Appendix H: Water, Wastewater, and Hydrology Existing Conditions

Appendices

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County of San Bernardino General Plan
Water, Wastewater, and Hydrology
Existing Conditions

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This report was prepared to inform the Countywide Plan and is not intended to be continuously updated.

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APPENDICES

1 EXECUTIVE SUMMARY

The purpose of this background report is to present the existing water, wastewater, storm drain, regional flood, and water quality conditions in San Bernardino County, with a focus on the ability of infrastructure systems to serve existing development and potential future growth in unincorporated communities. This executive summary highlights the report's key findings.

1.1 Water Supply

Based on information from water agencies and providers, there is sufficient water supply and adequate water conveyance systems to serve existing development throughout the unincorporated areas of the county. Agency-supplied projections indicate few barriers to continued growth based on water supply or conveyance systems. Additionally, none of the areas that rely on private or well water systems reported water supply concerns.

Table 1 summarizes existing conditions in the county's unincorporated communities and unincorporated spheres of influence (SOIs). Appendix A provides a map of the various unincorporated communities. Appendix B provides maps and a detailed breakdown agency-supplied information for water providers.

Information was also obtained from the Local Agency Formation Commission (LAFCO) for San Bernardino County through municipal service reviews, GIS data, and a series of meetings. Table 2 provides a summary of a community's ability to support growth based solely on water supply (excluding other factors that will be considered at other stages of the Countywide Plan, such as community growth patterns, topography, and hazard overlays).

Insight from LAFCO indicates that the communities in the Valley region are best positioned to have sufficient water supplies for continued growth. Some communities in the Desert region may also be able to accommodate additional growth without affecting the long-term sustainability of water supply. Communities in the Mountain region are better positioned to continue serving existing residents and businesses while accommodating a more incremental level of growth.

According to the County Division of Environmental Health Services (DEHS) and recent state law, hauled water is not allowed for new construction and the potable water source for any property must be from an approved water purveyor or permitted well.

1.2 Wastewater Services

Based on information from wastewater service agencies and providers, the Valley Region contains the most public wastewater collection/treatment facilities and most communities are connected to one of these systems. The Mountain Region contains regional treatment facilities for some communities, while many are still reliant on septic tanks and leach fields. Most communities in the Desert Region are serviced by private septic systems as the infrastructure, both collection and treatment plants, are limited in number and capacity.

In areas with wastewater plans and treatment plants, all agencies reported adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are also no reports of any major system deficiencies or service inadequacies. Data was unavailable, however, to make an assessment for almost half of the unincorporated communities in the county (these areas are predominantly on septic systems).

Table 1 summarizes existing conditions in the county's unincorporated communities and unincorporated SOIs. Appendix A provides a map of the various unincorporated communities. Appendix B provides maps and a detailed breakdown agency-supplied information for wastewater service providers.

Insight from LAFCO indicates that the communities in the Valley region are best positioned to accommodate growth and treat the associated wastewater. Some communities in the Desert region may also have sufficient treatment systems to accommodate additional growth. Communities in the Mountain region are better positioned to continue serving existing residents and businesses while accommodating a more incremental level of growth. Table 3 provides a summary of a community's ability to support growth based solely on wastewater systems (excluding other factors that will be considered at other stages of the Countywide Plan, such as community growth patterns, topography, and hazard overlays).

The County of San Bernardino adopted a Local Area Management Program (LAMP) to comply with the state's onsite wastewater treatment systems (OTWS) policy. The LAMP provides minimum standards and requirements for the treatment and disposal of sewage through OWTS when no connection to a sewer is available. Requirements for new development include siting standards for OWTS located near drinking water wells, impaired waterways, sources of groundwater, and other specific land uses. Regulations include minimum lot size, residential density, minimum setback requirements, natural ground slope and percolation, OWTS design specifications, and other criteria. In addition, OTWS are not allowed in certain areas of the county where a moratorium exists due to the high concentration of existing OWTS or proximity to groundwater or surface water sources. These communities include:

- Grand Terrace (County Service Area 70, Improvement Zone H)
- Yucaipa – Calimesa
- Lytle Creek (above 2,600 ft MSL)
- Mill Creek (above 2,600 ft MSL)
- Bear Valley (including Baldwin Lake drainage area)
- Lahontan Regional Water Quality Control Board Prohibition Areas 1-5

Oversight of OWTS installation and maintenance involves multiple County divisions: Building and Safety, Environmental Health Services, and Code Enforcement.

Table 1: Summary of Existing Water and Wastewater Systems and Issues

AREA	WATER *			WASTEWATER **		
	Primary Purveyor	System Issues	Supply Concerns	Treatment Provider	System Issues	Capacity Concerns
Detailed Community Plans						
Bear Valley	Mix	No	No	Public Agency	No	No
Bloomington	Mix	No	No	Mix	No	No
Crest Forest	Mix	No	No	Public Agency	No	No
Helendale	Mix	No	No	Public Agency	No	No
Hilltop	Mix	No	No	Public Agency	No	Yes
Joshua Tree	Public Agency	No	No	Private/Septic	N/A	N/A
Lake Arrowhead	Mix	No	No	Public Agency	Possible (2040)	No
Lucerne Valley	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Mentone	Public Agency	No	No	Mix	No	No
Muscoy	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Oak Glen	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Phelan/Pinion Hills	Mix	No	No	Private/Septic	N/A	N/A
Other Community Plan Areas						
Angelus Oaks	Mix	No	No	Private/Septic	N/A	N/A
Baker	Mix	N/A	No	Public Agency	No	No
Daggett	Mix	No	No	Private/Septic	N/A	N/A
El Mirage	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Homestead Valley	Mix	No	No	Private/Septic	N/A	N/A
Lytle Creek	Private/Wells	N/A	No	Public Agency	No	N/A
Morongo Valley	Private/Wells	No	No	Private/Septic	N/A	N/A
Mt Baldy	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Newberry Springs	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Oak Hills	Public Agency	No	No	Private/Septic	N/A	N/A
Oro Grande	Public Agency	No	No	Public Agency	No	No
Pioneertown	Public Agency	No	No	Private/Septic	N/A	N/A
San Antonio Heights	Public Agency	No	No	Public Agency	No	No
Wrightwood	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Yermo	Mix	No	No	Private/Septic	N/A	N/A
Unincorporated SOIs						
Adelanto	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Apple Valley	Mix	No	No	Public Agency	No	No
Barstow	Mix	No	No	Public Agency	No	No
Chino	Public Agency	No	No	Public Agency	No	No
Colton (northwest)	Mix	No	No	Public Agency	No	No
Colton (east)	Private/Wells	N/A	No	Private/Septic	N/A	No
Fontana (west)	Mix	No	No	Public Agency	No	No
Fontana (north)	Public Agency	No	No	Public Agency	No	Yes
Hesperia	Public Agency	No	No	Public Agency	No	No
Highland	Public Agency	No	No	Public Agency	No	No

Table 1: Summary of Existing Water and Wastewater Systems and Issues

	WATER *			WASTEWATER **		
AREA	Primary Purveyor	System Issues	Supply Concerns	Treatment Provider	System Issues	Capacity Concerns
Loma Linda	Private/Wells	N/A	No	Private/Septic	N/A	N/A
Montclair	Public Agency	No	No	Public Agency	No	No
Needles	Public Agency	No	No	Public Agency	No	No
Rancho Cucamonga	Public Agency	No	No	Public Agency	No	No
Redlands	Public Agency	No	No	Private/Septic	N/A	N/A
Rialto	Public Agency	No	No	Public Agency	No	Yes
San Bernardino (north)	Public Agency	No	No	Public Agency	No	No
San Bernardino (east)	Public Agency	No	No	Public Agency	No	No
Twentynine Palms	Public Agency	No	No	Private/Septic	N/A	N/A
Victorville	Public Agency	No	No	Public Agency	No	No
Upland	Public Agency	No	No	Public Agency	No	No
Yucaipa	Public Agency	No	No	Public Agency	No	No

*Opinion based on 2010/2015 UWMP data including supply/demand projections and population models.

**Opinion based on current demand/capacity information provided by the wastewater treatment agency. Current treatment capacity less than 75% of the Average Daily Flow (ADF) translated to be a capacity concern. OWTS (septic) is prohibited in the following areas in the County: Grand Terrace, Yucaipa, Lytle Creek, Mill Creek, Bear Valley.

Table 2: Ability to Accommodate Growth Based on Water Supply

LOCATION 1 = Yes * 2 = Likely 3 = Potentially 4 = Unlikely	Water Supply Able to Accommodate Growth **	LOCATION	Water Supply Able to Accommodate Growth **	LOCATION	Water Supply Able to Accommodate Growth **
COMMUNITY PLAN AREAS		Lucerne Valley	3	Highland	1
VALLEY		Phelan/Piñon Hills	2	Loma Linda	2
Bloomington	1	Baker	2	Montclair	1
Muscoy	2	Homestead Valley	4 | 2	Rancho Cucamonga	2
Mentone	2	Morongo Valley (incl CSA 70 F/W3)	4	Redlands	2
San Antonio Heights	3	Oak Hills *(CSA 70 J)*	2	Rialto	1
MOUNTAIN		Daggett	4	San Bernardino	1
Bear Valley	3	El Mirage	4	Upland	2
Crest Forest	2	Newberry Springs	4	Yucaipa	2
Hilltop	2	Oro Grande (incl CSA 42)	2	MOUNTAIN	
Lake Arrowhead (incl CSA 70 CG)	3	Pioneertown *(CSA 70 W4)*	4	Big Bear	3
Oak Glen	3	Yermo	4	DESERT	
Wrightwood	3	UNINCORPORATED SOI		Adelanto	3
Angelus Oaks	3	VALLEY		Apple Valley	2
Lytle Creek	4	Chino	1	Barstow	3
Mt Baldy	3	Colton | Northwest	1	Hesperia	2
DESERT		Colton | East	1	Needles (no service per MSR)	3
Helendale	2	Fontana | North	1	Victorville (incl CSA 64)	2
Joshua Tree	3	Fontana | West	1	Twentynine Palms	2

*The ability to accommodate growth is not quantified and is a generalized reference in regard to existing level of development in the community. In addition to access to adequate water supply, current information on groundwater quality contamination, the ability to treat, and the associated costs of treatment was also considered.

**Opinion based on latest available municipal service reviews, California Department of Water Resources reports, GIS data, and interviews with LAFCO staff.

Table 3: Ability to Accommodate Growth Based on Wastewater System

LOCATION 1 = Yes * 2 = Likely 3 = Potentially 4 = Unlikely	Wastewater System Able to Accommodate Growth **	LOCATION	Wastewater System Able to Accommodate Growth **	LOCATION	Wastewater System Able to Accommodate Growth **
COMMUNITY PLAN AREAS		Lucerne Valley	4	Highland	1
VALLEY		Phelan/Piñon Hills	3	Loma Linda	2
Bloomington (incl CSA 70 BL)	2	Baker *(CSD)*	4	Montclair	1
Muscoy	2	Homestead Valley	4 | 2	Rancho Cucamonga	1
Mentone (incl CFD 2003-1)	2	Morongo Valley (incl CSA 70 F/W3)	4	Redlands	2
San Antonio Heights	2	Oak Hills *(CSA 70 J)*	2	Rialto (incl CSA 70 GH)	1
MOUNTAIN		Daggett	4	San Bernardino (incl CSA 70 GH)	1
Bear Valley (incl CSA 53 B, OWTS ban)	3	El Mirage	4	Upland	2
Crest Forest (Crestline San Dist)	3	Newberry Springs	4	Yucaipa	2
Hilltop (incl CSA 79)	3	Oro Grande (incl CSA 42)	2	MOUNTAIN	
Lake Arrowhead *(CSD)*	3	Pioneertown	3	Big Bear	3
Oak Glen	2	Yermo	4	DESERT	
Wrightwood	4	UNINCORPORATED SOI		Adelanto	3
Angelus Oaks	4	VALLEY		Apple Valley	3
Lytle Creek (incl CSA 70 S3, OWTS ban)	3	Chino	2	Barstow (incl CSA 70 S7)	4
Mt Baldy	4	Colton | Northwest	2	Hesperia (incl CSA 70 SP2)	2
DESERT		Colton | East	2	Needles	3
Helendale	2	Fontana | North	2	Victorville (incl CSA 64)	2
Joshua Tree (exploring reg'l WWTS)	2	Fontana | West (incl CFD 2002-1)	2	Twentynine Palms	3

*The ability to accommodate growth is not quantified and is a generalized reference in regard to existing level of development in the community. In addition to access to adequate wastewater treatment (OWTS or WWTS), proximity to existing sewer systems and current information on groundwater quality contamination, the ability to treat, and the associated costs of treatment was also considered.

**Opinion based on latest available municipal service reviews, GIS data, and interviews with LAFCO staff.

1.3 Drainage and Flooding / Surface Water

San Bernardino County's topography, seasonal rainfall, and drainage patterns have made it susceptible to periodic flooding. The Federal Emergency Management Agency (FEMA) has identified extensive areas within the county that are subject to 100-year and 500-year flooding. However, many parts of the County are not mapped by FEMA and are denoted as Zone D on FEMA flood zone maps. The Department of Water Resources has identified areas in the County that may be subject to the 100-year flood, but regulatory mapping has yet to be completed by FEMA. Additional infrastructure is built as development occurs in different regions of the county.

The County Flood Control District has an extensive system of facilities - including about 70 dams and 40 levees – designed to convey water away from developed areas to protect property. The County has adopted a Master Stormwater System Maintenance Plan to facilitate timely maintenance of its more than 500 facilities. For future development proposals, the County does not require the payment of impact fees to pay for the construction and maintenance of regional infrastructure, although each project is required to include drainage improvements. This is an ongoing issue in outlying areas not located near service providers.

Typical water quality issues for surface water include excess sediments and nutrients, protection of endangered plant and animal species, wastewater disposal problems (septic tanks) and invasive plant eradication.

1.4 Groundwater Management

Groundwater resource protection in San Bernardino County is also an important issue given historical land subsidence and the high demand for water from urban uses. The 2014 Sustainable Groundwater Management Act (SGMA) requires qualifying entities to form groundwater sustainability agencies and prepare groundwater sustainability plans (GSPs). These are areas that are critically overdrafted, designated high and medium priority basins, and unadjudicated.[1] The majority of high and medium priority basins in the county are adjudicated; only a handful of groundwater basins are unadjudicated and would be required to prepare a GSP by 2022. The County has also adopted its Desert Groundwater Management Ordinance to protect groundwater resources in the unincorporated and unadjudicated desert region (Ordinance 33.06551).

Long-term groundwater management will remain a concern for decades to come, in particular until the long-term drought subsides. Although the majority of the groundwater basins in San Bernardino County are adjudicated, there continues to be ongoing discussion at the Department of Water Resources and other agencies regarding the effectiveness of adjudicated agreements in achieving the long-term goals articulated in the SGMA. The Sustainable Groundwater Management Act asks watermasters or managers of adjudicated areas to submit certain values and

[1] In adjudicated groundwater basins, the amounts of water that can be extracted by each person or entity holding rights to such water are set forth in a court judgement.

documents to DWR by April 1 of each year. This will allow for the monitoring of the elevation, use, and storage of groundwater throughout different basins in California.

1.5 Groundwater Quality

There are common water quality issues throughout San Bernardino County identified by the State and Regional Water Boards. These are due to a combination of issues, including historical and current agricultural, industrial, military, and other land uses within the county. The most typical water quality issues for groundwater include high total dissolved solids (TDS) and nitrate levels, solvent plumes, toxic constituents (metals), wastewater disposal problems (septic tanks), groundwater recharge and aquifer water level management.

The California Water Resources Control Board and its regional boards implement a variety of programs to address the quality of the groundwater.[2] Key statewide programs include: 1) monitoring groundwater contamination; 2) setting groundwater quality objectives to protect beneficial uses of groundwater; 3) implementing programs that regulate the discharge of pollutants to the ground, and cleanup of pollution that has contaminated groundwater; and 4) providing grants and loans for projects that protect the quality of the groundwater. The agency also works with other state and federal entities to cleanup groundwater contamination.

1.6 Drinking Water Quality

Water purveyors are solely responsible for ensuring that groundwater they provide to customers meets state and federal drinking water standards. The responsibility to control and treat groundwater is the sole responsibility of water purveyors. Ultimately, all water delivered by water purveyors and private wells must meet or exceed water quality standards established by state and federal drinking water regulations. Many of the water collection facilities that provide potable water from either groundwater or surface water sources actively treat the water before distribution to the communities. Potential impairments to drinking water (e.g., uranium, hexavalent chromium or Cr6[3], and arsenic) are present throughout the County.

[2] San Bernardino County is within the jurisdiction of three regional water quality control boards: the Santa Ana RWQCB for the southwest part of the County; the Lahontan RWQCB for the central and western desert portions of the County; and the Colorado River RWQCB for the southeast and south-central desert portions of the County.

[3] Note that this report evaluates hexavalent chromium based on the standard set by the California Department of Public Health in 2014: 10 parts per billion (ppb). On May 5, 2017, the Sacramento Superior Court issued a decision that the state's water regulation of hexavalent chromium is not economically feasible and must be withdrawn (a copy of the Court's Order can be read here). The State Water Board is reviewing the order and could appeal or develop a new standard. While the 10 ppb standard is withdrawn, the existing standard for total chromium will continue to limit hexavalent chromium to 50 ppb.

2 WATER SERVICES

The unincorporated areas within San Bernardino County have access to domestic water sources that are generally supplied through local and imported water—with approximately 85% of the domestic water supplied by local groundwater sources and the remaining 15% supplied by imported purchased water. Imported water is primarily purchased from the Metropolitan Water District through the State Water Project as a supplemental source to local groundwater supplies. While several regional water wholesalers distribute this imported water throughout the County, numerous retail and private water purveyors manage the majority of the groundwater pumping and distribution.

The following includes a brief discussion on hauled water and County Special Districts, followed by more detailed discussions of water services in the 12 communities associated with the Detailed Community Plans. Water services provided through community service districts (independent, self-governed entities), are referenced in the appropriate community discussion. Maps of water service providers and a detailed matrix of agency-supplied information by geographic area can be found in Appendix B.

2.1 Regulation of Hauled Water

2.1.1 County Regulation of Hauled Water

The County's current practice is to not permit hauled water as a water source for new residential construction due to the risk of contamination. This practice was supported by a joint 2003 recommendation of the California Conference of Directors of Environmental Health and the State Department of Health Services Division of Drinking Water and Environmental Management. The State Drinking Water Program was transferred to the State Water Resources Control Board Division of Drinking Water on July 1, 2014.

The County Development Code Section 84.21.030, subdivision (i)(3)(C), authorizes Environmental Health Services (EHS) to approve or deny the residential use of hauled water. A limited number of residences have historically used hauled water and have been allowed to continue (grandfathered). If one of these residences were to be destroyed by a natural disaster, pursuant to Development Code Section 86.15.050 and EHS policy, the owner would be permitted to rebuild in-kind, including continued utilization of hauled water as a water source. Hauled water is not a permitted source of water for multifamily dwellings pursuant to County Development Code Section 84.16.040, subdivision (i).

2.1.2 State Regulation of Hauled Water

SB 1262

Effective January 1, 2017, the County will be prohibited from considering hauled water as a source of water for any project as defined in California Water Code Section 10912 (including residential

subdivisions with 500 or more units) that the County determines is subject to the California Environmental Quality Act (CEQA).

SB 1263

Effective January 1, 2017, the County will be prohibited from issuing a building permit for the construction of a new residential development as defined in California Government Code Section 65008 (including a single-family residence, a multifamily residence, and manufactured homes) where a source of water supply is water transported by a water hauler, bottled water, a water-vending machine, or a retail water facility. The rebuilding of residences destroyed by a natural disaster is exempt from the prohibition.

2.2 County Special Districts

County Special Districts serves as a water supplier to unincorporated communities through county service areas (CSAs), community facilities districts (CFDs), as well as three regional parks, the High Desert Detention Center, and the Gilbert Street Complex.

CSAs are separate legal entities authorized by California laws and formed by the County Board of Supervisors to fund the County's provision of services, capital improvements and financial flexibility. They are formed and tailored to meet the specific needs of an area so that the property owners only pay for the services they that they want. Some of the unincorporated areas within San Bernardino County are exclusively serviced by these CSAs. CSA's in the County are generalized characterized by small and remote service areas with primary customers being single family residential parcels.

The CSAs provide water to approximately 7,939 residential and commercial connections. The water supply is from the Mojave and Morongo groundwater basins, with water pumped from and treated at active wells in each CSA. Groundwater meets the total annual demand of 3,850 acre-feet (ac-ft) for all CSAs. The CSAs distribute the pumped groundwater to its customers through a series of storage tanks and miles of distribution pipelines.

Special Districts also administers CFDs (aka Mello-Roos), which are formed when the property owners in a geographic area agree to impose a special property tax on the land to fund infrastructure improvements. Based on future tax revenue, CFDs seek public financing through bonds. A Mello-Roos tax must be approved by 2/3 of the voters in a proposed district. There are three CFDs that finance public improvements related to water services in unincorporated county areas.

A summary of the areas receiving water service or water-related public facility improvements is provided in Table 4 and subsequent narratives.

Table 4: Water Services Areas through County Special Districts

Reference	Name	Geographic Area	Other Services/Facilities
CSA 42	Oro Grande	North of Victorville	Sewer service
CSA 64	Spring Valley Lake	Between Victorville/Apple Valley	Sewer service
CSA 70 F	Little Morongo Heights	Morongo Valley	--
CSA 70 J	Oak Hills	South of Hesperia	--
CSA 70 CG	Cedar Glen	Lake Arrowhead	--
CSA 70 W3	Hacienda Heights	Morongo Valley	--
CSA 70 W4	Pioneertown	North of Yucca Valley	--
CFD 2002-1	Kaiser Commerce Center	Western Fontana SOI	Roads, sewer, storm drains, public utilities
CFD 2003-1	Citrus Plaza	Redlands, uninc. "Donut Hole"	Roads, sewer, storm drains, traffic mitigation
CFD 2006-1	Lytle Creek North	South of Cajon Pass, west of I-15	Sewer, wastewater treatment, roads and crossings, drainage and flood protection, parks, open space and trails
--	Calico Ghost Town	Calico Ghost Town Regional Park	--
--	Moabi Regional Park	Moabi Regional Park	--
--	Mojave Forks Regional Park	Mojave Forks Regional Park	--
--	High Desert Detention Center	City of Adelanto	--
--	Gilbert Street Complex	City of San Bernardino	--

2.2.1 CSA 42 – Oro Grande

The Oro Grande CSA was established in 1965 to provide water services to what used to be the Riverside Cement Company's "Company Town", in the area five miles northwest of the City of Victorville. The CSA uses user fees, connection fees, and service charges to provide water services to 136 customers. The water supply is obtained through a system of four wells located along the Mojave River, and stored in a 246,000-gallon tank. As of 2015, there were 108 single family residence, 7 multifamily residence, and 5 commercial or industrial connections. CSA 42 also provides sewer services.

2.2.2 CSA 64 – Spring Valley Lake

The Spring Valley Lake CSA was established in 1968, just before The Boise Cascade Home and Land Corporate bought the land to turn it from ranch and farmland into a community. The area uses property taxes, user fees, and services charges to provide services to 3,843 customers and maintain five wells, one booster station, and three water tanks. Spring Valley Lake is in the City of Victorville sphere of influence (SOI) and is adjacent to the Town of Apple Valley. CSA 64 also provides sewer services.

2.2.3 CSA 70 F – Little Morongo Heights

The Little Morongo Heights CSA in Morongo Valley was established in 1971. The district currently services 84 customers using three wells, one booster station, and a reservoir that stores

260,000 gallons of water. The area uses user fees and service charges, and also includes Requirements to fund and transfers.

Potential concerns include groundwater with elevated levels of radiation (gross alpha and uranium). As measured in water samples from January 2016, gross alpha levels were 31 picocuries per liter (pCi/L), which is above the standard or maximum contaminant level (MCL) of 15 pCi/L. As measured in water samples from March 2017, uranium levels were 42 picocuries per liter (pCi/L) and the running annual average (RAA) was 40 pCi/L, which is above the MCL of 20 pCi/L. County Special Districts is seeking grant funding for water treatment facilities to address these concerns. There are no requirements for customers to use alternative water supplies (e.g., bottled water).

2.2.4 CSA 70 CG – Cedar Glen

The Cedar Glen CSA was established in 2005 and provides operation and maintenance of water connections for 332 customers. The district is funded through user fees, service charges, and special assessments. Water is purchased from the Crestline-Lake Arrowhead Water Agency.

2.2.5 CSA 70 J – Oak Hills

The Oak Hills CSA, established in 1971, provides services to approximately 11,577 customers in the City of Oak Hills SOI through 3,219 metered water connections, and maintains five wells, five booster stations, nine water storage reservoirs, and 148 miles of water pipelines. It is mainly funded by user fees and services charges.

Potential concerns include groundwater with elevated levels of hexavalent chromium or Cr6. As of December 2016, the level of Cr6 was determined to have a RAA of 20 micrograms per litter (ug/L), which is above the MCL of 10 ug/L. A successful pilot test study was conducted in 2016 to remove the hexavalent chromium by weak base anion resins in well #5. A full-scale design is currently under consideration, with an estimated annual operation cost of $120,000 for well #5. Per state law, Cr6 levels must be reduced below the MCL by January 2020. There are no requirements for customers to use alternative water supplies (e.g., bottled water).

2.2.6 CSA 70 W-3 – Hacienda

The Hacienda CSA was established in 1976 and provides operation and water maintenance for 167 customers. The zone maintains two wells, two booster stations, and two storage reservoirs. It's main funding sources are user fees and service charges. Hacienda Heights is in the Morongo Valley.

Potential concerns include groundwater with elevated levels of radiation (gross alpha and uranium). As measured in water samples from August 2015, gross alpha levels were 20 to 31 pCi/L, which is above the MCL of 15 pCi/L. As measured in water samples from January 2017, uranium levels were 19 to 26 pCi/L and the RAA was 22 pCi/L, which is above the MCL of 20 pCi/L. County Special Districts is seeking grant funding for water treatment facilities to address

these concerns. There are no requirements for customers to use alternative water supplies (e.g., bottled water).

2.2.7 CSA 70 W-4 – Pioneertown

The Pioneertown CSA was established in 1980 and provides water to 120 customers, maintains two wells and two storage reservoirs. These are funded through user fees and service charges. Pioneertown is north of Yucca Valley.

Potential concerns include groundwater with elevated levels of arsenic, fluoride, and radiation (gross alpha and uranium). As measured in water samples from March 2017, arsenic levels were 62 ug/L, which is above the MCL of 10 ug/L. As measured in water samples from March 2017, fluoride levels were 0.24 to 8.0 milligrams per liter (mg/L) and the RAA was 2.7 mg/L, which is above the MCL of 2.0 mg/L. As measured in water samples from January 2016, gross alpha levels were 17 pCi/L, which is above the MCL of 15 pCi/L. As measured in water samples from January 2016, uranium levels were 10 pCi/L, which is above the MCL of 20 pCi/L.

To address water quality issues, County Special Districts prepared and submitted a construction grant application seeking $5,045,000 under the State's Drinking Water State Revolving Fund to pay for the construction of a pipeline to interconnect with the Hi-Desert Water District. Under that plan, a pipeline paralleling Pioneertown Road with pumping stations would deliver Hi-Desert Water District water from Yucca Valley to Pioneertown.

Regarding elevated arsenic and radiation levels, there are no requirements for customers to use alternative water supplies (e.g., bottled water). For elevated fluoride levels, County Special Districts recommended that children under the age of nine use an alternative source of water that is low in fluoride.

2.2.8 CFD 2002-1 – Kaiser Commerce Center

CFD 2002-1 was formed in 2002 to finance public improvements for the Kaiser Commerce Center project formerly located on the old Kaiser Steel site in Fontana's western SOI. The CFD is authorized to bonds for the acquisition and improvement of public facilities, including water transmission and distribution facilities. Other authorized facilities include public roadways, sewer facilities, storm drain facilities, and general public utilities.

2.2.9 CFD 2003-1 – Citrus Plaza

CFD 2003-1 was formed in 2003 to finance public infrastructure facilities, including sewer, water, roadway, storm drain and traffic mitigation improvements to the Citrus Plaza development in the unincorporated area known as the "Donut Hole." The Donut Hole is an unincorporated pocket surrounded by incorporated cities, but it is not a part of the Redlands SOI. This area is also subject to a tax sharing agreement (2003, No. 03-0856), which apportions sales and use tax revenue (90% to the City of Redlands through 2028 or until annexation). The City provides sewage

collection/treatment, water service, and law enforcement services. The County contracts with the City for fire protection and emergency medical services.

2.2.10 CFD 2006-1 – Lytle Creek

CFD 2006-1 was formed in 2007 to finance public facilities, including street, water, sewer, storm drain, flood control, and park and recreation improvements for the Lytle Creek North Community development, located just west of Interstate 15 in the San Gabriel Mountains. The CFD currently consists of 1,396 taxable parcels and five improvement areas, with and a sixth improvement area under consideration.

2.2.11 County Regional Parks

Calico Ghost Town Regional Park

The Calico Ghost Town Regional Park is in the Calico Mountains of the Mojave region of San Bernardino County. The water system consists of three wells (only 1 active), two water reservoirs with a capacity of 100,000 gallons, and approximately four miles of water line. There are 25 water connections.

Potential concerns include groundwater with elevated levels of arsenic and fluoride. As measured in water samples from October 2016, arsenic levels were 22 to 24 ug/L and the RAA was 22 ug/L, which is above the MCL of 10 ug/L. As measured in water samples in the fourth quarter 2016, the RAA was 2.6 mg/L, which is above the MCL of 2.0 mg/L.

Regarding elevated arsenic, there are no requirements for customers to use alternative water supplies (e.g., bottled water). For elevated fluoride levels, County Special Districts recommended that children under the age of nine use an alternative source of water that is low in fluoride.

Moabi Regional Park

The Moabi Regional Park is in the Needles area of San Bernardino County. The water system consists of two wells and two water reservoir tanks with a total capacity of 240,000 gallons. The regional park consists of 100 mobile home sites, 75 RV sites, 188 camp sites, 14 rental cabins, and 13 restrooms.

Potential concerns include groundwater with elevated levels of hexavalent chromium or Cr6. As of December 2016, the level of Cr6 was determined to have a RAA of 11 ug/L, which is above the MCL of 10 ug/L. Per state law, Cr6 levels must be reduced below the MCL by January 2020. There are no requirements for customers to use alternative water supplies (e.g., bottled water).

Mojave River Forks Regional Park

The Mojave River Forks Regional Park is in the Summit Valley area of San Bernardino County. The water system consists of one well and one water reservoir tank with a capacity of 50,000 gallons. There are 53 water connections, one residence, and 25 RV spaces and 25 campsites.

2.2.12 High Desert Detention Center

The High Desert Detention Center (HDDC) is in the City of Adelanto and currently provides safe, secure housing for over 700 inmates and over 160 safety, general, and medical employees. County Special Districts operates a Class III water treatment facility for the HDDC. The system consists of a single vertical well, pre-filter, reverse osmosis system, calcite treatment, chlorinator, storage tank capacity of 226,000 gallons and four variable frequency drive motors. The system has a backup water connection to City of Adelanto.

2.2.13 Gilbert Street Complex

The Gilbert Street Complex Water System is owned by the County of San Bernardino and is operated by County Special Districts. The system provides water services to the numerous buildings and a juvenile detention center, and consists of one well and one reservoir with a capacity of 250,000 gallons of water. The system has an auxiliary connection to the San Bernardino Municipal Water District for emergencies. A booster station serves the Juvenile Detention Center and consists of a pressure tank and two booster pumps.

2.3 Bloomington

Bloomington is locally serviced by West Valley Water District (WVWD), Fontana Water Company (FWC) and Marygold Mutual Water Company (MMWC) which all serve as the retail water purveyors. A WVWD water system facility map, UWMP and Water Master Plan have been obtained and have been preliminarily reviewed. More information/analysis regarding the Bloomington community is provided under separate cover.

2.4 Bear Valley Communities

The Bear Valley plan area encompasses approximately 135 square miles surrounding Big Bear Lake in the San Bernardino National Forest. It is bound to the southwest by the Hilltop Community and to the north by Lucerne Valley. Included within the Bear Valley Community are the communities of Baldwin Lake, Big Bear City, Erwin Lake, Fawnskin/Northshore, Lake Williams, Moonridge and Sugarloaf. Groundwater derived from the Bear Valley Groundwater Basin serves as the primary source of regional water throughout this community.

2.4.1 Baldwin Lake

Baldwin Lake is locally serviced by the Big Bear City Community Services District, which serves as the retail water purveyor. The BBCCSD service area encompasses approximately 21 square miles and 6,018 connections. BBCCSD draws water from a singular source: groundwater developed through springs, vertical wells and horizontal (slant) wells.

Water System facility maps have been obtained for the BBCCSD service area and the current infrastructure appears acceptable to meet the demands of the current land uses. In addition, a water master plan has been obtained for BBCCSD and the existing system appears to be in good condition with no pitfalls readily identified. The BBCCSD water distribution system includes four

reservoirs with a capacity of 6.25 mg, 82 miles of pipeline, 10 active vertical wells, 2 slant wells, 2 springs and 6 booster stations. BBCCSD plans to pump groundwater to meet the projected water use for the planning horizon and currently pumps 1,307 ac-ft/year.

The 2015 UWMP provides a forecast for water supply and demand within the district boundary based on population projections. According to the information available, the community of Baldwin Lake appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years through 2035. There are no reports of any major system deficiencies or current service inadequacies.

2.4.2 Big Bear City

Big Bear City is locally serviced by the BBCCSD, which serves as the retail water purveyor. A discussion regarding the BBCCSD water system can be found above. According to the information available, the community of Big Bear City appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years through 2035. There are no reports of any major system deficiencies or current service inadequacies.

2.4.3 Erwin Lake

Erwin Lake is locally serviced by the City of Big Bear Lake Department of Water and Power (BBLDWP), which serves as the retail water purveyor. The BBLDWP service area encompasses approximately 9.3 square miles. BBLDWP primarily produces potable water from groundwater wells (through pumping or by gravity) and does not currently use surface or imported water to meet its water demand.

Water System facility maps were obtained for the BBLDWP service area and the current infrastructure appears acceptable to meet the demands of the current land uses. In addition, a water master plan was obtained for BBLDWP and the existing system appears to be in good condition with no pitfalls readily identified. The BBLDWP water distribution system includes five water systems with 15 separate pressure zones, 176 miles of pipeline, 62 wells, 16 reservoirs and12 booster stations. BBLDWP plans to pump groundwater to meet the projected water use for the planning horizon and currently pumps 2,228 ac-ft/year. According to the 2015 UWMP, the estimate of perennial yield available to the BBLDWP is 3,100 ac-ft/year.

The 2015 UWMP provides a forecast for water supply and demand within the district boundary based on population projections. According to the information available, the community of Erwin Lake appears to have adequate supplies and infrastructure to meet projected water demands during average single-dry, and multiple-dry years through 2040. There are no reports of any major system deficiencies or current service inadequacies.

2.4.4 Fawnskin/Northshore

Fawnskin/Northshore is locally serviced by BBLDWP, which serves as the retail water purveyor. A discussion regarding the BBLDWP water system can be found above. According to the

information available, the community of Fawnskin/Northshore appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years. There are no reports of any major system deficiencies or current service inadequacies.

2.4.5 Lake Williams

Lake Williams is locally serviced by BBLDWP, which serves as the retail water purveyor. A discussion regarding the BBLDWP water system can be found above. According to the information available, the community of Lake Williams appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years. There are no reports of any major system deficiencies or current service inadequacies.

2.4.6 Moonridge

Moonridge is locally serviced by BBLDWP, which serves as the retail water purveyor. A discussion regarding the BBLDWP water system can be found above. According to the information available, the community of Moonridge appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years. There are no reports of any major system deficiencies or current service inadequacies.

2.4.7 Sugarloaf

Sugarloaf is locally served by BBLDWP, which serves as the retail water purveyor. A discussion regarding the BBLDWP water system can be found above. According to the information available, the community of Sugarloaf appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years. There are no reports of any major system deficiencies or current service inadequacies.

2.5 Crest Forest Communities

The Crest Forest plan area encompasses approximately 18 square miles and is bound to the east by the Lake Arrowhead Community. Included within the Crest Forest Community are the communities of Cedarpines Park, Crestline, Lake Gregory, and Valley of Enchantment. CLAWA serves as the primary regional water wholesaler for this Community. As such, CLAWA contracts for California State Water Project (SWP) water, and in turn sells this water to public and private retail water purveyors within the CLAWA service area.

2.5.1 Cedarpines Park

Cedarpines Park is locally serviced by Cedarpines Park Mutual Water Company (CPPMWC), which serves as the retail water purveyor. According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft of water annually do not need to develop and implement an Urban Water Management Plan. Because Cedarpines Park falls into this exempt category, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time. In addition, cooperation from CPPMWC has been restrictive so the County

of San Bernardino will be relied upon to acquire the pertinent existing conditions information for future inclusion in this report.

2.5.2 Crestline

Crestline is locally serviced by the Crestline Village Water District (CVWD), which serves as the retail water purveyor. The CVWD service area encompasses approximately 5 square miles. CVWD produces water locally from 52 approved groundwater sources located on 22 individual sites and purchases supplemental water from CLAWA. CVWD also has 12 water storage tanks with a total storage capacity of 8.84 million gallons. According to the 2010 UWMP, CVWD serves approximately 4,957 active service connections with 96% of those connections classified as residential.

Neither water system facility maps nor a water master plan has been obtained at this time for CVWD and a detailed assessment of the existing infrastructure can only be postulated from the available data. The 2010 UWMP vaguely describes the current system as containing "many miles of pipelines, of varying ages, types and conditions".

The 2015 UWMP provides a forecast for future water supply and demand within the district boundary based on population projections. According to the information available, the community of Crestline appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years through 2035. There are no reports of any major system deficiencies or current service inadequacies.

2.5.3 Lake Gregory

Lake Gregory is locally serviced by CVWD, the retail water purveyor. A discussion regarding the CVWD water system can be found above in the discussion of the Crestline community. According to the information available, Lake Gregory appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years through 2035. There are no reports of any major system deficiencies or current service inadequacies.

2.5.4 Valley of Enchantment

Valley of Enchantment is locally serviced by Valley of Enchantment Mutual Water Company (VOEMWC), which serves as the retail water purveyor. According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft of water annually do not need to develop and implement an Urban Water Management Plan. According to a 2014 Valley of Enchantment shareholder press release, VOEMWC purchased 67% of its total water supply from CLAWA and produced 33% from company well sources in 2013. Because Valley of Enchantment falls into this exempt category, water system information assessment is not readily available and a detailed existing conditions summary is not possible at this time.

2.6 Hilltop Communities

The Hilltop plan area encompasses approximately 40 square miles and is bound to the northwest by the Lake Arrowhead Community and to the east by the Bear Valley Community. Included within the Hilltop Community are the communities of Arrowbear Lake, Green Valley Lake, and Running Springs. CLAWA serves as the primary regional water wholesaler for this Community. As such, CLAWA contracts for SWP water, and in turn sells this water to public and private retail water purveyors within the CLAWA service area.

2.6.1 Arrowbear Lake

Arrowbear Lake is locally serviced by Arrowbear Park County Water District (APCWD), which serves as the retail water purveyor. According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft of water annually do not need to develop and implement an Urban Water Management Plan. Because Arrowbear Lake falls into this exempt category, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

2.6.2 Green Valley Lake

Green Valley Lake is locally serviced by Green Valley Mutual Water Company (GVMWC), the retail water purveyor. According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft of water annually do not need to develop and implement a UWMP. Because Green Valley Lake falls into this exempt category, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time. In addition, cooperation from GVMWC has been restrictive so the County of San Bernardino will be relied upon to acquire the pertinent existing conditions information for future inclusion in this report.

2.6.3 Running Springs

Running Springs is locally serviced by the Running Springs Water District (RSWD), the retail water purveyor. The RSWD water system supplies water to over 4,500 people with a distribution system encompassing approximately 7 square miles. RSWD draws water from three different sources: purchased water from CLAWA, purchased water from Arrowbear Park County Water District (APCWD) and groundwater from 12 wells. The current mix of water supplied within the distribution system is 53% groundwater and 47% purchased water. According to the 2010 UWMP, the RSWD planned to construct new wells so an update to this breakdown may be forthcoming.

Water System facility maps have been obtained for the entire water network within the RSWD service area and the current infrastructure appears acceptable to meet the demands of the current land uses. In addition, a water master plan has been obtained for RSWD and the existing system appears to be in good condition with no pitfalls readily identified. The RSWD water supply system includes 13 water storage tanks, 14 booster (pumping) stations and approximately 43 miles of

pipes ranging in size from 2" to 16" in diameter. Pipe materials in the distribution system consist of asbestos-concrete (AC) pipe, PVC pipe and steel pipe.

In addition, the 2010 UWMP provides a forecast for future water supply and demand within the district boundary based on population projections. According to the information available, RSWD has adequate supplies to meet demands throughout the planning period (through the year 2025) assuming they will continue to be able to purchase water from CLAWA and APCWD. There are no reports of any major system deficiencies or current service inadequacies.

2.7 Helendale

The Helendale plan area encompasses 5 square miles and a population of 5,623. The Helendale Community Services District (HCSD) supplies water from local groundwater sourced by the Mojave River Regional aquifer. The MWA replenishes the aquifer with imported water primarily from the SWP and serves as the regional water wholesaler for Helendale. The MWA maintains a comprehensive groundwater monitoring program and the 2015 UMWP states that water levels in the Helendale plan area (Alto Subarea) appear to be in regional balance although portions of the subarea have shown continued historical decline. Ultimately, supply is anticipated to continue to meet future demand based on population growth projections for this plan area.

According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft/year of water annually do not need to develop and implement an Urban Water Management Plan. Because HCSD falls into this exempt category, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

2.8 Joshua Tree

The Joshua Tree area is locally serviced by the Joshua Basin Water District (JBWD), which encompasses approximately 100 square miles and serves more than 4,200 water connections. JBWD draws water from two groundwater sub-basins as its sole source of water.

The underground basins are not adjudicated; there are no deeded rights to withdraw water. JBWD is responsible for overall management of water resources pursuant to their Groundwater Management Plan. MWA replenishes the aquifer with imported water primarily obtained from the SWP and serves as the regional water wholesaler. JBWD is in the process of constructing a basin recharge system to use SWP water via MWA's Morongo Basin Pipeline and lessen the overdraft situation. The MWA maintains a comprehensive groundwater monitoring program and the 2015 UWMP states that the Joshua Tree area (Morongo Subarea) is in overdraft condition. As shown in the UWMP analyses, JBWD has adequate supply to meet demands during average, single-dry and multiple-dry years throughout the planning period (through 2035). While during the dry years, the groundwater basin will continue to be overdrafted to meet the supplies due to the lack of imported

supplies being available to recharge the basin, the planned imported SWP supply will lessen and offset the overdraft as much as possible.

Through an agreement with MWA, JBWD is entitled to 1,959 ac-ft/year of SWP water until 2022, which they cannot access without the extension of the Morongo Pipeline and construction of planned recharge facilities. Groundwater production from the underground basins has averaged 1,660 ac-ft/yr. According to the 2015 UWMP, JBWD obtains its water supply from 5 wells; two wells are in the Copper Mountain basin and three wells, along with the proposed recharge basins, are in the Joshua Tree Basin. Water System facility maps were obtained for the JBWD service area and the current infrastructure appears acceptable to meet the demands of the current land use.

According to the information available, the community of Joshua Tree appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years throughout the 20-year planning period (through the year 2040) to maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or current service inadequacies.

2.9 Lake Arrowhead Communities

The Lake Arrowhead plan area encompasses approximately 30 square miles and is bound to the west by the Crestline Community and to the southeast by the Hilltop Community. Included within the Lake Arrowhead Community are the communities of Blue Jay, Cedar Glen, Deer Lodge Park, Lake Arrowhead, Rim Forest, Sky Forest, and Twin Peaks. The Crestline-Lake Arrowhead Water Agency (CLAWA) serves as the primary regional water wholesaler for this Community as a whole. As such, CLAWA contracts for SWP water, and in turn sells this water to public and private retail water purveyors within the CLAWA service area.

2.9.1 Blue Jay

Blue Jay is locally serviced by CLAWA, the retail water purveyor. Although primarily serving as a water wholesaler, CLAWA does provide some direct service to retail customers such as those located within Blue Jay. According to the 2010 UMWP, there are approximately 14,750 active service connections in the entirety of the CLAWA service area with only 1,199 of those connections being served by CLAWA directly. Neither water system facility maps nor a water master plan has been obtained at this time and a detailed assessment of the existing infrastructure can only be postulated from the available data.

According to the information available, the community of Blue Jay appears to have adequate supplies and infrastructure to meet projected water demands during average and multiple-dry years through the year 2035, but may run into deficiencies by 2035 during single-dry years. The single-dry year scenario is based on a very conservative assumption that no Houston Creek supplies would be available despite historical availability during such years. There are otherwise no reports of any major system deficiencies or current service inadequacies.

2.9.2 Cedar Glen

Cedar Glen is locally serviced by CSA 70 Zone CG, which serves as the retail water purveyor. Cedar Glen maintains two in-service groundwater supply wells and approximately 22 miles of pipeline for water deliveries. Total population in the service area is 1,253 per LAFCO MSR data with 342 single family residential connections (no multi family or commercial/industrial connections). No information has been found for current and future water supply and demand assessments as they are not required to prepare an Urban Water Management Plan and a California Department of Water Resources survey was not available.

2.9.3 Deer Lodge Park

Deer Lodge Park is locally serviced by LACSD, the retail water purveyor. The LACSD water system boundary includes approximately 4,900 acres and services several environs within the Lake Arrowhead Community. LACSD draws water from three different sources: purchased water from CLAWA, surface water from Lake Arrowhead and groundwater from approximately 5 wells. Recycled water is also being produced from wastewater in limited capacity with the potential to expand the system in the future.

According to the 2015 Urban Water Management Plan (UWMP), LACSD has 7,800 water meters installed. Water System facility maps have been obtained for the entire water network within the LACSD service area and the current infrastructure appears acceptable to meet the demands of the current land use. A water master plan could not be obtained at this time so a detailed assessment of infrastructure can only be postulated from available data. The 2015 UWMP forecasts future water supply and demand within the district boundary based on population projections.

According to the information available, the community of Deer Lodge Park appears to have adequate supplies and infrastructure to meet projected water demands during average and multiple-dry years through the year 2035, but may run into deficiencies by 2040 during average and single-dry years. There are otherwise no reports of any major system deficiencies or current service inadequacies.

2.9.4 Lake Arrowhead

Lake Arrowhead is locally serviced by the Lake Arrowhead Community Services District (LACSD), which serves as the retail water purveyor. A discussion regarding the LACSD water system is can be found above. According to the information available, the LACSD appears to have adequate supplies and infrastructure to meet projected water demands during average and multiple-dry years through the year 2035, but may run into deficiencies by 2040 during average and single-dry years. There are otherwise no reports of any major system deficiencies or current service inadequacies.

2.9.5 Rim Forest

Rim Forest is locally serviced by LACSD, the retail water purveyor. A discussion regarding the LACSD water system can be found above. According to the information available, the community of Rim Forest appears to have adequate supplies and infrastructure to meet projected water demands during average and multiple-dry years through the year 2035, but may run into deficiencies by 2040 during average and single-dry years. There are otherwise no reports of any major system deficiencies or current service inadequacies.

2.9.6 Sky Forest

Sky Forest is locally serviced by Sky Forest Mutual Water Company (SFMWC), the retail water purveyor. According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft/year of water annually do not need to develop and implement an Urban Water Management Plan. Because Sky Forest falls into this exempt category, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

2.9.7 Twin Peaks

Twin Peaks is locally serviced by Alpine Water Users Association (AWUA), the retail water purveyor. According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft of water annually do not need to develop and implement an Urban Water Management Plan. Because Twin Peaks falls into this exempt category, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

2.10 2.10 Lucerne Valley

The Lucerne Valley plan area encompasses approximately 433 square miles and is bound directly to the south by the Bear Valley Community. Included within this plan area are 10 private water purveyors that serve their respective customers. The water companies include Bar H Mutual Water Company, Center Water Company, Desert Dawn Mutual Water Company, Desert Springs Mutual Water Company, Golden State Water Company (Lucerne Valley System), Gordan Acres Water Company, Jubilee Mutual Water Company, Lucerne Valley Mutual Water Company, Lucerne Vista Mutual Water Company and West End Mutual Water Company.

All of the water retailers listed above supply water to their customers from local groundwater from the Lucerne Valley Groundwater Basin. The Mojave Water Agency (MWA) replenishes the aquifer with imported water primarily obtained from the SWP and serves as the regional water wholesaler. The MWA maintains a comprehensive groundwater monitoring program and the 2015 UMWP states that water levels in the Lucerne Valley plan area (Este Subarea) have remained stable indicating a relative balance between recharge and discharge. Ultimately, supply is anticipated to continue to meet future demand based on population growth projections for this plan

area. Neither water system facility maps nor a water master plan has been obtained at this time and a detailed assessment of the existing infrastructure can only be postulated from the available data

According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft/year of water do not need to develop and implement an UWMP. Because all 10 of the water companies servicing Lucerne Valley fall into this exempt category, and no additional information could be obtained from the majority of these water companies, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

2.11 Mentone

The Mentone plan area is locally serviced by the City of Redlands, which serves as the retail water purveyor. Currently, Redlands provides water to a population of about 78,000 within its service area with approximately 23,000 water connections. The service area encompasses approximately 36 square miles.

Redlands supplies local groundwater, surface water, and imported water from SBVMWD. The majority of water is obtained from the Santa Ana River, Mill Creek, and the San Bernardino and Yucaipa Basins. Redlands utilizes about 50% groundwater to meet annual water demand. Historically, Redlands has purchased supplemental water from SBVMWD only when surface water flows are not available to meet demands. Redlands system includes two surface water treatment plants, 20 wells, 37 booster pumps, 18 reservoirs, and nearly 400 miles of transmission and distribution lines. Redlands' average daily water consumption is estimated at 27 million gallons-per-day (MGD) with a maximum daily of 50 MGD in the summer. The entire water system has a 54-million-gallon maximum storage capacity and the Tate water treatment plant has a design capacity of 20 MGD.

Neither a water system facility maps nor a water master plan were furnished by Redlands, a meeting with the municipal utility indicated that adequate resources are available to meet current and future water demands with excess resources and expansion potential. A limiting factor to consider for future land use scenarios stems from Measure 'U' which limits the City's ability to only approve 125 new domestic water meters and 25 new commercial water meters in any given year on a first-come first-serve basis. According to the 2015 UWMP and the City, the community of Mentone has adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years through 2040. There are no reports of any major system deficiencies or current service inadequacies.

2.12 Muscoy

The Muscoy community is locally serviced by the Muscoy Mutual Water Company (MMWC), which serves as the retail water purveyor. MMWC draws groundwater as its singular source, which is delivered through 1,550 service connections. According to the UWMP Act, water suppliers who

directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft/year of water annually do not need to develop and implement an Urban Water Management Plan. Because MMWC falls into this exempt category, and no additional information could be obtained from MMWC, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

However, MMWC supplies water to their customers from local groundwater sourced by the San Bernardino Basin aquifer and pumped via wells. The San Bernardino Valley Municipal Water District (SBVMWD) replenishes the aquifer with imported water primarily obtained from the SWP and serves as the regional water wholesaler for Muscoy. According to the 2015 UWMP for SBVMWD, the community of Muscoy appears to have adequate supplies and infrastructure to meet projected water demands during average, single-dry, and multiple-dry years through 2035. There are no reports of any major system deficiencies or current service inadequacies.

2.13 Oak Glen

Oak Glen is locally serviced by Oak Glen Domestic Water Company (OGDWC), which serves as the retail water purveyor. According to the UWMP Act, water suppliers who directly or indirectly provide water for municipal purposes to no more than 3,000 customers, or supply less than 3,000 ac-ft of water annually do not need to develop and implement an Urban Water Management Plan. Because OGDWC falls into this exempt category, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

2.14 Phelan/Piñon Hills

The Phelan/Piñon Hills area covers 134 square miles and is served by two water purveyors: Phelan Piñon Hills Community Services District (PPHCSD)and Sheep Creek Water Company. Both agencies supply water from local groundwater sourced by the Mojave River Regional aquifer and pumped via wells. The MWA replenishes the aquifer with imported water primarily obtained from the SWP and serves as the regional water wholesaler. The MWA maintains a comprehensive groundwater monitoring program and the 2015 UMWP states that water levels in the Phelan/Piñon plan area (Alto Subarea) appear to be in regional balance although portions of the subarea have shown continued historical decline. Ultimately, supply is anticipated to continue to meet future demand based on population growth projections for this plan area.

PPHCSD's service area encompasses 119 square miles and provides water to 6,800 service connections, of which 99% are single-family homes. According to the 2015 UWMP, PPHCSD obtains its water supply from the local groundwater aquifer through 11 wells. PPHCSD's water distribution system consists of 353 miles of pipelines, 16 pressure zones, 35 storage reservoirs, 32 pressure-reducing stations and 24 booster bump stations. Neither water system facility maps nor a water master plan has been obtained for PPHCSD and a detailed assessment of the existing infrastructure can only be postulated from the available data. According to the information available, the community of Phelan/Piñon Hills appears to have adequate supplies and

infrastructure to meet projected water demands during average, single-dry, and multiple-dry years through 2040. There are no reports of any major system deficiencies or current service inadequacies.

An area of about 10 square miles centered at the south end of PPHCSD's service area is serviced by the Sheep Creek Mutual Water Company. Because Sheep Creek Water Company is considered exempt from the preparation of a UWMP, water system assessment information is not readily available and a detailed existing conditions summary is not possible at this time. In addition, cooperation from PPHCSD has been restrictive so the County of San Bernardino will be relied upon to acquire the pertinent existing conditions information for future inclusion in this report.

2.15 Other Unincorporated Areas

Data was also gathered for other areas in the unincorporated portion of San Bernardino County, including unincorporated spheres of influence (SOIs) and smaller communities that are generally farther away from urbanized areas. Based on information provided by water districts/purveyors, the vast majority of land within unincorporated SOIs receive water service from public agencies with adequate water supplies through 2040. Additional information can be found in Appendix B.

2.15.1 Communities on Wells

Other portions of unincorporated areas in San Bernardino County rely on groundwater extracted by wells as the primary source of drinking water. DEHS is responsible for permitting new wells. If a community area is not within the service area of a water purveyor, well water is allowed if all setback requirements and appropriate testing are met, and the well permit is approved. DEHS also recommends testing annually for bacteria, nitrates and any other contaminants of concern including arsenic, fluoride, iron, manganese and sulfur.

A list of unincorporated areas or communities that are reliant on wells (and are not covered by a CSA) is provided below.

- Adelanto SOI (portions)
- Colton SOI (east)
- El Mirage
- Loma Linda SOI (east)
- Lytle Creek
- Mt Baldy
- Newberry Springs

2.15.2 Community Service Districts

Three CSDs provide water service to unincorporated communities in the county.

Baker CSD

The Baker CSD provides water, sanitary sewer, trash collection, fire protection, television translators, road maintenance, street lighting, park and recreation including the Jesse Meyer Community Center, a public swimming pool, and a senior center (shared by the Baker Area Chamber of Commerce). The current service population is approximately 1,000.

Potential concerns include groundwater with elevated levels of gross alpha uranium and Cr6. As measured in water samples from June 2015, gross alpha uranium levels were 22-33 pCi/L, which is above the MCL of 15 pCi/L. As of June 2015, the level of Cr6 was measured at 7.3-19 ug/L, which is above the MCL of 10 ug/L. Per state law, Cr6 levels must be reduced below the MCL by January 2020. There are no requirements for customers to use alternative water supplies (e.g., bottled water).

Daggett CSD

The Daggett CSD provides water, streetlighting, fire protection, and park and recreation services. While the permanent population of this community is low (current service population approximately 1,000), the services are also used by travelers passing through along Interstate 40. Water production rights are determined by the adjudication of the Mojave Water Basin, with a based annual production of 304 ac-ft and a 40% free production allowance (122 ac-ft) for 2017-18.

Newberry CSD

The Newberry CSD provides water, sewer, refuse, fire protection, park and recreation, police, and streetlighting services. The CSD utilizes water from local wells for its facilities and fire protection purposes. While the permanent population of this community is low (current service population approximately 2,071), the services are also used by travelers passing through along Interstates 15 and 40.

3 WASTEWATER SERVICES

The Valley Region of San Bernardino County contains the most public wastewater collection/treatment facilities and most communities there are connected to one of these systems. The Mountain Region also contains regional treatment facilities for the associated communities. While most of the communities are connected to these systems, some communities still rely on private sewage treatment systems (septic). Most communities in the Desert Region are serviced by private septic systems, however, there are limited sewer service agencies in the region.

The following includes a brief discussion on wastewater regulation and County Special Districts, followed by more detailed discussions of wastewater services in the 12 communities associated with the Detailed Community Plans. Wastewater services provided through community service districts (independent, self-governed entities), are referenced in the appropriate community discussion. Maps of wastewater service providers and a detailed matrix of agency-supplied information by geographic area can be found in Appendix B.

3.1 Regulation of Wastewater

3.1.1 County Regulation of Wastewater

The County of San Bernardino adopted a Local Area Management Program (LAMP) to comply with the state's onsite wastewater treatment systems (OTWS) policy. The LAMP provides minimum standards and requirements for the treatment and disposal of sewage through OWTS when no connection to a sewer is available. Requirements for new development include siting standards for OWTS located near drinking water wells, impaired waterways, sources of groundwater, and other specific land uses. Regulations include minimum lot size, residential density, minimum setback requirements, natural ground slope and percolation, OWTS design specifications, and other criteria. In addition, OTWS are not allowed in certain areas of the county where a moratorium exists due to the high concentration of existing OWTS or proximity to groundwater or surface water sources. These communities include:

- Grand Terrace (County Service Area 70, Improvement Zone H)
- Yucaipa – Calimesa
- Lytle Creek (above 2,600 ft MSL)
- Mill Creek (above 2,600 ft MSL)
- Bear Valley (including Baldwin Lake drainage area)
- Lahontan Regional Water Quality Control Board Prohibition Areas 1-5

Oversight of OWTS installation and maintenance involves multiple County divisions. The Building and Safety Division is responsible for issuing permits for new construction, replacement, and repair of OWTS; reviewing plot plans for new and replacement OWTS; retaining permit

information; and complying with LAMP reporting requirements. The Building and Safety Division requires DEHS approval for OWTS proposals when the OTWS is in a prohibition area, or within the Advanced Protection Management Program area.

DEHS is also responsible for issuing permits for alternative treatment systems; reviewing percolation reports and alternative treatment proposals for new and replacement systems in high risk residential areas and commercial projects; investigating and storing complaints for OWTS in multi-family dwellings (3 or more units); and complying with LAMP reporting requirements.

The Division of Code Enforcement Investigating complaints for overflowing/failed septic tanks for single family residences and two-unit dwellings, and complying with LAMP reporting requirements.

3.1.2 State Regulation of Wastewater

AB 885

The State Water Resources Control Board implements regulations to reduce the impact of wastewater sources on groundwater quality in accordance with state law (AB 885), through its water quality control policy for siting, design, operation, and maintenance of OWTS (Resolution No. 2012-0032). This policy establishes a statewide, risk-based, tiered approach for the regulation and management of OWTS installations and replacements that have affected, or will affect, groundwater or surface water to a degree that makes it unfit for drinking water or other uses, or cause a health or public nuisance condition. RWQCBs incorporated the standards established in the OWTS Policy, or standards that are more protective of the environment and public health, into their water quality control plans. Implementation is overseen by the state and regional water quality boards and local agencies (e.g., county and city departments and independent districts).

3.2 County Special Districts

County Special Districts provides sewer services to unincorporated communities through county service areas (CSAs) and community facilities districts (CFDs).

Ten county service areas (CSAs) provide sewer services to approximately 11,484 residential and commercial connections, serving small and/or remote areas. Special Districts collects and transports sewage flow over its miles of collection pipelines to local treatment facilities or to a third-party treatment provider. For the CSAs that do not have treatment facilities, Special Districts has treatment agreements with Victor Valley Wastewater Reclamation Authority (VVWRA), Running Springs Water Agency, and Big Bear Area Regional Wastewater Agency (BBARWA).

In general, the Special Districts operates and maintains each CSA as a self-supporting enterprise. CSAs are formed and tailored to meet the specific needs of an area so that the property owners only pay for the services they that they want. As self-supporting enterprises, the water and sewer rates should provide sufficient levels of revenue to meet all operation and maintenance expenses,

debt service requirements, routine annual replacements of capital improvements, and other requirements.

Special Districts also administers CFDs (aka Mello-Roos), which are formed when the property owners in a geographic area agree to impose a special property tax on the land to fund infrastructure improvements. Based on future tax revenue, CFDs seek public financing through bonds. A Mello-Roos tax must be approved by 2/3 of the voters in a proposed district. There are two CFDs that finance public improvements related to wastewater services in unincorporated county areas.

A summary of the wastewater CSAs and CFDs is provided in Table 5 and maps are included in Appendix B.

Table 5: Wastewater Services Areas through County Special Districts

Reference	Name	Geographic Area	Other Services/Facilities
CSA 42	Oro Grande	North of Victorville	Water service
CSA 53 B	Fawnskin	Big Bear Lake	--
CSA 64	Spring Valley Lake	Between Victorville and Apple Valley	Water service
CSA 70 BL	Bloomington	Valley, southeast of Fontana	--
CSA 70 GH	Glen Helen	North of San Bernardino by I-15/I-215	--
CSA 70 S-3	Lytle Creek	South of Cajon Pass and west of I-15	--
CSA 70 S-7	Lenwood	West of Barstow	--
CSA 70 SP-2	High Country	Hesperia	--
CSA 79	Green Valley Lake	West of Big Bear Lake	--
CSA 82	Trona	Desert region, north of Barstow	--
CFD 2002-1	Kaiser Commerce Center	Western Fontana SOI	Roads, water, storm drains, public utilities
CFD 2003-1	Citrus Plaza	Redlands, uninc. “Donut Hole”	Roads, water, storm drains, traffic mitigation

3.2.1 CSA 42 – Oro Grande

The Oro Grande CSA provides sewer and water services, and was created in 1965. It is funded by user fees and service charges to provide service through approximately 190 sewer connections (190 equivalent dwelling units (EDUs) and a population estimate of less than 1,000). The collection system is operated by the Victor Valley Wastewater Reclamation Authority (VVWRA). Oro Grande is north of the City of Victorville.

3.2.2 CSA 53B – Fawnskin

The Fawnskin CSA was established in 1968 to provide sewer services. It is funded by user fees and service charges, and provides service through approximately 962 sewer connections (1,259 EDUs and a population estimate of 3,559). The collection system involves an innovated vacuum system, and sewage treatment is provided by a contract with the Big Bear Area Regional Water Agency. Fawnskin is near Big Bear City.

3.2.3 CSA 64 – Spring Valley Lake

The Spring Valley Lake CSA was established in 1968, and provides sewer and water services to approximately 3,771 connections (4,349 EDUs and a population estimate of 14,300). It is funded through property taxes, user fees, and service charges, and is operated by the VVWRA. Spring Valley Lake is a planned community in the Victorville sphere of influence (SOI) consisting of 4,213 individually-owned lots, two condominium complexes, one townhome complex, restaurants and convenience stores, and a 200-acre fresh water lake.

3.2.4 CSA 70 BL – Bloomington

The Bloomington sanitation district was established in 2013, and will provide sewer services to Bloomington residents using user fees. The district has an agreement with the City of Rialto to provide services to 419 dwelling units, and will connect sewage to the Rialto Wastewater Treatment Plant. A recent affordable housing development will require approximately 280 EDUs, leaving approximately 139 EDUs of sewer capacity. Bloomington is primarily in the Rialto SOI.

3.2.5 CSA 70 GH – Glen Helen

The Glen Helen CSA was established in 2004 to provide parks and recreation, sewer, and streetlight services to the Glen Helen master planned community and the San Bernardino Sheriff's Department detention facility. It is funded by developer contributions, user fees, and services charges to provide service through approximately 1,452 sewer connections (1,391 EDUs and a population estimate of 5,372). Glen Helen is partially in the northwest portion of the City of San Bernardino SOI.

3.2.6 CSA 70 S-3 – Lytle Creek

The Lytle Creek CSA was established in 1974 and is funded by user fees and service charges to provide service through approximately 798 sewer connections (750 EDUs and a population estimate of 2,953). The CSA provides sanitation services to residents in the Lytle Creek community as well as the U.S. Forest Service. Lytle Creek is in the San Gabriel Mountains south of the Cajon Pass.

3.2.7 CSA 70 S-7 – Lenwood

The Lenwood CSA was established in 1977 to provide sewer services to property owners who approved assessments to pay the debt service on construction of the sewer system. Sewer demand is approximately 850 EDUs. Lenwood is north of the City of Barstow, and the City performs routine maintenance on the system, while the CSA is responsible for non-routine repairs. The CSA does not, therefore, charge regular service fees.

3.2.8 CSA 70 SP-2 – High Country

The High Country CSA was established in 1985, and is funded through uses user fees and service charges to provide service through approximately 503 sewer connections (503 EDUs and a

population estimate of 1,861). Service is provided to the High Country development tract in the City of Hesperia SOI and addition homes in the incorporated boundaries of the City of Hesperia.

3.2.9 CSA 79 – Green Valley Lake

The Green Valley Lake CSA was established in 1971 is funded through uses user fees and service charges to provide service sewer services through approximately 1,064 sewer connections (1,192 EDUs and a population estimate of 3,937). Wastewater treatment is provided through a contract with the Running Springs Water District. Green Valley Lake is in the San Bernardino Mountains between Lake Arrowhead and Big Bear.

3.2.10 CSA 82 – Trona

The Trona CSA was first established in 1976, in 2000, the sanitation zones of Trona and Pioneer Point were combined to create a new CSA. This CSA is funded by property taxes, user fees, and service charges to provide service sewer services through approximately 568 sewer connections (568 EDUs and a population estimate of 2,102). The CSA provides sewer and streetlight services, and maintains a park/rest stop. Trona (and the Searles Valley area) is at the northwestern top of the county.

3.2.11 CFD 2002-1 – Kaiser Commerce Center

CFD 2002-1 was formed in 2002 to finance public improvements for the Kaiser Commerce Center project formerly located on the old Kaiser Steel site in Fontana's western SOI. The CFD is authorized to bonds for the acquisition and improvement of public facilities, including sewer facilities. Other authorized facilities include public roadways, water transmission and distribution facilities, storm drain facilities, and general public utilities.

3.2.12 CFD 2003-1 – Citrus Plaza

CFD 2003-1 was formed in 2003 to finance public infrastructure facilities, including sewer, water, roadway, storm drain and traffic mitigation improvements to the Citrus Plaza development in the unincorporated area known as the "Donut Hole." The Donut Hole is an unincorporated pocket surrounded by incorporated cities, but it is not a part of the Redlands SOI. This area is also subject to a tax sharing agreement (2003, No. 03-0856), which apportions sales and use tax revenue (90% to the City of Redlands through 2028 or until annexation). The City provides sewage collection/treatment, water service, and law enforcement services. The County contracts with the City for fire protection and emergency medical services.

3.3 Bloomington

The Bloomington community is currently serviced by septic tanks and leach field systems with some regional wastewater treatment provided by the Cities of Rialto and Fontana. A sewer master plan for the City of Rialto has been obtained and preliminarily reviewed. More information/analysis regarding the Bloomington community is provided under separate cover.

3.4 Bear Valley Communities

Big Bear Area Regional Wastewater Agency's (BBARWA) serves the entire Big Bear area totaling 79,000 acres. It is served by three separate collection systems: City of Big Bear Lake (CBBL), Big Bear City Community Services District (BBCCSD) and the County of San Bernardino Service Area 53B (CSA 53B). Each Member Agency maintains and operates its own sewer collection system and delivers wastewater to BBARWA's interceptor system for transport to the WWTP (4.89 MGD).

CBBL's service area covers all land located within the city limits, which includes a permanent population of 6,142, with about 11,489 equivalent dwelling units (EDU). CBBL's sewer system includes 126 miles of gravity sewer, 3,027 manholes, 13 lift stations, and associated force mains. BBCCSD's service area encompasses 21 square miles, and serves portions of the unincorporated area of Big Bear City, Lake William, Baldwin Lake and Erwin Lake. BBCCSD serves 11,855 EDUs, and maintains 115 miles of sewer pipeline, 2,842 manholes, 7 lift stations, and associated force mains. CSA 53B's service area encompasses a small area in Fawnskin. Its sewer system provides sewer service to 1,253 EDUs in the Fawnskin area from the dam to Division Drive.

BBARWA operates three sewer main lines. The Lake Pump Station (LPS) force main serves CBBL's sewer system and transfers system flows from BBARWA's LPS to the WWTP. The North Shore Interceptor that serves CSA 53B's sewer system and the BBARWA Trunk Line that serves BBCCSD's sewer system conveys flow to the WWTP. The Trunk Line transfers CSA 53B and BBCCSD' s collection flows to the treatment plant. BBARWA discharges secondary WTP effluent to a 480-acre site in Lucerne Valley for irrigation of farmlands.

3.4.1 Baldwin Lake

Baldwin Lake is serviced by BBARWA for wastewater services. A discussion regarding the BBARWA wastewater system can be found above. According to the information available, the community of Baldwin Lake appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.4.2 Big Bear City

Big Bear City is serviced by BBCCSD for wastewater services. Discussion regarding the BBCCSD wastewater system can be found above. According to the information available, the community of Big Bear City appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.4.3 Erwin Lake

Erwin Lake is serviced by BBCCSD for wastewater services. A discussion regarding the BBCCSD wastewater system can be found above. According to the information available, the community of

Erwin Lake appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.4.4 Fawnskin/Northshore

Fawnskin/Northshore is serviced by CSA 53B for wastewater services. A discussion regarding CSA 53B and the BBARWA wastewater system can be found above. According to the information available, the community of Fawnskin/Northshore appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.4.5 Lake Williams

Lake Williams is serviced by CSA 53B for wastewater services. A discussion regarding the BBARWA wastewater system can be found above. According to the information available, the community of Lake Williams appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.4.6 Moonridge

Moonridge is serviced by BBARWA for wastewater services. A discussion regarding the BBARWA wastewater system can be found above. According to the information available, the community of Moonridge appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.4.7 Sugarloaf

Sugarloaf is locally serviced by BBCCSD for wastewater services. A discussion regarding the BBCCSD wastewater system can be found above. According to the information available, the community of Sugarloaf appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.5 Crest Forest Communities

The Crestline Sanitation District (CSD) presently provides collection, treatment, and redisposal for primarily domestic sewage from four wastewater collection and treatment systems through one common effluent disposal system.

Each of the four wastewater treatment plants within the individual tributary areas treat sewage from an upstream collection system. The area served by the Huston Creek Treatment Plant is the largest (0.7 MGD), providing service for 75% of the sewered area. The service area for the Seeley Creek Treatment Plant (0.5 MGD) comprises the remaining 25% within the present boundaries of

the CSD. The Cleghorn Treatment Plant (owned by the CSD with 0.2 MGD) and the State-owned Pilot Rock treatment plants provide service to areas whose collection systems are owned and maintained by the California Departments of Parks and Recreation and Forestry.

CSD's sewage collection system was built from 1952 to 1977. Since then, private developers have installed other sewers, totaling about 15,000 feet. Approximately 95% of the systems are composed of 8" sewer mains. CSD has two primary sewage pump stations and one small backyard pump station serving three residences. The Lake Gregory pump station is located on the east side of Lake Gregory along San Moritz Way and receives raw sewage from Assessment Districts 2, 11, 12 and the Pinecrest area. The pump station was built in 1968 with construction of the sewer system for Assessment District No. 2 and also serves Assessment Districts No. 11 and 12, and was expanded in 1988 to accommodate flows from Camp Pinecrest.

CSD owns and operates three wastewater treatment plants–Huston Creek Treatment Plant, the Seeley Creek Treatment Plant, and the Cleghorn Treatment Plant. In addition, CSD disposes of treated effluent from the Pilot Rock Treatment Plant (owned by the California Department of Forestry) that is pumped into CSD's effluent outfall. The effluent outfall traverses around Silverwood Lake and disposal from these facilities occurs at the Las Flores Ranch in Summit.

3.5.1 Cedarpines Park

Cedarpines Park is served by CSD for wastewater services. A discussion regarding the CSD wastewater system can be found above. According to the information available, the community of Cedarpines Park appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.5.2 Crestline

Crestline is locally serviced by CSD for wastewater services. A discussion regarding the CSD wastewater system can be found above. According to the information available, the community of Crestline appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.5.3 Lake Gregory

Lake Gregory is locally served by CSD for wastewater services. A discussion regarding the CSD wastewater system can be found above. According to the information available, the community of Lake Gregory appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.5.4 Valley of Enchantment

Valley of Enchantment is locally served by CSD for wastewater services. A discussion regarding the CSD wastewater system can be found above. According to the information available, the community of Valley of Enchantment appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.6 Helendale

The Helendale community is serviced by the Helendale Community Services District (HCSD) which operates the Silver Lakes WWTP with a max design capacity of 1.2 MGD and a currently average daily flow of 0.5 MGD. Wastewater system assessment information is not readily available and a detailed existing conditions summary is not possible at this time. In addition, cooperation from HCSD has been restrictive so the County of San Bernardino will be relied upon to acquire the pertinent existing conditions information for future inclusion in this report.

3.7 Hilltop Communities

The Hilltop plan area encompasses approximately 40 square miles and is bound to the northwest by the Lake Arrowhead Community and to the west by the Crestline Community. Included within the Hilltop Community are Arrowbear Lake, Green Valley Lake, and Running Springs. Running Springs Water District serves as the primary regional wastewater service provider to the Hilltop communities. Also included are CSA 79, US Forest Service Recreation areas, and the Snow Valley Ski area recreation site located on Highway 18 at Snow Valley.

3.7.1 Arrowbear Lake

Arrowbear Lake is locally serviced by APCWD for wastewater services. A discussion regarding the APCWD wastewater system can be found the discussion of Running Springs. According to the information available, the community of Arrowbear Lake appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.7.2 Green Valley Lake

Green Valley Lake is locally serviced by CSA 79 for wastewater services. A discussion regarding the CSA 79 wastewater system can be found in the discussion on CSAs. According to the information available, the community of Green Valley Lake appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.7.3 Running Springs

RSWD's sewer system consists of seven Assessment Districts, one interceptor system, and 3.2 miles of transmission lines. The collection system consists of pipelines ranging in sizes from 6" to

15", spanning 58 miles with 1,994 associated manholes and cleanouts. RSWD has 9 lift stations with 2.25 miles of sewer force mains. Wastewater treatment is provided by the Running Springs WWTP, which is designed for a maximum flow of 0.6 MGD and currently treats and average flow of 0.5 MGD. The facility includes a solids handling system, effluent disposal site and evaporation ponds, and spray irrigation.

According to the information available, the community of Running Springs appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies

3.8 Joshua Tree

The Joshua Tree community is currently serviced by septic tanks and leach field systems with no regional wastewater treatment. Regional wastewater treatment and disposal facilities are currently being investigated by the JBWD and may be implemented in the future. JBWD has applied and been approved by County LAFCO as the regional sewer provider for the area. A plant is currently being operated by JBWD at the Hi Desert Medical Center. This plant may be decommissioned as future centralized treatment facilities are constructed.

3.9 Lake Arrowhead Communities

The Lake Arrowhead Community Services District (LACSD) wastewater service area lies in the San Bernardino National Forest. It covers an extensive area of approximately 9,600 acres and includes the communities of Lake Arrowhead, Cedar Glen, Blue Jay, Twin Peaks, Deer Lodge Park, Rim Forest, Agua Fria and Sky Forest.

LACSD manages a wastewater collection system that includes about 200 miles of gravity sewer pipes; 6,200 manholes; 1,300 cleanouts, 2 siphons, 21 pump stations, and 7 miles of force mains. LACSD also owns a 2-mile, 24" intertie pipeline that runs between the Grass Valley and Willow Creek wastewater treatment plants (WWTP). LACSD 21 lift stations and associated force mains carry water from lower to higher elevation areas. Wastewater generated within LACSD's service area consists primarily of domestic flow generated from residential and commercial sources. There are no industrial discharges. During the winter, a significant portion of the wastewater flows also includes infiltration of high groundwater and inflow of storm runoff.

The Willow Creek and Grass Valley WWTPs have a total combined permitted treatment capacity for dry weather average daily flow of 3.75 MGD. Partially treated effluent is conveyed from the Willow Creek WWTP to the Grass Valley WWTP for final treatment. Treated wastewater is then conveyed through the District's 10-mile outfall pipeline to percolation ponds on a 350-acre facility owned by the District in Hesperia.

3.9.1 Blue Jay

Blue Jay is locally serviced by LACSD for wastewater services. A discussion regarding the LACSD wastewater system can be found above. According to the information available, the community of Blue Jay appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.9.2 Cedar Glen

Cedar Glen is locally serviced by LACSD for wastewater services. A discussion regarding the LACSD wastewater system can be found above. According to the information available, the community of Cedar Glen appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.9.3 Deer Lodge Park

Deer Lodge Park is locally serviced by LACSD for wastewater services. A discussion regarding the LACSD wastewater system can be found above. According to the information available, the community of Deer Lodge Park appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.9.4 Lake Arrowhead

Lake Arrowhead is locally serviced by LACSD for wastewater services. A discussion regarding the LACSD wastewater system can be found above. According to the information available, the community of Lake Arrowhead appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.9.5 Rim Forest

Rim Forest is locally serviced by LACSD for wastewater services. A discussion regarding the LACSD wastewater system can be found above. According to the information available, the community of Rim Forest appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.9.6 Sky Forest

Sky Forest is locally serviced by LACSD for wastewater services. A discussion regarding the LACSD wastewater system can be found above. According to the information available, the community of Sky Forest appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.9.7 Twin Peaks

Twin Peaks is locally serviced by LACSD for wastewater services. A discussion regarding the LACSD wastewater system can be found above. According to the information available, the community of Twin Peaks appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.10 Lucerne Valley

The Lucerne Valley community is currently served by septic tanks and leach field systems with no regional wastewater treatment. After preliminary research, it appears that sanitary sewer upgrades for the area are not planned. According to the information available, the community of Lucerne Valley appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.11 Mentone

Mentone is primarily serviced by septic tanks and leach field systems with some regional wastewater treatment provided by Redlands. Although the City could not disclose for security concerns the portions of Mentone served by them, the City has 17,500 sewer connections. The Redlands WWTP can process 9.5 MGD of wastewater but is currently processing about 6 MGD. According to the information available, Mentone appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain current level of service for existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.12 Muscoy

The Muscoy community is serviced by septic tanks and leach field systems with no regional wastewater treatment. After preliminary research, it appears that sanitary sewer upgrades for the area are not planned. Because this study area is entirely on septic, wastewater system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

3.13 Oak Glen

The Oak Glen community is currently serviced by septic tanks and leach field systems with no regional wastewater treatment. After initial research, sanitary sewer upgrades for the area are not planned. Because this study area is entirely on septic, wastewater system assessment information is not readily available and a detailed existing conditions summary is not possible at this time.

3.14 Phelan/Piñon Hills

Piñon Hills and Phelan communities are currently being serviced by septic tanks and leach field systems with no regional wastewater treatment. After preliminary research, it appears that sanitary sewer upgrades for the area are not planned. According to the information available, the community of Phelan/Piñon Hills appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

3.15 Other Unincorporated Areas

Data was also gathered for other areas in the unincorporated portion of San Bernardino County, including unincorporated spheres of influence (SOIs) and smaller communities that are generally farther away from urbanized areas. Based on information provided by wastewater treatment providers, the vast majority of land within unincorporated SOIs receive wastewater treatment service from public agencies with additional capacity to serve future growth. Additional information can be found in Appendix B.

3.15.1 Communities on Septic Systems

Generally, other portions of the unincorporated county rely on private septic systems as there are no close regional sewer services. Some unincorporated communities within the Valley region could connect to nearby regional wastewater collection systems if additional funding mechanisms are supported by property owners. Most unincorporated communities within the Mountain and Desert regions are geographically isolated from regional wastewater collection systems and will continue to require private septic tank systems as the primary wastewater disposal option unless regional wastewater collection and treatment systems are established. A list of unincorporated areas or communities that are reliant on septic systems is provided below.

- Angelus Oaks
- Adelanto SOI (portions)
- Bloomington (portions)
- Colton SOI (east)
- Daggett
- El Mirage
- Homestead Valley (Flamingo Heights, Johnson Valley, Landers, and Yucca Mesa)
- Joshua Tree (portions)
- Loma Linda SOI (east)
- Lucerne Valley

- Morongo Valley
- Mt Baldy
- Newberry Springs
- Oak Glen
- Oak Hills
- Pioneertown
- Redlands (east)
- Twentynine Palms
- Wrightwood
- Yermo

3.15.2 Community Service Districts

One CSD provides wastewater service to the unincorporated community of Baker.

Baker CSD

The Baker CSD provides sanitary sewer, water, trash collection, fire protection, television translators, road maintenance, street lighting, park and recreation including the Jesse Meyer Community Center, a public swimming pool, and a senior center (shared by the Baker Area Chamber of Commerce). The current service population is approximately 1,000. The CSD maintains the Body Wastewater Treatment Facility and provides service to 53 domestic connections and 29 commercial connections. According to the information available, the community of Baker appears to have adequate capacity and infrastructure to meet current wastewater demands and maintain the current level of service for the existing land uses. There are no reports of any major system deficiencies or service inadequacies.

4 DRAINAGE, HYDROLOGY, AND FLOODING

4.1 Hydro-Geographic Description

San Bernardino County encompasses 20,105 square miles and is divided into three distinct regions: Valley, Mountain, and Desert. About 80% of the County is desert with the remaining areas divided between the valley and mountains. Flood Control Zones 1, 2 and 3 include the Valley Region. Zone 5 includes the Mountain Region and Zones 4 and 6 include primarily the Desert Region but also contain some drainage facilities located in the Mountain Region.

4.1.1 Valley Region

The Valley Region is situated at the base of the San Gabriel and San Bernardino mountains to the north, Los Angeles County line to the west, and Yucaipa and the Riverside County line to the east. The defining fluvial landforms include the creeks, streams, and washes that have formed from mountain and foothill fluvial processes. Many of these features drain into the Santa Ana River. Prominent drainage features in the Valley Region maintained in full or in part by the District include creeks, streams, washes, rivers, and channels, basins and dams. District-maintained drainages drain into the Santa Ana River, which ultimately ends at the Pacific Ocean.

4.1.2 Mountain Region

The Mountain Region spans the San Gabriel and San Bernardino mountains, and includes communities stretching from Mt. Baldy and Wrightwood to the west, to Big Bear City on the east, and Forest Falls to the southeast. Runoff from the mountains provides the main water source for the Santa Ana and Mojave rivers. Fluvial landforms in the Mountain Region consist of a series of creeks, streams, and rivers that drain into mountain lakes, the valleys, and deserts. The more prominent drainage features maintained in full or in part by the Public Works Departments are creeks, streams, washes, and channels. These include streams and rivers that emanate from or feed into Lake Arrowhead, Big Bear Lake, and other water bodies.

4.1.3 Desert Region

The Desert Region is characterized by an assemblage of low mountain ranges and desert floors. The more prominent drainage features maintained in full or in part by the District are creeks, streams, washes, rivers, channels, and basins. The Mojave River, a 120-mile long river is dry most of the year and terminates at Silver Dry Lake. However, there are areas where surface flows are year-round, at the headwaters, and where groundwater is forced to the surface in areas with impermeable bedrock (e.g., near Victorville and in the Afton Canyon area). Morongo Valley Creek, which is dry most of the year, drains into Whitewater River, and ultimately into the Salton Sea. Several drainages in Needles drain to the Colorado River. Other drainages and washes emanating from the low mountain ranges terminate in dry lakes or on the desert floor.

4.2 Flood Control District Zones

The flood control functions of San Bernardino County are handled through the San Bernardino County Flood Control District (SBCFCD). The District was established in 1939 in response to the severe floods of 1938, which caused millions of dollars of property damage thin the county. The SBCFCD has developed an extensive system of facilities including dams, conservation basins, channels and storm drains. The primary purpose of these facilities is to intercept and convey flood flows through and away from the major developed areas of the County to protect property and ensure public safety. Primary functions of SBCFCD are flood protection, water conservation, and storm drain construction. SBCFCD also maintains more than 530 flood control facilities that are spread throughout its 20,000-square mile service area.

The SBCFCD is divided into six zones with interests, responsibilities and geographical divisions distinctive to the particular zone. Maps depicting these different zones have been provided in Appendix C along with facilities in each zone. Because the Flood Control District is so large and many of the drainage issues are more localized, Master Plans of Drainage (MPD) and Comprehensive Storm Drain Plans (CSDP) have been created to evaluate the existing drainage systems, identify deficiencies and recommend improvements and new facilities in an area. Following is a breakdown of the existing hydrologic conditions for the County.

4.2.1 Zone 1

This zone encompasses the County's West End, from the Los Angeles and Riverside County lines to West Fontana and several other unincorporated areas within San Bernardino County. This includes the cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga and Upland with the community of Etiwanda. According to the information readily available for Zone 1, the type of facility in this area primarily consists of underground storm drains that empty into the Santa Ana River. An MPD or CSDP was not available for review. The average ground slope across Zone 1 has generally been calculated at 1.5% from the northeast to the southwest.

4.2.2 Zone 2

This zone encompasses the central area of the San Bernardino Valley. This region includes This includes the cities of Colton, Fontana, Grand Terrace, Highland, Loma Linda, Redlands, Rialto and San Bernardino with the communities of Bloomington, Del Rosa, Devore and Muscoy. According to the information readily available for Zone 2, the type of facility in this area primarily consists of levees. An MPD or CSDP was not available for review; however, a comprehensive Storm Drain Plan No. 7 (dated 12/29/82) exists for the Muscoy area describing several storm drains in the area. The average ground slope across Zone 2 has generally been calculated at 2% from the northwest to the southeast.

4.2.3 Zone 3

This zone consists of the east end of the San Bernardino Valley, including the Cities of Highland, Loma Linda, Redlands, San Bernardino and Yucaipa with the community of Mentone. According to the information readily available for Zone 3, the types of facilities in this area primarily consists of channels, streams, and natural watercourses. An MPD or CSDP was not available for review in this area. The average ground slope across Zone 3 has generally been calculated at 2.6% from the northwest to the southeast.

4.2.4 Zone 4

This zone consists of portions of the Mojave River Valley, and includes the cities/towns of Adelanto, Apple Valley, Barstow, Hesperia and Victorville and all or portions of the communities of Baker, Baldy Mesa, Daggett, Desert Knolls, El Mirage, Helendale, Hinkley, Hodge, Lenwood, Oro Grande, Phelan, Piñon Hills, Silver Lakes, Spring Valley Lake, Wrightwood and Yermo. According to the information readily available for Zone 4, the types of facilities in this area primarily consists of channels, streams, and natural watercourses. An MPD or CSDP was not available for review in this area. The average ground slope across Zone 4 has generally been calculated at 0.3% from the southeast to the northwest.

4.2.5 Zone 5

This zone consists of communities in the San Bernardino Mountains–Arrowbear Lake, Blue Jay, Cedar Glen, Crestline, Green Valley Lake, Lake Arrowhead, Lake Gregory, Rimforest, Running Springs, Silverwood Lake, Skyforest, Snow Valley, and Twin Peaks. According to the information readily available for Zone 5, the types of facilities in this area primarily consists of channels, streams, and natural watercourses. The MPD (dated 8/15/68) shows existing earth channels with recommendations to upgrade to concrete channels and recommended roadway crossings to be improved with box culverts. The report presents recommended storm drain and flood control facility system plan for the eventual protection of all private lands within Zone 5. The average ground slope has generally been calculated at 2.4% from southeast to northwest.

4.2.6 Zone 6

This zone consists of the remaining portions of the San Gabriel and San Bernardino Mountains and the semi-desert portion of the county. This zone includes Bear Valley, Joshua Tree and Lucerne Valley. According to the information readily available for Zone 6, the types of facilities primarily consist of storm drains, channels, natural streams and watercourses. An MPD or CSDP was not available for review in this area. However, according to the Cushenbury Creek Drainage Study (SBCFCD, 2011), detention basins are being proposed to mitigate the ongoing flooding issues in the Cushenbury Springs area. In addition, the MPD (dated 2/19/92) shows storm drain pipes, channels, and retention basins in the area. The average ground slope across Zone 6 has generally been calculated at 0.2% from the west to the east.

4.3 Public Facility Improvements and Developer Fees

The San Bernardino County Flood Control Planning Division is mainly responsible for long range advance planning and for coordinating flood control project development and funding with other agencies. Included in Appendix C is a list of Flood Control Capital Improvement projects from the 2015-16 recommended budget, with projects in the unincorporated communities of Rim Forest and Wrightwood. Also included in Appendix C is a County of San Bernardino Public Facilities Needs list (prepared in 2013) related to individual flood control improvements throughout Flood Zones 1-6.

In addition to agency funding, there are two active developer fee plans currently in affect for the Valley Region of the County. These programs are summarized below:

- **Project 3-5 Area**. This project covers a total area of 2,045 acres and includes areas within the Cities of San Bernardino, Rialto, and Colton as well as unincorporated areas of the County. The project will provide a system of storm drains, channels, and basin improvements to assist in the protection of properties that are developed or planned for future development or redevelopment. The area drainage fee is provided as $7,159/acre.

- **Upper Etiwanda Creek and San Sevaine Creek Area**. This project covers 51 square miles and includes areas within Rancho Cucamonga, Fontana, and the unincorporated County. The project will provide a backbone system of channels and basins to assist in the protection of properties that are being developed or planned for future development or redevelopment. The area drainage fees are $9,790/acre for the Upper Etiwanda Drainage Area and $4,405/acre for the San Sevaine Creek Drainage Area.

Periodically the County has considered the option of instituting impact fees to address the long - term impacts of growth on the County's infrastructure. The majority of improvements in the infrastructure backbone system in the County occurs in response to targeted growth. The County does not currently impose development impact fees to fund the construction of backbone infrastructure for flooding and drainage control. Instead, County growth management policies have encouraged development in the spheres of influence of incorporated communities because of the availability of infrastructure and services. Where infrastructure does not exist or needs to be expanded, the service providers for the sphere and adjacent incorporated areas may impose impact fees to provide the necessary funding.

4.4 FEMA Regulatory Flood Zones

San Bernardino's topography, climate, and seasonal rains have made it susceptible to flooding. Since 2000, 272 reported flooding events have caused an estimated $233 million in damage to property, crops, public facilities, and infrastructure. This section details flooding risks in San Bernardino County. The Safety Technical Report provides greater detail.

Flood zones are geographic areas that FEMA defines according to varying levels of flood risk. While FEMA has generally categorized specific flood limits of the communities detailed in this report, it is important to note that flood risks are dynamic and can change over time. Water flow and drainage patterns can be altered dramatically due to surface erosion, changes to land use and natural forces. Consequently, FEMA continues to update their flood maps using the latest data gathering and mapping technology wherever possible.

The County has established Floodplain Overlay Districts that correspond to major flood zones designated by FEMA. These overlay districts trigger specific requirements for proposed developments with respect to density, site design, building standards, and various technical reports and inspections. Table 6 compares a list of FEMA and County flood designations. Appendix C includes a map of the 100-year and 500-year flood zones provided by FEMA.

Table 6: FEMA Floodplains and San Bernardino County Overlay Districts

FEMA Flood zone	FEMA Definition of Flood Zones	Corresponding County Overlay District Definition, if applicable
100-year	High flood hazards are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 100-year flood zone are Zones A, AO, AH, A1-A30, AE, A99, AR, AR/AE, AR/AO, AR/A1-A30, AR/A, V, VE, and V1-V30.	County has established its FP 1 zone to correspond to the 100-year flood zone defined by FEMA to identify areas that are prone to flooding.
500 year	Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The 500-year flood zone includes areas designated A-99 and shaded Zone X.	County has established its FP 2 zone to closely correspond to the 500-year flood defined by FEMA to identify areas that are prone to flooding.
Undetermined	FEMA identifies certain areas with a designation Zone D. This flooding designation is used for areas where there are possible but undetermined flood hazards, as no analysis of flood hazards has been conducted.	County has established its FP 3 zone for areas of undetermined, but possible, shallow flooding as determined by the County, Flood Control District, or other governmental entity.

Source: Federal Emergency Management Agency, 2016; San Bernardino County Development Code

4.4.1 Zone D and Areas of Unknown Risk

Although limited urbanized areas in San Bernardino County are designated within FEMA's 100-year flood zone, the majority of less populated areas is classified as Zone D. As defined by FEMA, Zone D is used for areas where there are possible but undetermined flood hazards, as no analysis of flood limits has been conducted. The San Bernardino County Development Code does not contain an overlay district that corresponds to FEMA's designation of Zone D. However, the County's Floodplain Overlay District regulations authorize the County, at its discretion, to establish a FP3 overlay in areas where flood risks have not been determined.

With respect to property insurance, lenders typically require the purchase of flood insurance for areas within the 100- and 500-yerar flood zones. While flood insurance is available to purchase in Zone D and property owners are typically encouraged to purchase it, flood insurance is not federally required by lenders for loans on properties in these zones. Although these areas tend to be undeveloped or sparsely populated, lenders may become aware that new development in such areas has increased the possibility of property damage from flooding. As a result, they may require coverage as a condition of their loans, even though it is not federally required. Flood insurance rates for properties in Zone D are commensurate with the uncertainty of the flood risk.

While local regional flood control ordinances do not specifically preclude development in the floodplain, the land use compatibility matrix set forth in the existing General Plan Safety Element addresses the appropriateness of certain development within the 100-year flood zones. However, the General Plan land use compatibility matrix does not include the 500-year floodplain, potential 100-year floodplains as identified by DWR, or areas where FEMA has determined there is possible, but undetermined flooding potential (Zone D). Therefore, there is some uncertainty on how other flood hazards are addressed at the general plan level.

4.4.2 DWR Awareness Areas

Although limited community areas are impacted by the 100-year flood limit according to FEMA, the California Department of Water Resources (DWR) has developed Best Available Maps (BAM) for all counties. These maps contain the best available information on flood hazards and are accessible through a web viewer. The BAM, however, does not replace existing FEMA regulatory floodplains shown on Flood Insurance Rate Maps. Rather the BAM identify areas with potential flood risks that may warrant further studies or analyses for land use decisions.

The BAM floodplains delineate areas that are subject to potential exposure to flooding for three storm events: the 100-year flood, 200-year flood (for Central Valley only), and 500-year flood. Appendix C includes a map showing areas where a 100-year floodplain may exist in the county, but precise studies and elevations have not yet been assessed. Many of these potential 100-year floodplains are located in portions of the county designated as Zone D by FEMA.

4.5 Dam Inundation Areas

When dams that are designed to restrict water from entering a region of land fail, the water body being restricted suddenly and abruptly enters into the city or region. However, because of geographic patterns and slopes in the land, certain sections of the area downstream from the dam get completely covered with the receiving flood waters while other areas of the land remain untouched. The specific areas of land that would become flooded and covered with water if a particular dam were to break or fail is known as a Dam Inundation Area.

San Bernardino County has more than 70 dams, of which 35 are tracked based on their potential risk of inundation. Dam operators are required to submit inundation maps to the Department of Water Resources (DWR). DWR is responsible for monitoring inspecting, and maintaining a

database of these dams that includes the year built, construction types, built specifications, purpose, capacity, etc. The vast majority of dams are primarily intended for flood and debris control purposes, followed by recreation and water supply, irrigation, and other purposes. Table 7 summarizes these dams and Appendix C maps the associated inundation paths where known.

Table 7: Inventory of San Bernardino County Dams by Primary Purpose

	Basic Characteristics		
Primary Purpose	Number of Dams	Storage Capacity (Acre feet)	Description of Use
Flood/Debris Control	15	535,905	This includes flood control and debris control purposes
Recreation	8	3,083	This may include boating, fishing, or other recreational use
Water Supply	8	111,588	This includes potable water supply, including following treatment
Irrigation	5	100,274	This is for purpose of irrigation of crops
Hydroelectric	2	236,400	This includes dams that generate electricity
Mining	2	160	This applies to specific mining interests

Sources: National Inventory of Dams, Army Corps of Engineers, 2016

The presence of dams and inundation paths within the County does affect the feasibility of development. Although still developable land, proposed development projects within the dam inundation areas may be limited by the local approving agency and additional insurance may be required. However, certain restrictions exist for different types of development projects. The 2007 County General Plan contains a program to prohibit critical, essential, and high risk land uses from dam inundation areas identified on the County's hazards overlay maps.

4.6 Levee Protected Areas

San Bernardino County relies on a system of levees to divert waters away from developed areas. According to the Army Corps of Engineers, the County has 33 levee systems comprising 63 linear miles of channels. The largest levees are in the Upper Colorado region near the Arizona border. The Bureau of Reclamation built four levees spanning 20 linear miles to provide protection from storm flow of the Colorado River and meet agricultural irrigation and water supply needs. These levees protect approximately 20 square miles of land area from flooding.

Although the majority of levees were originally built by the federal government, the SBCFCD now owns and operates the vast majority of levees. The federal government maintains oversight of levees, but has no direct responsibilities for maintenance, except for Corps-operated levees. The Corps has developed a National Inventory of Levees that details the condition of each levee. According to this database, only one levee is rated in acceptable condition, 19 levees are rated in minimally acceptable condition, 8 levees are in unacceptable condition, and 5 are not rated.

Table 8, Levees in San Bernardino County, summarizes basic information for levees in San Bernardino County. Information regarding safety concerns are documented in the Safety Technical Background Report, prepared for the Countywide Plan.

Table 8: Summary of Levees and Safety Ratings in San Bernardino County

Safety Rating	Basic Characteristics			Description of Levee Safety Rating
	Number of Systems	Length in Miles	Acres Protected	
Acceptable	1	0.2	11	Acceptable. While all the items may not be rated Acceptable, the levee system was assigned an "Acceptable" rating because no action is required in the recommendation other than to monitor.
Minimally Acceptable	19	24.7	17,877	Minimally Acceptable. Where one or more items are rated minimally acceptable or unacceptable, the unacceptable items would not prevent the system or segment from performing as intended during the next flood.
Unacceptable	8	17.4	4,742	Unacceptable. One or more system components are rated unacceptable and would seriously impair the functioning of the levee system, prevent it from performing as intended, and pose unacceptable risk to public safety.
Not Rated	5	21.4	12,378	

Source: Army Corps of Engineers, National Inventory of Levees, 2016.
Specific inspection reports are available at: http://www.spl.usace.army.mil/Missions/Civil-Works/Levee-Safety-Program/.

4.7 Operations and Maintenance

Maintenance of flood control facilities occurs year-round, with some facilities requiring maintenance several times a year and others on an as- needed basis in preparation of or following large storm events. In past years, the District has had to obtain multiple permits for the same work in the same facilities for each season or year, which has become an inefficient method of facility maintenance. In order to ensure continued stormwater infrastructure reliability, the District implements a Master Stormwater System Maintenance Program (MSWMP) for flood facilities in the county.

In 2014, the County of San Bernardino County adopted a Maintenance Plan, along with appropriate environmental clearance, to facilitate required operations and maintenance (O&M) activities associated with watershed management, while still protecting life, property, and public infrastructure from damages associated with stormwater. Under the Maintenance Plan, documentation would be prepared for O&M activities, and long-term programmatic regional permits would be obtained for work to streamline the CEQA and permitting process and execute projects on a regular and timely basis.

Although O&M activities within San Bernardino County flood control facilities are ongoing, the Maintenance Plan provides a systematic and scheduled approach to these maintenance activities, providing increased efficiency and environmental sensitivity to the implementation of

maintenance activities. The Maintenance Plan describes routine maintenance activities and provide a schedule for routine inspection and maintenance of various flood control facilities. The Maintenance Plan also identifies facilities with sensitive resources and BMPs to avoid and minimize potential impacts to those resources from maintenance activities.

Routine O&M activities allow a facility/structure to function at its current/designed capacity, including minor alterations to a facility/structure to meet current standards or maintain structural integrity. O&M activities do not include alterations for expanding facility capacity. Routine O&M activities include, but are not limited to, the removal of excess sediment, debris, and vegetation; stockpiling excess material and debris following removal; maintaining sufficient flowpaths; grooming/repairing earthen and improved channel slopes and bottoms; and maintaining culverts and bridges to ensure drainage and structural integrity.

More information about the County's Maintenance Management Plan can be found online at: http://cms.sbcounty.gov/dpw/PublicNotices.aspx#27545.

5. SURFACE WATER QUALITY

Stormwater runoff has long been recognized as one of the most persistent and serious contributors to the degradation of surface waters. The following describes the National Pollutant Discharge Elimination System (NPDES) requirements affecting San Bernardino County.

5.1 National Pollutant Discharge Elimination System

In 1972, the Federal Clean Water Act (CWA) established the NPDES program to regulate the discharge of pollutants from point sources to waters of the United States. However, pollutants from land runoff were largely unabated until the 1987 CWA amendments. In 1987, the CWA was amended to require public agencies that serve urbanized areas with a population above 100,000 and other designated areas to obtain permits to discharge stormwater runoff from municipally owned drainage facilities including streets, highways, storm drains and flood control channels.

In 1990, the United States Environmental Protection Agency (USEPA) promulgated enforceable regulations establishing Municipal Separate Storm Sewer System (MS4) Permit requirements under its National Pollutant Discharge Elimination System (NPDES) program. The NPDES program is intended to ensure, to the greatest extent possible, that discharges to surface waters do not adversely affect the quality and beneficial uses of such waters. NPDES permits are required by all entities that discharge pollutants from any point source into waters of the United States [40 CFR Part 122.1]. Agricultural activities are not subject to NPDES permits.

In California, the USEPA has delegated its NPDES permitting authority to the California State Water Resources Control Board (SWRCB). The SWRCB issues and enforces NPDES Municipal Separate Storm Sewer System (MS4) permits through Regional Water Quality Control Boards. Three regional boards—Santa Ana, Mojave River, the Colorado River-- cover San Bernardino County. Each regional board is charged by the Porter-Cologne Water Quality Control Act with the protection of water quality for waters within the region and implementing provisions and pollution control requirements that the federal Clean Water Act specifies for surface waters.

The Federal Clean Water Act [Section 303(d)] requires states to develop lists of waters that do not meet water quality standards through the implementation of technology-based controls. This planning process is known as Total Maximum Daily Loads (TMDLs). The TMDL process involves determining the amount of pollutants that can be allowed in each water body without exceeding water quality standards, and allocating responsibility for managing those pollutants. In accordance with California's "Porter-Cologne" Water Quality Control Act, any TMDL implementation program should be adopted as an amendment to the applicable Basin Plan.

5.2 Designated Impaired Waterways

Table 9 lists all the impaired waterways by impaired segment, type of impairment, and estimated TMDL completion date. A map of impaired waterways can also be found online at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml.

Table 9: Impaired Waterways in San Bernardino County as of 2012

Water Body	Impaired Segments	Impairments	Est. TMDL Completion
Amargosa River	Willow-Creek confluence to Badwater	Arsenic	2019
Colorado River	Stateline to Lake Havasu	Toxicity	2025
Colorado River	Lake Havasu Dam to Imperial Dam	Toxicity	2025
Searles Lake	Saline Lake	Salinity & Total Petroleum Hydrocarbons	2019
Mojave River	Forks Reservoir to Upper Narrows	Fluoride	2021
Holcomb Creek	No segment specified	Total Dissolved Solids	2021
Arrowhead Lake	Entire lake	Mercury	2025
Lake Gregory	Entire lake	Mercury	2025
Silverwood Reservoir	Entire lake	Mercury, PCBs	2025
Big Bear Lake	Entire lake	Mercury, Nutrients | PCBs	2007 | 2009
Grout Creek	No segment specified	Nutrients	2008
Rathbone Creek	No segment specified	Cadmium & Copper | Nutrients | Sediment	2021 | 2008 | 2006
Summit Creek	No segment specified	Nutrients	2008
Knickerbocker Creek	No segment specified	Pathogens	2005
Crab Creek	No segment specified	Total Dissolved Solids	2021
Sheep Creek	No segment specified	Total Dissolved Solids & Nitrate	2021
Santa Ana River	Reach 6	Cadmium, Copper, Lead	2021
Santa Ana River	Reach 4	Pathogens	2019
Mountain Home Creek	No segment specified	Pathogens	2019
Lytle Creek	No segment specified	Pathogens	2019
Mill Creek	Reach 1 & 2	Pathogens	2019
San Antonio Creek	No segment specified	pH	2021
Cucamonga Creek	Reach 2	pH	2021
Cucamonga Creek	Reach 1	Cadmium, Copper, Lead, Zinc | Coliform	2021 | 2007
Chino Creek	Reach 1B	Nutrients | Pathogens	2019 | 2007
Chino Creek	Reach 2	Coliform Bacteria | pH	2007 | 2021

Source: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml

5.3 Basin Requirements

In San Bernardino County, three regional boards—Santa Ana, Lahontan, and the Colorado River–are charged by the Porter-Cologne Water Quality Control Act with the protection of water quality for waters within the region and implementing provisions and pollution control measures specified for surface waters under the federal Clean Water Act. Each region implements a series of programs (described below) to achieve water quality objectives. Included in Appendix D is a watershed map showing the various regional water quality control boards (RWQCBs) and watersheds in San Bernardino County.

5.3.1 Santa Ana River Basin

The Santa Ana River Basin covers nearly 3,000 square miles of mountains, foothills, and valleys that cross portions of Los Angeles, Riverside, San Bernardino, and Orange Counties. The Santa Ana River channel, through both surface and subsurface flow, transects the watershed for a linear distance of 100 miles, from the San Bernardino National Forest in a southwesterly direction to its terminus into the ocean at Huntington Beach. The Upper Santa Ana River basin covers the Valley and Mountains Regions of San Bernardino County; the remainder of the Santa Ana River Basin is in other counties.

The Santa Ana RWCB has adopted a Basin Plan that identifies beneficial uses for waterbodies, establishes water quality objectives to protect those uses, and provides an implementation plan to protect water quality. Other key issues addressed in the plan include dairies in the Chino Valley and their impact on present and future water quality, including total dissolved solids and nitrates. This has led to a separate order issued by the SARWQCB for dairy operations. In addition, much of the region's efforts is focused on addressing the salt imbalance along the Santa Ana River.

The County is a co-permittee under a stormwater discharge permit, issued through the Santa Ana RWQCB. As the "Principal Permittee" under the MS4 Permit, the SBCFCD administers and coordinates many of the permit requirements on behalf of all the Permittees. Under Order No. R8-2010-0036, the County prepares and implements the following plans:

- Model Areawide Local Implementation Plan (Model LIP)
- Comprehensive Bacteria Reduction Plan
- Santa Ana Rivershed Technical Guidance Document for Water Quality Management Plans (WQMPs)
- Watershed Action Plan (WAP)
- Integrated Watershed Monitoring Program (IWMP)

Unlike the Lahontan and Colorado River RWQCBs, the many jurisdictions and communities in the Valley Region of San Bernardino County are covered under the County's MS4 permit. Many

communities may also need to comply with relevant grading and erosion control ordinances and regulations promulgated by the County or air quality management district.

5.3.2 Mojave River Basin

The Mojave River Watershed encompasses approximately 4,500 square miles and is located entirely within San Bernardino County. Much of the existing and projected future population is concentrated in Victor Valley, which includes the incorporated cities of Victorville, Hesperia, Apple Valley and Adelanto. The headwaters of the Mojave River are in the San Bernardino Mountains. The Mojave River channel, through both surface and subsurface flow, transects the watershed a linear distance of 120 miles to its terminus at Silver Dry Lake near Baker.

The Lahontan RWQCB has adopted a Basin Plan that identifies beneficial uses for waterbodies, establishes water quality objectives to protect those uses, and provides an implementation plan to protect water quality. The Basin Plan was updated in 2014 to address the remediation of groundwater contamination at China Lake, flexibility in the application of pesticides to water, and various minor amendments. The Mojave River has been selected as a priority or focus watershed because of the numerous water quality issues associated with the watershed.

The Mojave River Watershed Group (includes San Bernardino County, Hesperia, Victorville, Apple Valley, Phelan, Oak Hills, Spring Valley Lake, and unincorporated Victorville) has been issued a Small Municipal Separate Sewer System (Phase 2 MS4) permit. Under Order No. 2013-0001-DWQ, these agencies have prepared and implement the following plans:

- Stormwater Management Plan;
- Mojave River Watershed Technical Guidance-Water Quality Management Plans (2016);
- Model Areawide Local Implementation Plan (Model LIP)

It should be noted that many unincorporated communities within San Bernardino County that are in the Lahontan RWQCB are excluded from the Phase 1 or Phase 2 MS4 program. Some of these communities do not have at least 10,000 residents or do not have a density of at least 1,000 people per square mile. Some other communities, regardless of population, do not contain Waters of the United States.[4] Surface waters in such communities are contained within the existing area topography and are ultimately infiltrated into the underground aquifer. NPDES permits are not required in such areas.

However, jurisdictions and projects proposed exempt from MS4 permits must still adhere to construction and post-construction practices as required by their respective jurisdictions or the SWQRCB to ensure that best management practices are followed. Desert areas may also need to

[4] Waters of the United States include waters that are or have been used, or could be used, in interstate or foreign commerce; interstate waters including interstate wetlands; tributaries of the aforementioned categories of waters; territorial seas; and wetlands adjacent to the aforementioned categories of waters.

comply with relevant grading and erosion control ordinances and regulations promulgated by the County or air quality management district.

5.3.3 Colorado River Basin

The Colorado River Basin covers over 240,000 square miles of the western United States and includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. Regional drainage waters from the Colorado River drain into the Salton Sea. Multiple dams along the Colorado River divert water to users in accordance with documents collectively referred to as the "Law of the River." This includes interstate compacts, federal legislation, water delivery contracts, state legislation, a treaty with Mexico, and US Supreme Court decrees. For reporting purposes, the basin is divided into seven major planning areas, of which several are within San Bernardino County.

The Colorado River RWQCB has adopted a Basin Plan that identifies beneficial uses for waterbodies, establishes water quality objectives to protect those uses, and provides an implementation plan to protect water quality. The Colorado River Basin Plan was adopted in 2006 with amendments most recently in 2014 to address recent issues. Priority issues for the Basin include, but are not limited to:

- Agricultural uses in the Imperial Valley and Palo Verde Valley
- Surface water quality issues in the Salton Sea and its tributaries
- Leaking underground storage tanks
- Onsite wastewater treatment systems in the Colorado region
- Bacteria plan for the Coachella Valley

Incorporated cities and unincorporated communities within San Bernardino County within the jurisdiction of the Colorado River RWQCB are excluded from Phase 1 or Phase 2 MS4 permits. These excluded communities include smaller communities within the Lucerne Valley and the Morongo Basin. These jurisdictions either do not have at least 10,000 residents or do not have a population density of at least 1,000 people per square mile. As there are no Waters of the US in these areas, these communities are not covered by an MS4 permit.

However, jurisdictions and projects exempt from MS4 permits must still adhere to construction and post-construction practices to control and reduce stormwater runoff as required by their respective jurisdictions or SWQRCB to ensure implementation of best management practices where feasible. In desert areas, communities and projects may also need to comply with grading and erosion control regulations promulgated by the County or air quality management district.

6 GROUNDWATER CONDITIONS

Groundwater resource protection in San Bernardino County depends upon the continued availability of groundwater through ensuring that extraction activities do not exceed the safe yield of aquifers, considering both the short and long-term impacts of groundwater extraction, including the recovery of groundwater aquifers through natural and artificial recharge. Groundwater resource protection also includes the consideration of the health of individual aquifers and the continued ability of those aquifers to store and maintain water.

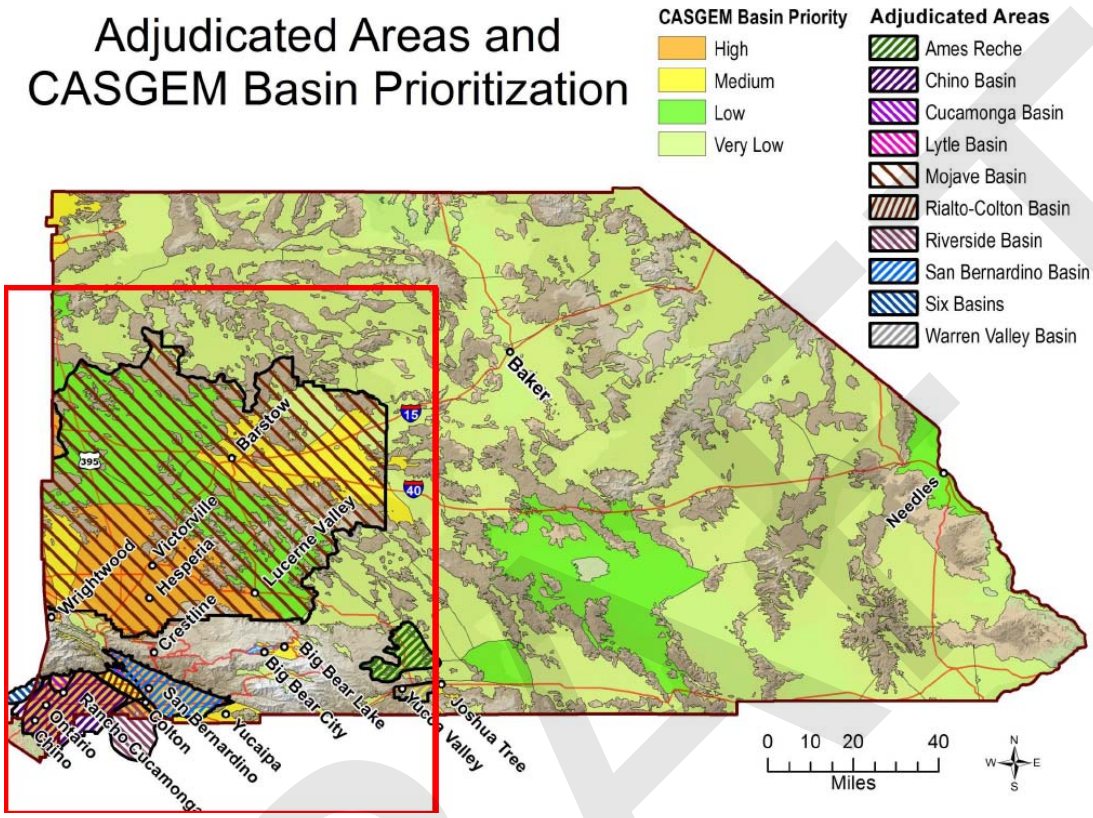
6.1 Groundwater Management

In 2014, the Legislature passed the Sustainable Groundwater Management Act (SGMA) to address the long-term sustainable management of groundwater in California. This ground-breaking legislation is the result of severe water shortages in certain areas of California, long-term issues with land subsidence, and continued overdrafting of groundwater aquifers. Although the issues driving this legislation are statewide, particularly for central California, the SGMA set the stage for a more coordinated statewide approach to managing groundwater.

To further this mandate, the Department of Water Resources (DWR) has developed a Strategic Plan for its Sustainable Groundwater Management Program. The DWR was tasked with a variety of responsibilities, including: (1) developing regulations to revise groundwater basin boundaries; (2) adopting regulations for evaluating and implementing Groundwater Sustainability Plans (GSPs) and coordination agreements; (3) identifying basins subject of concern; (4) identifying water available for groundwater replenishment; and (5) publishing best management practices.

DWR has identified the status of water basins by overdraft (critically or not critical) and different priority levels (e.g., very low, low, medium, or high priority). Critically overdrafted basins that are assigned a high or medium priority must be managed under a GSP by January 31, 2020. All other high and medium priority basins must be managed under a GSP by January 31, 2022. However, this requirement does not apply to areas where the water rights have been adjudicated. Appendix D provides a map of the medium and high priority water basins within San Bernardino County and where adjudication has been determined.

As of 2016, only one of the county's groundwater basins are *critically* overdrafted: the Indian Wells Valley basin, which just overlaps the county boundary near Trona. Of the dozen medium and high priority water basins, only a handful of groundwater basins have not been adjudicated and would be required to prepare a GSP by 2022. For other groundwater basins designated as low or very low priority, the Water Code encourages and authorizes (but does not require) that public agencies form GSAs and develop GSPs, update groundwater management plans, or collaborate with others to develop new plans in accordance with Water Code 10750. The following figure highlights priority basins and the status of adjudication.



Identification of Basin Priority and Adjudicated Areas

For the areas outside the Mojave River Basin that are unadjudicated, the County adopted a Desert Groundwater Management Ordinance designed to protect groundwater resources in the unincorporated and unadjudicated desert region (Ordinance 33.06551). Well proposals located outside of the jurisdictional boundaries of the Mojave Water Agency and Public Water Districts within the Morongo Basin and which are situated in the unincorporated desert region of the County must either adopt a groundwater management plan or fall under one of the specified exclusions. In addition, a permit is required for any new groundwater well.

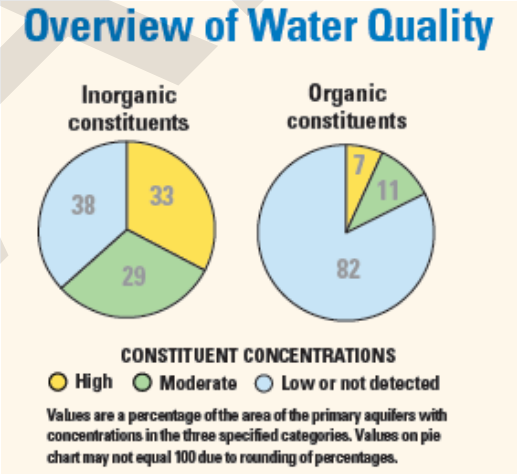
The last significant piece of legislation enacted that affects sustainable groundwater management is AB 1739 (Chapter 347, Statutes of 2014), which reinforces the State Legislature's intent to link local land use planning and groundwater management. GSAs are required to take into account the most recent planning assumptions stated in local general plans overlaying the basin in their water planning efforts. Moreover, prior to adoption or substantial amendment of a general plan, the planning agency is required to review and consider a GSP, GMP, groundwater management order, judgement, decree, or adjudication of water rights. This mandate will ensure that land use decisions and water supplies are considered in tandem.

6.2 Groundwater Quality

The Groundwater Quality Monitoring Act of 2001 was enacted to address statewide concerns with groundwater quality. To implement this act, the SWRCB and USGS initiated the GAMA Priority Basin project to assess and monitor the quality of groundwater in all priority basins. The priority basins chosen account for 90% of all groundwater in the state. Monitoring and assessments are on a ten-year cycle, with more frequent trend monitoring. The GAMA Priority Basin Project focuses on an assessment of the quality of "untreated" groundwater, not the quality of drinking water, which is regulated by state and federal law.

Groundwater quality is rated against federal and state regulatory benchmarks (e.g., Maximum Contaminant Levels, MCL) when available. Concentrations are considered high if they exceed a benchmark MCL. For inorganic constituents, concentrations are moderate if they are greater than one half a benchmark. For organic and special interest constituents, concentrations are moderate if greater than 1/10 of a benchmark; this lower threshold was used because organic constituents are less prevalent and have smaller concentrations relative to benchmarks than inorganic constituents. Low include non-detections and values less than the moderate concentrations

6.2.1 Santa Ana Basin



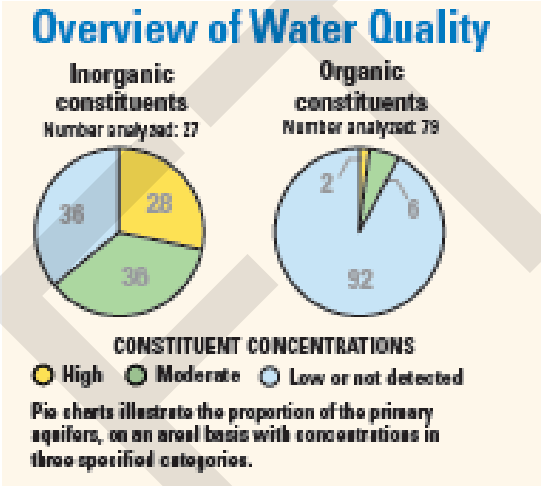
In the Upper Santa Ana Watershed area, one or more organic constituents were present at high concentrations in 7% of the primary aquifers and at moderate concentrations in 11%. Inorganic constituents were present at high concentrations in 33% of the primary aquifers and moderate concentrations in 29% of primary aquifers.

Trace elements with human health benchmarks were present at high levels in 7% of primary aquifers. Arsenic, boron, and molybdenum were most frequently found at high concentrations. Aluminum, fluoride, lead, uranium, and vanadium were also detected at high concentrations, but in less than 2% of the primary aquifers. Gross alpha radioactivity, uranium, or radium-2228 occurred at high concentrations in 4% of the primary aquifers and at moderate levels in 14%.

Of additional interest, nitrate was found at high levels in 25% of the aquifers. Solvents were detected at high levels in 3% of primary aquifers. 1,2-Dibromo-3-chloropropane, a fumigant, was detected at high concentrations in 4% of the primary aquifers. Perchlorate was found at high concentrations in 11% of the primary aquifers, and at moderate concentrations in 53%. There are several major groundwater contamination plumes in the Upper Santa Ana River Valley

Groundwater Basin; pollutants include 1,2-dichloroethylene (1,2-DCE), trichloroethylene (TCE), perchloroethylene (PCE), debromochloropropane, (DBCP), and perchlorate.

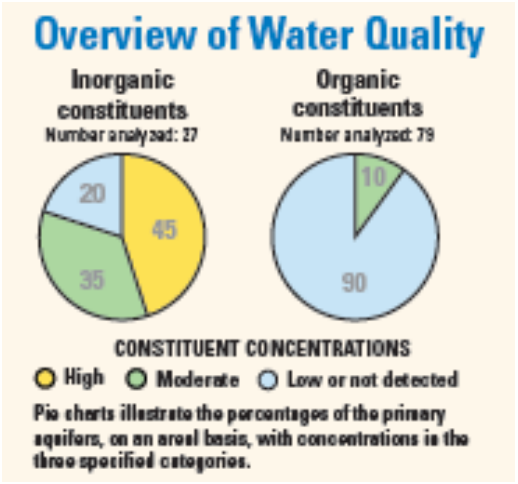
6.2.2 Mojave Basin



In the Mojave study area, one or more inorganic constituents were present at high concentrations in 28% of primary aquifers and at moderate concentrations in 36%. Meanwhile, organic constituents were present at high concentrations in 2% of the primary aquifers and at moderate concentrations in 6%.

Trace elements were present in 33% of the primary aquifers and at moderate concentrations in 22%. Of the 17 trace elements analyzed, 6 were detected at high levels: arsenic, boron, fluoride, molybdenum, strontium, and vanadium. Radioactive constituents were detected at high concentrations in 2% of the primary aquifers and at moderate concentrations in 15%. Perchlorate was found at moderate concentrations within 22% of the samples and nitrates were detected at concentrations above benchmarks. There are several plumes in the region. Of particular note, groundwater under Hinkley is contaminated with hexavalent chromium or Cr6 remaining from past use at a Pacific Gas & Electric (PG&E) facility.

6.2.3 Colorado River Basin



One or more inorganic constituents were present at high concentrations in 45% of the primary aquifers and at moderate concentrations in 35% of aquifers. Organic constituents were present at moderate concentrations in 10% of the primary aquifers

Trace elements were present at high concentrations in 40% of the primary aquifers, and at moderate concentrations in 30% of the primary aquifers. Of the 17 trace elements analyzed in this study, high concentrations were detected for arsenic, boron, fluoride, molybdenum, and strontium. Cr6 was also detected at moderate concentrations.

It should be noted, however, that groundwater is typically treated before consumption. Common methods used to ensure that groundwater meets state and federal standards include disinfection, filtering, blending, and other techniques. Water purveyors in California are required to meet stringent state and federal drinking water standards to protect public health.

6.2.4 Groundwater Quality Programs

As authorized by state and federal law, the California Water Resources Control Board and its regional boards implement a variety of programs to address the quality of the groundwater. Key statewide programs are summarized below:

- **Groundwater Quality Standards.** The SWRCB adopts and implements numerical and narrative standards called water quality objectives (WQOs) to protect beneficial uses of groundwater. To achieve this goal, Water Boards identify the actual and likely future groundwater uses, and the applicable protection standards for each groundwater basin.

- **Groundwater Monitoring**. The SWRCB samples community and domestic water supply wells for a variety of historic and emerging pollutants using ultra-low detection limits. The Water Boards use these data to help prioritize cleanup work and permitting decisions to ensure that high quality groundwater is protected.

- **Regulatory Activities**. The SWRCB implements programs that regulate the discharge of pollutants to the ground, and cleanup pollution within the ground. These programs aim to prevent the release of hazardous substances from a variety of facilities – such as landfills, waste disposal sites, and service stations– clean up spills and leaks that may occur.

- **Financial Assistance**. The SWRCB provides grants and loans for constructing municipal sewage and water recycling facilities, remediation for underground storage tank release, watershed protection projects, nonpoint source pollution (NPS) control projects, public drinking water system projects, and other projects.

The Department of Toxic Substances Control (DTSC) is charged with protecting California's people and environment from harmful effects of toxic substances. This is achieved by restoring contaminated resources, enforcing hazardous waste laws, reducing hazardous waste generation, and encouraging the manufacture of chemically safer products. DTSC works closely with the SWRCB on enforcing or overseeing the cleanup of various plumes that affect the quality of groundwater or drinking water supplies. Specific projects include the PG&E Topock Compressor Station in Needles, Hinkley facility, Newmark facility in San Bernardino, and other facilities.

Individual water suppliers also implement numerous programs to address groundwater quality. These include wellhead protection, disinfection/treatment, mixing/blending, and other programs too numerous to mention in this report. Additional information on groundwater quality programs can be found within the urban water management plans of each water agency.

6.3 Drinking Water Quality

The southern California region relies on a mix of groundwater water, surface water, and imported water to meet its drinking water needs. The State Water Resources Control Board has assumed responsibility for monitoring and regulating the quality of drinking water in California form the California Department of Public Health. In implementing its mission, the SWRCB is committed to implementing UN Resolution 64/292, Human Right to Water and Sanitation, to provide clean drinking water and sanitation to all people in California.

6.3.1 Drinking Water Quality

Fundamental to the mission of SWRCB is the provision of healthful drinking water. The Health and Safety Code requires that water supplies provided to customers must meet minimum quality standards. As described later, the County of San Bernardino is also involved in ensuring the delivery of clean and healthful drinking water.

Water quality standards fall into two general categories.

- **Public Health Goals (PHG)**: PHGs are established by the Office of Environmental Health Hazard Assessment (OEHHA). PHGS are concentrations of drinking water contaminants that pose no significant health risk if consumed for a lifetime, based on current risk assessment principles, practices, and methods. OEHHA establishes PHGs pursuant for contaminants with MCLs, and for those for which MCLs will be adopted.

- **Maximum Contaminant Levels (MCL):** The MCL is the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, allowing an adequate margin of safety. State law requires a contaminant's MCL to be established at a level as close to its PHG as is technologically and economically feasible, placing primary emphasis on the protection of public health

Appendix D includes a table reflecting California's current maximum contaminated levels (MCLs) and public health goals (PHGs) for regulated drinking water contaminants in California.

Although these regulations affect the usefulness of groundwater in a particular region, the responsibility to control and treat groundwater is the sole responsibility of the water purveyor. In addition, all new wells must be permitted and accompanied by the water well driller's report, bacterial analysis, inorganic chemical analysis, general physical assessment, radiological analysis, nitrate analysis, organic chemical analysis and general mineral breakdowns. All of these tests must comply with drinking water quality requirements before being put into use. Ultimately, all water delivered by water purveyors and private wells must meet or exceed water quality standards established by state and federal drinking water regulations.

6.3.2 Constituents of Emerging Concern (CEC)

CECs are typically classified as the pharmaceuticals that people use to treat illnesses as well as everyday products that people use for personal care including shampoos and detergents. These constituents enter into the wastewater and subsequently the water supply by human waste and improper disposal methods. Generally, these constituents are found at trace levels in many water sources including potable water from treatment facilities, underground aquifers, and recycled water.

Conventional wastewater treatment partially removes CECs to very low levels or levels below detection. As analytical methods continue to improve to allow the detection of even lower levels of contaminants, more compounds will be found but the ability to detect a compound does not necessarily translate to human health concerns. Water and recycled water treatment agencies are responsible for producing high-quality water through source control, treatment, monitoring and research.

There are currently measures in place to reduce the amounts of CECs entering into the water systems including outreach to the general public and collaboration amongst regulators. California and its associated counties are actively monitoring levels of CECs; but no legislation has currently been passed specifically addressing the issue within San Bernardino County.

6.3.4 Small Drinking Water Programs

The DEHS Small Drinking Water System Program protects public health and safety by inspecting water systems to ensure pure and safe drinking water is supplied throughout San Bernardino County. In partnership with small drinking water systems owners/operators, DEHS conducts routine inspections to prevent waterborne diseases, identify risks of bacteriological, chemical and/or radiological contamination, and provides technical assistance.

DEHS has an agreement with the California Department of Public Health, Drinking Water Program for administration and enforcement of federal and state statutes and regulations for any water systems under 200 service connections. Currently, there are 272 small drinking water systems in the County. DEHS is currently using a grant to take domestic well water samples for known or suspected contaminants for their voluntary Domestic Well Water Sample Program. The goal is to identify contaminants of concern and to notify the property owner of the results so they can be properly informed regarding their well water quality.

6.3.5 Wastewater Impacts on Groundwater Quality

Wastewater from septic tanks has long been an environmental concern in southern California. As early as 1989, the State Water Resources Control Board identified high concentrations of nitrate from septic tanks as one of the leading long-term threats to groundwater quality in California. Excessive nitrate levels are associated with a range of deleterious health effects, some of which can be fatal to children and other vulnerable populations. Similarly, pathogens from leaking septic tanks can also lead to a range of human diseases, including diseases that can be fatal. As such, the

State Water Resources Control Board implements regulations to reduce the impact of wastewater sources on groundwater quality in accordance with state law (AB 885).

In 2012, the State Water Resources Control Board adopted Resolution No. 2012-0032, which provides the water quality control policy for siting, design, operation, and maintenance of onsite wastewater treatment systems (OWTS). This policy establishes a statewide, risk-based, tiered approach for the regulation and management of OWTS installations and replacements that have affected, or will affect, groundwater or surface water to a degree that makes it unfit for drinking water or other uses, or cause a health or public nuisance condition. RWQCBs incorporated the standards established in the OWTS Policy, or standards that are more protective of the environment and public health, into their water quality control plans. Implementation is overseen by the State and regional water quality boards and local agencies (e.g., county and city departments and independent districts).

The County of San Bernardino adopted a Local Area Management Program (LAMP) to comply with the state's OTWS Policy. The LAMP provides minimum standards and requirements for the treatment and disposal of sewage through OWTS when no connection to a sewer is available. Requirements for new development include siting standards for OWTS located near drinking water wells, impaired waterways, sources of groundwater, and other specific land uses. Regulations include minimum lot size, residential density, minimum setback requirements, natural ground slope and percolation, OWTS design specifications, and other criteria. In addition, OTWS are not allowed in certain areas of the county where a moratorium exists due to the high concentration of existing OWTS or proximity to groundwater or surface water sources. These communities include:

- Grand Terrace (County Service Area 70, Improvement Zone H)
- Yucaipa – Calimesa
- Lytle Creek (above 2,600 ft MSL)
- Mill Creek (above 2,600 ft MSL)
- Bear Valley (including Baldwin Lake drainage area)
- Lahontan RWQCB Prohibition Areas 1-5

Addressing the issue of water quality is problematic for many small communities. For community water supplies, there are at least five options for improving potable water supplies:

(1) Locating and developing a new source of drinking water

(2) Purchasing drinking water from another water system

(3) Blending water from a contaminated source with water from uncontaminated source(s)

(4) Building and operating a treatment plant to remove contaminants; or

(5) Installing point-of-use (POU) treatment devices at each drinking water tap

(6) Haul in bulk domestic water supplies, either by truck or bottle

For non-community water systems (e.g., schools, restaurants, churches, motels, etc. served by their own water supply), a point of entry (POE) treatment system can be effective. However, a POU system can also be effective for residents served by individual wells.

Table 10: Communities Vulnerable to Groundwater Quality Concerns

Community	Issue	Concern
Morongo Valley	WQ	Water quality supplies are contaminated with high levels of uranium that may exceed MCLs.
Joshua Tree	WQ	Numerous wells in the JBWD system have Cr6 levels that exceed the new state MCL.
Newberry Springs	WQ	High fluoride concentrations
East of Barstow	WQ	UST leakage – benzene, toluene, MTBE, etc.
West of Barstow	WQ	OWTS density and leaching, industrial pollutants, illegal dumping
Wrightwood	WQ	Nitrates from OWTS density, Cr6
Phelan Pinion Hills	WQ	Nitrates from OWTS density, Cr6
Oak Hills (CSA 70 J)	WQ	Nitrates from OWTS density, Cr6
Pioneertown, Hacienda Heights, and Little Morongo (CSA 70)	WQ	CSA 70 W-3 and CSA 70 F water wells exceed MCL for gross alpha and uranium. CSA 70 W-4 water wells exceed the MCL for arsenic, fluoride, and uranium.

Source: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2012.shtml

APPENDIX A

Community Boundary Map

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Community Boundary Map

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APPENDIX B

Water and Wastewater Maps and Matrices

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Water and Wastewater Maps and Matrices

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APPENDIX C

Regional Stormwater Maps and Information

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Regional Stormwater Maps and Information

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APPENDIX D

Water Quality Maps and Information

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Water Quality Maps and Information

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