River, Tijuana River International Project, San Luis Rey River, Santiago Creek Channel, Mission Zanja Creek, Shore Protection Projects.
  - Source: (DWR 1980, pp. 145-161), (USACE 1995), LGS. **Need to verify post-1980, post-1995 for USACE.**
- **Table**, "Flood Control Reservoirs", outlined in General Instructions.doc (GI).
  - **Subject:** Big Dalton Reservoir, Santa Anita Reservoir, Big Tujunga Reservoir, Cogswell Dam, Devils Gate Reservoir, Live Oak Reservoir, Eaton Wash Reservoir, Pacoima Reservoir, Puddingstone Reservoir, San Gabriel Reservoir, Sawpit Reservoir, Thompson Creek Reservoir, Hansen Dam, Sepulveda Dam, Lopez Dam, Santa Fe Dam, Whittier Narrows Dam, San Antonio Dam, Alessandro Dam, Box Springs Dam, Harrison Street Dam, Pigeon Pass Dam, Prenda Dam, Sycamore Dam, Woodcrest Dam, Mockingbird Dam, Fullerton Dam, Prado Dam, Seven Oaks Dam, Carbon Canyon Dam, Lake Elsinore Reservoir. **Need to verify post-1980, post-1995 for USACE.**
  - **Source:** (DWR 1980, pp. 145-161), (USACE 1995).
- Hydromet Systems and Stations.
  - **Subject:** Stream gages as listed in Setting other stream gages, rain gages, snow gages. Adequacy of existing gage network.
  - **Source:** DFM Hydrology Staff, LGS, (USGS 2001).

<u>Flood Governance</u>

- List of Governance Methods
  - **Subject:** Floodplain zoning ordinances, designated floodways (CVFCB), county floodplain management programs
  - **Source:** (DWR 1980), LGS.

- Status of Floodplain Mapping and FIRMs.
  - **Subject:** Mapped and unmapped areas, planned mapping projects
  - **Source:** DFM Staff (Tom Christensen, 574-1407)
- Local Government Participation in the NFIP Community Rating System.
  - **Subject:** Participating counties as listed in Appendices A and B to GI.
  - **Source:** DFM staff, reference to SS, GI.
- **Table**, "Community Ratings for NFIP" outlined in *General Instructions.doc* (GI).
  - **Subject:** Anaheim, Fountain Valley, Huntington Beach, Irvine, Long Beach, Mission Viejo, Moreno Valley, Newport Beach, Oceanside, Orange, Orange County, Santa Clara, Santa Clara County, Santa Clarita, San Juan Capistrano, Simi Valley
  - **Source:** See General Instructions.doc (GI)

Operating Procedures

- General Reservoir Operating Rules.
  - **Subject:** Big Dalton Reservoir, Santa Anita Reservoir, Big Tujunga Reservoir, Cogswell Dam, Devils Gate Reservoir, Live Oak Reservoir, Eaton Wash Reservoir, Pacoima Reservoir, Puddingstone Reservoir, San Gabriel Reservoir, Sawpit Reservoir, Thompson Creek Reservoir, Hansen Dam, Sepulveda Dam, Lopez Dam, Santa Fe Dam, Whittier Narrows Dam, San Antonio Dam, Alessandro Dam, Box Springs Dam, Harrison Street Dam, Pigeon Pass Dam, Prenda Dam, Sycamore Dam, Woodcrest Dam, Mockingbird Dam, Fullerton Dam, Prado Dam, Seven Oaks Dam, Carbon Canyon Dam, Lake Elsinore.
  - **Source:** Corps Operations manuals in Flood Center
- Forecast-coordinated Operations Agreements
  - **Source:** DFM Staff
- Status of Response Agreements (See GI for description)
  - **Source:** Flood Center, LGS
- Available H&H models.
  - **Subject:** Streams outlined in "Setting"
  - **Source:** DFM Hydrology staff, LGS, reference to SS for Comp Study.

Emergency Procedures

- Formal Emergency Management Organization.
  - **Subject:** Agency participation and responsibility
  - **Source:** reference to SS **(provided in this work)**
- **Table,** "Response Organizations", headings as listed in GI.
  - **Source:** DFM Staff, (DWR 2007), LGS.
- Recovery Resources
  - **Subject:** Agency participation and responsibility
  - **Source:** reference to SS **(provided in this work)**

Relationship with Other Regions

[Will collect information and develop text for later drafts.]

PLACEHOLDER: Figure 5-4 MWD inland feeder

[Flood info to be added by flood team]

- inter-regional flood management coordination(Omit if none).
  - **Subject:** None found at this time

- **Source:** DFM Staff, LGS, reference to SS.

Regional Water and Flood Planning and Management

[Develop tribal content: Major issues that involve tribes may already be included, e.g, TROA, Mono Lake, and Klamath River, etc. Name tribal governments involved, as involved agencies also are named.]

Over the past decade, the region has improved water supply reliability in the face of reduced imported supplies from the Owens Valley and Mono Basin and reduced uncertainty regarding the amount of imports available from the SWP through strategic planning. New issues such as global warming, aging water infrastructures, and the recent court ruling on pumping from delta will require the region to continue with these planning activities.

For the past several years, a number of integrated regional water management planning activities have commenced in the region. Water, wastewater, and local government agencies and local organizations have begun to collaborate in the development strategic regional plans to give them the necessary water management tools and water planning practices to improve and optimize local water resources in relation to the imported water needs.

As an example of this type of collaboration, the San Bernardino Valley Water Conservation District, San Bernardino Valley Municipal Water District, and the Western Municipal Water District entered into a facilities-sharing agreement. The agencies will share existing facilities to divert water from the Santa Ana River and store it in the local groundwater basin for potable water uses locally.

[Additional information to be collected and text to be updated for later drafts]. www.wmwd.com/pressreleases.htm.)

Integrated Regional Water Management

[Generally describe the portions of area covered by IRWMs in this HR. Name the IRWM efforts and give short status. Discuss objectives and main water management strategies to meet objectives and then summarize to the HR level. In this HR, these are the main objectives; these are the water management strategies to meet those objectives.]

There are multiple Integrated Regional Water Management (IRWM) planning efforts in the South Coast HR at varying stages of function and development. These IRWMs generally cover the entire HR. The IRWM planning efforts in the region are:

- Watersheds of Ventura County IRWM
- Upper Santa Clara River IRWM
- Greater Los Angeles IRWM
- Gateway Cities IRWM
- Santa Ana Watershed Protection Agency
- Orange County IRWMs (North, Central, and South)
- San Bernardino IRWM
- San Jacinto IRWM
- Upper Santa Margarita IRWM
- San Diego IRWM

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[Discuss varying status of plans – discuss relationship of SAWPA plan and North and Central Orange Co, San Bernardino, and San Jacinto. Discuss relationship between Gateway Cities and LA IRWM]

[Discuss objectives and water management strategies in the region]

PLACEHOLDER: Figure 11-xx Areas within South Coast Hydrologic Region covered by IRWM planning efforts (map)

[Text to be added by flood team]:

- Flood Management provisions in IRWMPs
  - **Subject:** South Orange County IRWM, San Diego Region IRWMP, Santa Ana Watershed IRWMP, Upper Santa Ana River Watershed IRWMP, San Jacinto IRWMP, Central Orange County IRWMP, Newport Beach and Irvine Coast ICWM, Watersheds Coalition of Ventura County IRWMP, Upper Santa Clara River IRWMP, San Jacinto River Watershed Council IRWMP, Greater LA County Region IRWMP.
  - **Source:** http://www.ocwatersheds.com/watersheds/documents/IRWMP_053105.rtf, http://www.rmcwater.com/clients/sdirwmp/pdf/7_SDIRWMP_%20Public_Workshop_Handout_29jun07.pdf, http://www.sawpa.org/documents/OneWater/OWOW%20Methodology.pdf, DFM Staff (Chris Adams)

Accomplishments

[Text to be added by flood team]:

- Brief descriptions of significant flood management accomplishments, particularly recent accomplishments. Include years of completion or establishment.
  - **Source:** Text, reference to SS.

Challenges

[Text to be added by flood team]:

- Challenges in ameliorating the hazards listed above.
  - **Source:** DFM Staff, Author.

In general, the following issues remain as challenges in the region:

- Salinity management affects recycling – relates to land use, use of water softeners
- Examine loss of groundwater supplies due to contamination and seawater intrusion
- Identify disadvantaged communities and describe what is being done to enhance water supplies
- Look at movement and displaced populations, integrate with census development of private wells is currently unregulated

[Update CWP 2005's related text for topics above and develop text for other challenges since 2005]

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Drought and Flood Planning

[Will collect information and develop text for later drafts.]

[From flood text to include]:

- Regional Flood Plans or Flood Planning Agencies
  - **Subject:** San Diego County Flood Control District, County of San Bernardino Flood Control District, County of Orange Resources and Development Management Department, Riverside County Flood Control and Water Conservation District, Ventura County Watershed Protection District, Santa Clara County Water District, San Diego County Flood Control District, San Diego County Flood Control District, Harris County Flood Control District, LA Department of Public Works, Ventura County Flood Control District, Irvine Ranch Water District, Santa Clara Valley Water District..
  - **Source:** LGS, (DWR 1980).
- FloodSAFE regional flood management plans.
  - **Source:** Reference to SS
- Multi-county projects.
  - **Source:** LGS, (DWR 1980).

Looking to the Future

The region's water agencies generally have solid plans for adapting to changing conditions and meeting future water needs. For example, the 2004 Report on MWD's water supplies states, "Metropolitan has a comprehensive supply plan to provide sufficient supplemental water supplies and to provide a prudent supply reserve over the next 20 years and beyond." SAWPA has begun a 10-year integrated program to help, among other things, drought-proof the watershed, so it can roll off imported water for up to three years during drought years. The Chino Basin is one area that has developed an integrated conjunctive management program with the potential to develop 500,000 acre-feet of new storage over the next 20 years, including new yield from storm water management, SWP and recycled water recharge, and the implementation of aggressive water use efficiency programs. Water districts in the Santa Clarita Valley of Los Angeles County are engaged in integrated urban water management planning, collaborative data collection, and a new groundwater plan. These and other ongoing planning programs are important to manage changing conditions facing the region. Water conservation programs, water recycling, and groundwater recovery, as well as water marketing and other water supply augmentation responses are being examined and implemented.

The signing of the Quantification Settlement Agreement and related agreements in October 2003 facilitated long-term water transfers from the IID and Coachella Valley Water District (CVWD) in the Colorado River Hydrologic Region to urban water users in the South Coast Hydrologic Region. They will help California reduce its use of Colorado River water to its basic allotment of 4.4 million acre-feet during years of normal supply. They will also make possible the transfer of additional water to be obtained through lining the All American and the Coachella canals. The water transfer between IID and SDCWA will help to stabilize water supplies for MWD and CVWD. It will satisfy outstanding miscellaneous and Indian water rights and provide funding that IID and farmers in the Imperial Valley will use to implement additional water conservation measures once the required fallowing is complete.(Box 5-6) [From CWP 2005; update.]

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PLACEHOLDER: Box 5-6 Key Elements of California's Colorado River Quantification Settlement Agreement

MWD will continue its replenishment services water pricing program to encourage local agencies to store imported water in groundwater basins for use during the summer and during drought years. In addition, local agencies in the region are now planning to use water transfers for part of their base supplies, a change from past years when marketing arrangements were viewed as primarily for drought year supplies. [From CWP 2005; update.]

[Develop text from most recent IRWM plans regarding future goals: water conservation targets, etc.]

[Develop tribal content: Mention if something pending in tribal water rights. Tribal water rights that have not been quantified could be the sleeping giant throughout the western states. As tribes look to the future of their communities, their own economic survival may be played out in water rights proceedings. Some may simply buy from wholesale or retail water agencies.]

Desalination. Ocean water desalination is sometimes described as the ultimate solution to Southern California's water supply shortfall. While it has become a more feasible source of supply due to technical advances, the development of desalination facilities still faces many challenges that include high energy requirements, environmental impacts of brine disposal, and plant-siting considerations. State agencies have provided funding for the Desalination Research and Innovation Partnership, which furthered the development of advance reverse osmosis membranes. [From CWP 2005; update.]

MWD and five of its member agencies have planned for the potential development of 126,000 acre-feet of desalinated ocean water. Those member agencies include LADWP, Long Beach Water Department, Municipal Water District of Orange County, WBMWD, and SDCWA. The SDCWA expects desalted ocean water to meet between 6 and 15 percent of the region's needs by 2020 and is conducting an environmental review for building an ocean water desalination facility on the Encina Power Plant property in Carlsbad. SDCWA also is carrying out feasibility studies of desalination facilities at Camp Pendleton and in the southern county. All three sites are on the coast. [From CWP 2005; update.]

Another future water supply option is management of the San Bernardino Basin as a groundwater storage facility. The basin has a capacity of about 5.5 million acre-feet. Pursuant to the January 1969 settlement for Western Municipal Water District et al. vs. East San Bernardino Valley Municipal Water District et al. Superior Court Riverside County Case number 78426, the Western-San Bernardino Watermaster determined that the safe yield of the San Bernardino Basin is about 232,000 acre-feet per year. SBVMWD has been working with the US Geological Survey for many years to develop a groundwater computer model that will enable the agency to determine ways to enhance the safe yield of this basin. [From CWP 2005; update.]

The Groundwater Replenishment System, a high-technology water purification system, is a project under development by the OCWD and the Orange County Sanitation District. [Update text from CWP 2005]

Flood control reservoirs are now being evaluated for their potential to provide some water supply benefits through the modification of their operations to enhance groundwater recharge and provide limited year-round storage. The SBVMWD, for example, has applied to the SWRCB for authorization to store storm water from the Santa Ana River in a reservoir that could be created behind Seven Oaks Dam. Los Angeles County Department of Public Works (LACDPW) is completing a study, in cooperation with the US Army Corps of Engineers (Corps), to reauthorize

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four Corps flood control facilities in Los Angeles County for the purpose of capturing and safely storing storm water and then slowly releasing the water to downstream groundwater recharge facilities after storm events. [From CWP 2005; update.]

The Water Augmentation Study is a long-term research project, led by the Los Angeles and San Gabriel Rivers Watershed Council and supported financially by its partners, the US Bureau of Reclamation, MWD, LACDPW, Los Angeles RWQCB, Water Replenishment District of Southern California, LADWP, City of Los Angeles Watershed Protection Division, DWR, and the city of Santa Monica. The purpose of the study is to explore the potential for increasing local water supplies and reducing urban runoff pollution by increasing the upstream infiltration of storm water runoff. The project began in January 2000 to assess the impact of runoff-transported pollutants on rivers, coastal water, and beaches; the viability of adding these storm water resources to local water supplies, and the challenge of capturing storm water for infiltration, in terms of groundwater quality and quantity. [From CWP 2005; update.]

In 2000, DWR, in cooperation with the USBR and 10 Southern California water and wastewater agencies, undertook the Southern California Water Recycling Projects Initiative to continue the work previously started by the Southern California Comprehensive Water Reclamation and Reuse Study (SCCWRRS). The initiative is a multiyear planning study that evaluates the feasibility of a regional water-recycling plan and assists local water and wastewater agencies in final planning and environmental documentation leading to implementation of projects identified in the SCCWRRS. The initiative is funded on a 50-50 percent cost-sharing among the 12 agencies. The initiative identified short-term projects that could add about 378,000 acre-feet of recycled water for regional use. The 15 short-term projects were identified for the areas of Calleguas, East San Gabriel, West Basin, Central Basin, North Orange County, Central Orange County, Upper Oso, San Juan, Encina, San Pasqual Valley, North City, South Bay, Chino Basin, San Bernardino, and Eastern Basin. [From CWP 2005; update.]

As part of a regional strategy to improve water supply reliability, several agreements with water districts in the Central Valley are providing groundwater storage for the South Coast region:

- Semitropic Water Banking and Exchange Program. This program allows storage of up to 350,000 acre-feet in the groundwater basin underlying the Semitropic Water Storage District in Kern County.
- Arvin-Edison Water Storage Program. MWD and the Arvin-Edison Water Storage District have developed a program that allows Metropolitan to store water in the groundwater basin in the Water Storage District's service area in Kern County. Over the next 25 to 30 years, this groundwater storage program will provide average dry-year withdrawals of about 70,000 acre-feet annually.
- Kern-Delta Storage Program. This 25-year program will allow storage of up to 250,000 acre-feet of available State Water Project supplies. (Figure 5-5)

PLACEHOLDER: Figure 5-5 MWD Storage agreements with San Joaquin Valley agencies

Other potential management strategies includes interstate groundwater banking in Arizona, drought year land fallowing programs, lining parts of the All-American and Coachella canals, and agricultural water conservation beyond EWMP implementation. In addition, South Coast region water agencies are storing discount-priced imported water during winter months into groundwater basins and increasing their groundwater use during the summer and during droughts. [From CWP 2005; update.]

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The Calleguas Municipal Water District operates a conjunctive use program in the Las Posas Groundwater Basin of Ventura County. Identified as the Las Posas Basin Aquifer Storage and Recovery Project, it is designed to store a maximum of 300,000 acre-feet of water supplies that can be used during short-term and long-term water supply shortages. The project calls for the construction of 30 dual-purpose groundwater wells that will be used for both injection and water production. Pipelines will be constructed to connect the wells with CMWD facilities as far away as the Cities of Simi Valley and Thousand Oaks. The source of water supplies would be the State Water Project. The project will be phased into operation with full operation anticipated by 2010. To date, 18 wells have been built and about 50,000 acre-feet of water is in storage. [From CWP 2005; update.]

To improve the reliability of its potable water supplies during droughts, the Western Municipal Water District is moving forward with plans to operate a conjunctive use program in groundwater basins in western San Bernardino and Riverside counties. The project, the Riverside-Corona Feeder, calls for the recharge of water supplies during above-average precipitation years into the groundwater basins in San Bernardino Valley and pumping those supplies during drought years. Sources of water for the recharging operations would be local surface runoff, including releases from the Seven Oaks Reservoir near the community of Mentone in San Bernardino County and the SWP. Recipients of the stored groundwater supplies are the cities of Corona and Riverside and the Elsinore Valley Water District. When completed, 20 wells and 28 miles of pipeline will have been constructed. About 40,000 acre-feet of groundwater supplies could be achieved through this project. [From CWP 2005; update.]

Most of the projects described above are designed to improve water quality as the way to obtain increased water supplies. These include watershed activities, such as the Water Augmentation Study, groundwater desalination, use of highly treated recycled water by the OCWD, reduction of sewage spills and storm water runoff through water conservation, and surface and groundwater storage projects that implement blending and treatment strategies to reduce contaminants in treated drinking water supplies. [From CWP 2005; update.]

In addition, MWD is committed to retrofitting all five of its water treatment plants to use ozone; adding fluoride to treated drinking water supplies; implementing a recreation policy for Diamond Valley Lake that protects drinking water quality; and supporting salinity reduction projects throughout the region. Outside the region MWD also supports efforts to preserve and enhance the Sacramento River watershed and the Delta, which are important to the operation of the SWP system. [From CWP 2005; update.]

Future Scenarios

[Will collect information and develop text for later drafts.]

Climate Change

[Will collect information and develop text for later drafts.]

[Flood text to add]

- **Subject:** Precipitation Studies, USACE Sea Level Study (USACE 2001)
- **Source:** DFM Hydrology Staff (Tom Christiansen), reference to SS, (USACE 2001).

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Response Strategies

[Will collect information and develop text for later drafts.]

[Flood text to come from flood team:]

- **Subject:** Studies to be developed
- **Source:** DFM Staff, Text ("Flood Hazards", "Challenges"), Author.

Implementation Next Steps

[Will collect information and develop text for later drafts.]

[Flood text to come from flood team:]

- Steps to improve any aspect of flood management in the region.
- **Source:** DFM Staff, Text ("Flood Hazards", "Challenges", and "Response Strategies"), Author.

Water Portfolios from 1998–2005

[Will collect information and develop text for later drafts.]

PLACEHOLDER: Table 5-3 South Coast Hydrologic Region water portfolio (taf)

PLACEHOLDER: Figure 5-6 South Coast Hydrologic Region—illustrated water flow diagram

PLACEHOLDER: Figure 5-7 South Coast Hydrologic Region —schematic flow diagram

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