SECTION 6: RELIABILITY PLANNING

Severe droughts, including the most recent State drought (pictured), highlight the need for strong water supply management. Schwarzenegger's signing of the 2009 Water Conservation Act enforces a mandatory conservation of up to 20% by 2020 that applies to Urban Water Management Plans.

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Section 6

RELIABILITY PLANNING

Due to recent severe droughts (pictured), it is important to evaluate water supplies under future drought conditions.

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6.1 OVERVIEW

Drought conditions continue to be a critical issue for Southern California's water supply. As the population of Southern California continues to increase while competition, environmental regulations, and court judgments restrict water supplies, it is important that each agency manage its water supplies and consumption in the face of drought. A strong understanding of water supply sources, and the current state, regional, and local issues affecting those sources, are a first step to properly managing supply and demand. Ultimately, water agencies must plan for a worst-case scenario, so that during times of seasonal drought, each agency can expect adequate supplies in case of demand increases.

This section discusses local and regional efforts to ensure a reliable supply of water. This section also compares projected supply to projected demand over a 25-year planning period for various climate scenarios. Demand and supply projections are provided in **Tables 6.4** - **6.10**.

6.2 HISTORIC DROUGHTS

Climate data has been recorded in California since 1858. Since then, California

has experienced several periods of severe drought, including: 1928-34, 1976-77 and 1987-91, 2007-2009, and most recently in 2011-2016. In addition to these, California has also experienced several periods of less severe drought. Among the aforementioned droughts, the year 1977 is still considered to be the driest year of record in the Four Rivers Basin by DWR (these rivers flow into the Delta and are the source of water for the State Water Project).

In 1983, as a result of previous droughts, the State legislature enacted the UWMP Act, which requires the preparation of this UWMP. Several subsequent amendments have been made to the Act to ensure such items as public coordination, recycled water, and contingency response plans are included in UWMPs, among other items.

In 1991, as a result of the 1987-1991 drought, over 100 water agencies and environmental groups came together to form the California Urban Water Conservation Council (CUWCC) to manage the impacts of drought through the promotion of water conservation. The CUWCC has grown in significance and their established Best-Management-Practices or "BMPs" are required of all agencies in their UWMPs.

In 2009, as a result of the drought of 2007-2009, Gov. Arnold Schwarzenegger signed the Water Conservation Act of 2009 (SBx7-7), which is perhaps the strongest piece of legislation to date on water conservation, requiring mandatory water conservation up to 20 percent by 2020.

At the local level, water agencies have enacted their own ordinances to deal with the impacts of drought. For instance, Chapter 13.40 of the City's municipal code deals with Water Conservation. In addition, the City has established several recent ordinances in response to recent drought of 2011-2016. More on the City's code and ordinances can be found in **Section 8**.

6.3 RECENT DROUGHT (2011-2016)

A significant drought hit the state of California in 2011-2016. The drought depleted reservoir levels all across the state, as reflected by **Figure 6.1** on the following page. In January of 2014, Governor Brown declared a state of emergency and directed state officials to take all necessary actions to prepare for water shortages. As the drought prolonged into 2015, Governor Brown gave an executive order in April 2015 which mandated a statewide 25% reduction in water use.

In January of 2016, the DWR and the U.S. Bureau of Reclamation have finalized the 2016 Drought Contingency Plan that outlines

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Figure 6.1: Lake Oroville During Recent State Drought of 2011-2016

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outlines State Water Project and Central Valley Project operations for February 2016 to November 2016. The plan was developed in coordination with staff from State and federal agencies. One of the key purposes of the plan is to communicate goals for water management and the potential operations needed to achieve those goals for water resources stakeholders and the public.

Although the recent drought has more significantly impacted northern surface waters and central-valley agencies that use SWP water for agriculture, the City is indirectly impacted by the recent conditions of Northern California Waters, primarily due to the competition of Colorado River Water Users who also happen to use SWP Water (most notably MWD).

To date, Californians have reduced water use by about 25 percent since the emergency conservation regulations took effect in June of 2015. This continues to meet Governor Brown's 25 percent mandate (despite a decline in the statewide water-savings rate for the last two months).

6.4 STATE SUPPLY RELIABILITY

As a result of continued challenges to the State's water supplies, SWP Contractors understand the importance of reliable water supplies. With close participation of its Contractors, DWR strives to meet the water

Figure 6.2: Lake Oroville at End of State Drought (Feb 2017)

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needs of Southern California by developing new projects to increase the capacity of its supplies while encouraging its member agencies to develop local supply project to meet the needs of its customers. Also, DWR is committed to developing and maintaining high-capacity storage reservoirs, including both those which are DWR-owned and Contractor-owned (such as Diamond Valley Lake, an MWD-owned reservoir -the largest in Southern California), to meet the needs during times of drought and emergency.

The large reservoirs help to avoid the repercussions of reduced supplies not only from the SWP but also the Colorado River Aqueduct (CRA). Throughout the Los Angeles Region, a total of three (3) DWR-owned reservoirs, nine (9) MWD-owned reservoirs, and twenty-four (24) SDCWA reservoirs contain up to 2.2 million acre-feet (MAF) of water storage.

6.4.1 STATE WATER PROJECT RELIABILITY

Although not a SWP Contractor, IID has transfer agreements in place with SWP contractors, and as such, is indirectly affected by SWP reliability. On an annual basis, each of the 29 SWP Contractors, request an amount of SWP water based on their anticipated yearly demand. Each SWP contractor's Water Supply Contract contains a "Table A" amount that identifies

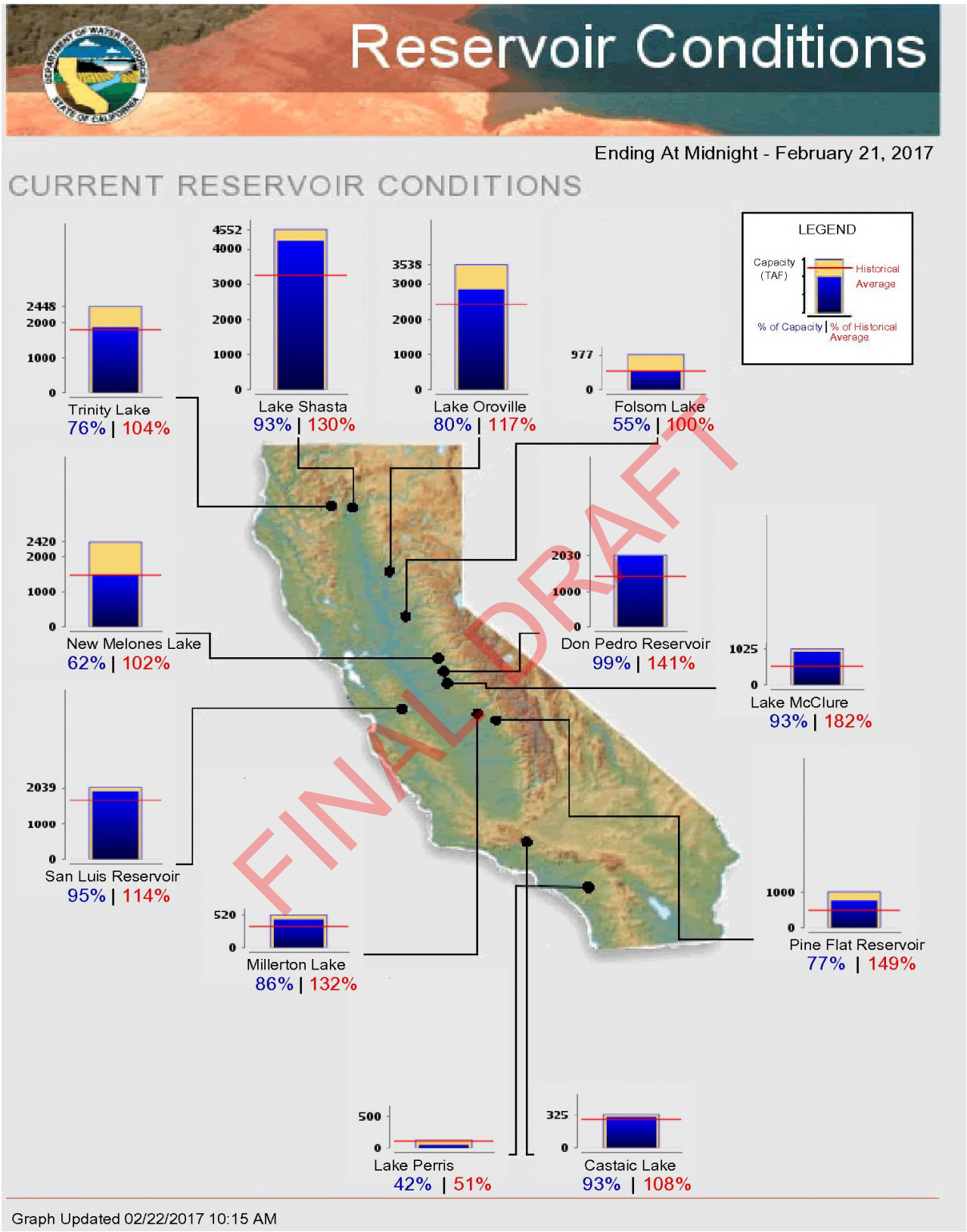

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Figure 6.3: California State Reservoir Levels (Showing End of Drought in Feb 2017)

the maximum amount of water that a contractor may request. However, the amount of SWP water actually allocated to contractors each year is dependent on a number of factors than can vary significantly from year to year. The availability of SWP supplies is generally less than their full Table A amounts in many years and can be significantly less in very dry years. After receiving the requests, DWR assesses the amount of water supply available based on precipitation, snow pack on Northern California watersheds, volume of water in storage, projected carry over storage, and Sacramento-San Joaquin Bay Delta regulatory requirements. For example, according to the State Water Project Delivery Reliability Report 2015, the total SWP annual delivery of water to contractors ranged from 3.7 MAF in 2005 to 476,743 AF in 2014.

SWP supplies are typically less than the maximum "Table A" amounts requested by the Contractors each year

Due to the uncertainty in water supply, contractors are not typically guaranteed their full Table A amount, but instead a percentage of that amount based on available supply. For instance, the current DWR Notice 16-06 (April 2016) indicates that 2016 SWP allocation is set at 60% (up from 30% in February) for all Contractors. For agencies that deal with IID, such as MWD, this means their supplies from the SWP should be at 60% of their full "Table A" amounts for 2016 (1,146,900 AF for MWD). DWR's Bulletin 132-14, November 2015, provides certain SWP reliability information, and in July 2015, the DWR Bay-Delta Office prepared a report specifically addressing the reliability of the SWP.

The reliability of the SWP obviously impacts the Contractors ability to plan for future growth and supply and causes them to seek out other supply sources or transfer agreements (such as MWD's transfers with IID). Although not largely important for IID, SWP matters do play a small role in the way the State and other water agencies interact with IID.

6.4.2 COLORADO RIVER RELIABILITY

Water supply from the Colorado River continues to be a critical issue for IID as Southern California as a whole competes with several other States for Colorado River water supplies. The hydrology of the Colorado River Basin is known to be highly variable, and in the past 16 years, the Lower Colorado River Basin has been suffering from its own drought (in addition to five years of drought across California). For instance, annual inflow to Lake Powell from 2000-2016 ranged from a low of 2.64 MAF in 2002 to a high of 15.97 MAF in 2011. Current

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Figure 6.4: Colorado River Basin

Figure 6.5: All-American Canal Lining Project Improves Reliability of Colorado River Supplies

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forecast models project total Colorado River Basin storage (primarily Lake Powell and Lake Mead) at the end of water year 2017 will be about 29.5 MAF or 50 percent of capacity.

As a result of this, in 2014, the Secretary of the Interior tasked the Colorado River Basin States with developing drought contingency plans. As part of this process, the Lower Basin States (California, Arizona, and Nevada) signed a Memorandum of Understanding (MOU) which seeks to ensure an additional 3.0 MAF of water is preserved in Lake Mead though 2019. As for the State of California, the needs of the Colorado River water users, including MWD and IID, will continue to be met largely due to the effective implementation of the State's plan to utilize and distribute its Colorado River water.

Improving Colorado River Supply Reliability

Studies in the 1990s concluded that up to 70,000 acre-feet per year of water was lost due to seepage along a 23-mile section of the All-American Canal running through the sand dunes from Pilot Knob to Drop 3. For years, the cost associated with mitigation was prohibitive. In 1998, however, laws were enacted which allowed for the lining of the

All-American Canal or to recover seepage from it. Later that year, $235 million was appropriated for a water project that ensures continued flows from the Colorado River. Of that appropriation, $200 million was used to concrete line part of the All-American Canal and its Coachella branch. The remaining $35 million went to increase underground water storage along the Colorado River aqueduct (north of the Canal).

Completed in 2009, the 23-mile All-American Canal lining project now saves about 70,000 AF of water per year.

Construction began in 2007 which consisted of concrete lining of a 23-mile concrete lined canal parallel to the existing earthen canal, from one mile west of Pilot Knob to Drop 3. The 2009 completion of the All-American Canal Lining Project resulted in the concrete lining of 23 miles of the unlined Canal. After completion, the flows were then transferred to the concrete lined canal for this 23-mile stretch. The new concrete lined section of the AAC will conserve 67,700 acre-feet per year of Colorado River water that was previously lost to seepage.

6.5 COMPETITION FOR WATER RIGHTS

The *Law of the River* is essentially a compilation of numerous compacts, state and federal laws, court decisions and decrees, contracts, and regulatory guidelines which define rights to water from the Colorado River. These documents apportion the water and regulate the use and management of the Colorado River among the seven basin states and Mexico. A brief listing of these items is as follows:

- Colorado River Compact (1922)
- Boulder-Canyon Project Act (1928)
- CA Seven Party Agreement (1931)
- Arizona v. California (1964)
- CO River Basin Project Act (1968)
- Arizona v. California Supplemental Decision (1979)
- Quantification Settlement Agreement (2003)

Per the 2003 Quantification Settlement Agreement (QSA), California's allocation has been confirmed (re-established) at 4.4 MAF per year (as it was in the 1931 Agreement), with IID's allotment established at 3.1 MAF. With the largest water rights of Colorado River water among the Lower Basin states (3.1 million acre-feet), IID's water conservation efforts are paramount to maintaining agricultural production and water conservation for Southern California.

IID's Water Rights Vulnerability

Under the *Law of the River*, IID retains a legal right to annual net consumptive use of 3.1 MAF from the Colorado River. Even in

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drought years with Lower Colorado River flows less than 7.5 MAF, the existing laws and agreements provide security that the IID should receive its Present Perfected Rights of 2.6 MAF and its overall water allocation remains at 3.1 MAF. Under the terms of various agreements and laws, the annual Colorado River flows would have to be reduced to less than 5.0 MAF (one-third of historic average) before the water supply to IID would be impacted. Nevertheless, in the face of a large-scale water supply disruption in the western states, IID is potentially subject to some water supply reduction.

Due to a long history of CO river water rights, IID's water rights are fairly secure, even during periods of drought.

6.6 IMPLEMENTATION OF IID'S RIGHTS

Since the 2003 implementation of the QSA, IID has aggressively been conserving water to meet the ramping-up conservation, expecting to generate more than 314,000 AF in 2016 for the QSA. This is in addition to the 105,000 AF generated annually by the conservation program funded by the MWD and the 67,700 AF conserved by the All-American Canal Lining Project.

Collectively, with all its conservation efforts, IID will ultimately conserve about 15 percent of its consumptive use entitlement each year – over 487,000 acre-feet when all conservation measures are at full implementation.

IID Drought Apportionment for Urban Areas

For severe droughts, where there may be a Supply/Demand Imbalance (SDI), IID's Equitable Distribution Plan (EDP) governs. The EDP was adopted in 2007, and most recently updated in 2013, allowing the IID Board to make an annual determination as to Supply/Demand Imbalance (SDI) conditions. Apportionment of municipal, industrial, geothermal, feedlots/dairies, and environmental resources was prescribed in the EDP. The EDP prescribes the amount of water that IID water users receive during SDI conditions.

As part of the Equitable Distribution Plan, a District Water Exchange is established so that agricultural water users can sell and buy water. This provides flexibility for some agricultural water users to obtain water in addition to straight-line apportionments.

As far as the City of Calexico is concerned, under the Equitable Distribution Plan, when a supply/demand imbalance is declared, IID apportions the estimated supply for urban water users such that, per Section 3.1a of the 2013 EDP Update, "Municipal Users" will receive the first allocation, which will consist of a base amount of 2006 usage plus

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current City-wide average use on a per capita basis multiplied by the increase in population since 2006. This method will be applied later in this Section (**Table 6.9**) when assessing projected supplies versus projected demand.

Recent IID Apportionment for City (2016)

As a result of the State Drought and the Colorado River regional drought over the past several years, IID issued a letter to the City in December of 2015 which apportioned a volume of 8,098.5 AF for the City in 2016. As indicated by the City's recent use from 2011 to 2015 (see **Table 5.2**), IID's apportionment for 2016 is more than adequate to meet demands.

6.7 CITY SUPPLY RELIABILITY

As the City obtains all of its supply water from the Colorado River via IID canals, the City's water supply reliability is based entirely on the reliability of IID's water rights, which were addressed in the previous **Sections 6.1 to 6.6**. Population growth will also continue to be a factor in future reliability projections, since the City has open spaces ready for development. Also, due to the arid nature of the City's climate and as a result of past drought conditions, the City it is expected to be vulnerable to high increases in water demand due to its hot summer months.

Imported (Surface) Water Vulnerability

Sections 6.4 to **6.6** discussed the vulnerability of IID's water rights, and determined that IID's water rights were fairly secure, unless the current drought in the Lower Colorado River basin becomes borderline catastrophic. In addition, due to the All-American Canal lining, and the IID's efforts in implementing conservation measures related to the 2003 QSA, it is reasonable to expect IID's supplies to remain intact for the foreseeable planning period of this UWMP (i.e. through 2040).

Groundwater Vulnerability

Although the City does not use groundwater, groundwater supplies are typically considered a very reliable source of supply, even in drought years, (for up to 5 years of drought). If the City were able to pump groundwater at some point in the future, it would strengthen the City's supply reliability.

Recycled Water Vulnerability

Since recycled water is produced from wastewater, this source has the advantage of consistently being available during any type of average, single-dry, or multiple-dry year as discussed in **Section 3**. If the City were to use recycled water at some point in the future, it would greatly add to the City's supply reliability, especially since the

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majority of the City's water is used for landscaped irrigation landscapes (i.e. lawns, parks, athletic fields, etc).

6.7.1 SUPPLY VS. DEMAND COMPARISONS

Basis for Projected Comparisons

To project future supply and demand comparisons during normal climate conditions, it will be assumed that demand will change annually based on changes in population along with a constant consumption rate of 152 GPCD in accordance with the average of the last 10 years (2006-2015) per **Section 5**.

During times of drought, however, demand is expected to increase at a time when supplies are prone to decreases. To project demands during single and multiple (three) year drought periods, the following increase factors observed from historical demand data from the following historical drought years will be assumed:

Table 6.1
Demand Increases: Historic Basis

Normal Water Year	Single Dry Year	Mult. Dry Year
1990	1974	1996-1998
---	103.2%	101.3%

As for supplies, because IID's supplies are fairly drought-proof as mentioned in previously, it is not likely that supplies will be restricted per IID's Equitable Distribution Plan (EDP) for routine dry conditions, even up to three year periods. In fact, IID did not implement any part of its EDP through the 2007-2009 drought. However, IID did implement its EDP in early 2013, which prompted two subsequent revisions in that year. Thus, for conservative planning purposes, it will be assumed that IID may implement their EDP as mentioned previously during dry years **Table 6.9** and **Figure 6.7** project an EDP condition.

Tabular Comparisons

Tables **6.2** to **6.9**, shown on the following pages, provide an analysis of the City's supply and demand projections to the year 2040. **Tables 6.2** to **6.8** assume that IID's EDP is not implemented whereas **Table 6.9** assumes implementation of IID's EDP. **Figures 6.6 & 6.7** show a visual chart of worst-case scenarios (one for non-EDP implementation and one for EDP implementation).

Based on the data contained in these tables, the City can expect to meet most future demands for all climatologic classifications through 2040 (even during implementation of IID's EDP). Closer to 2040 however, the gap shrinks, which suggests that the City's Water Treatment Plant will be operating near full-capacity almost each day of the year meet demands.

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Table 6.2
City Water Supply Availability & Demand Projections (AF)
Normal Water Year

Water Sources	2020	2025	2030	2035	2040
Population					
Service Area Pop.	50,800	50,911	58,800	62,800	68,744
Supply					
Imported (Surface) Water	10,081	10,081	10,081	14,000	14,000
Groundwater	0	0	0	0	0
Total Supply	**10,081**	**10,081**	**10,081**	**14,000**	**14,000**
Demand					
Total Normal Demand	**7,656**	**8,668**	**9,681**	**10,693**	**11,705**
Supply/Demand Comparison					
Supply/Demand Difference	**2,425**	**1,413**	**400**	**3,307**	**2,295**
Supply/Demand (%)	**131.67%**	**116.30%**	**104.14%**	**130.93%**	**119.61%**

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Table is intended only to show City has the supply capacity* to meet demands** per the following:

1. Total demand based on a conservative consumption rate of 152 GPCD (avg. of last 10 yrs. which is under SBx7-7 target) multiplied by population projections shown above.

2. Since IID does not have a contract with the City limiting the amount of available water, imported (surface) water supply in this table represents the water treatment plant production running at two-thirds capacity (10,081 AF) through 2030 and then at 90% capacity (14,000 AF) beginning in 2031 through 2040.

3. Although groundwater is a potential supply if the right technologies are in place, groundwater is not expected to become a supply source at any point through this planning period (2040).

4. No other potable supply sources are expected to become available.

**This Table is intended to address the California Water Code for UWMPs and also to show that the City has adequate supplies to meet demands. This table is not intended to be a recommendation of production volumes or a constraint on the City's supplies. The City's water department has the authority to produce water at volumes which meet the daily needs of its citizens.*

*** This table is intended to address the California Water Code for UWMPs. This Table is not intended to be a constraint on demand or a basis for evaluation of future water rates or caps/restrictions on use. This table shows that demands are likely to be met even if water use efficiency does not increase.*

Table 6.3
City Water Supply Availability & Demand Projections (AF)
Single Dry Year

Water Sources	2020	2025	2030	2035	2040
Population					
Water Service Area Population	50,800	50,911	58,800	62,800	68,744
Supply					
Imported (Surface) Water	10,081	10,081	10,081	14,000	14,000
Groundwater	0	0	0	0	0
Total Supply	**10,081**	**10,081**	**10,081**	**14,000**	**14,000**
Normal Year Supply	10,081	10,081	10,081	14,000	14,000
% of Normal Year	100%	100%	100%	100%	100%
Demand					
Total Dry Year Demand	**7,901**	**8,946**	**9,990**	**11,035**	**12,080**
Normal Year Demand	7,656	8,668	9,681	10,693	11,705
% of Normal Year	103%	103%	103%	103%	103%
Supply/Demand Comparison					
Supply/Demand Difference	**2,180**	**1,135**	**91**	**2,965**	**1,920**
Supply/Demand (%)	**128%**	**113%**	**101%**	**127%**	**116%**

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Table is intended only to show City has the supply capacity* to meet demands** per the following:

1. Total Demand based on a conservative consumption rate of 152 GPCD (avg. of last 10 yrs. which is under SBx7-7 target) multiplied by population projections shown above and by single dry year increase of 103%.

2. All other items derived in similitude to Table 6.2 (i.e. no changes in supplies for single dry year).

**See notes below Table 6.2 for explanation of supply/demand.*

Table 6.4
City Water Supply Availability & Demand Projections (AF)
Multiple Dry Years (2016-2020)

Water Sources	2016	2017	2018	2019	2020
Population					
Service Area Pop	40,211	41,400	42,589	43,778	44,967
Supply					
	Normal Years		Multiple Dry Years		
Imported (Surface) Water	10,081	10,081	10,081	10,081	10,081
Groundwater	0	0	0	0	0
Total Supply	**10,081**	**10,081**	**10,081**	**10,081**	**10,081**
Normal Year Supply	10,081	10,081	10,081	10,081	10,081
% of Normal Year	100%	100%	100%	100%	100%
Demand					
	Normal Years		Multiple Dry Years		
Normal / Molt. Dry Demand	**6,846**	**7,049**	**7,389**	**7,595**	**7,756**
Normal Year Demand	6,846	7,049	7,251	7,454	7,656
% of Normal Year	100%	100%	102%	102%	101%
Supply/Demand Comparison					
	Normal Years		**Multiple Dry Years**		
Supply/Demand Difference	**3,235**	**3,032**	**2,692**	**2,486**	**2,325**
Supply/Demand (%)	**147%**	**143%**	**136%**	**133%**	**130%**

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Table is intended only to show City has the supply capacity* to meet demands** per the following:

1. Total Demand based on a conservative consumption rate of 152 GPCD (avg. of last 10 yrs. which is under SBx7-7 target) multiplied by population projections shown above and by multiple dry years increases of 102%, 102%, and 101%

2. All other items derived in similitude to Table 6.2 (i.e. no changes in supplies for dry years).

**See notes below Table 6.2 for explanation of supply/demand.*

Table 6.5
City Water Supply Availability & Demand Projections (AF)
Multiple Dry Years (2021-2025)

Water Sources	2021	2022	2023	2024	2025
Population					
Service Area Pop	46,156	47,345	48,534	49,723	50,912
Supply					
	Normal Years		Multiple Dry Years		
Imported (Surface) Water	10,081	10,081	10,081	10,081	10,081
Groundwater	0	0	0	0	0
Total Supply	**10,081**	**10,081**	**10,081**	**10,081**	**10,081**
Normal Year Supply	10,081	10,081	10,081	10,081	10,081
% of Normal Year	100%	100%	100%	100%	100%
Demand					
	Normal Years		Multiple Dry Years		
Normal / Molt. Dry Demand	**7,859**	**8,061**	**8,420**	**8,627**	**8,781**
Normal Year Demand	7,859	8,061	8,263	8,466	8,668
% of Normal Year	100%	100%	102%	102%	101%
Supply/Demand Comparison					
	Normal Years		**Multiple Dry Years**		
Supply/Demand Difference	**2,222**	**2,020**	**1,661**	**1,454**	**1,300**
Supply/Demand (%)	**128%**	**125%**	**120%**	**117%**	**115%**

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Table is intended only to show City has the supply capacity* to meet demands** per the following:

1. Total Demand based on a conservative consumption rate of 152 GPCD (avg. of last 10 yrs. which is under SBx7-7 target) multiplied by population projections shown above and by multiple dry years increases of 102%, 102%, and 101%

2. All other items derived in similitude to Table 6.2 (i.e. no changes in supplies for dry years).

**See notes below Table 6.2 for explanation of supply/demand.*

Table 6.6
City Water Supply Availability & Demand Projections (AF)
Multiple Dry Years (2026-2030)

Water Sources	2026	2027	2028	2029	2030
Population					
Service Area Pop	52,101	53,290	54,479	55,668	56,857
Supply					
	Normal Years		Multiple Dry Years		
Imported (Surface) Water	10,081	10,081	10,081	10,081	10,081
Groundwater	0	0	0	0	0
Total Supply	**10,081**	**10,081**	**10,081**	**10,081**	**10,081**
Normal Year Supply	10,081	10,081	10,081	10,081	10,081
% of Normal Year	100%	100%	100%	100%	100%
Demand					
	Normal Years		**Multiple Dry Years**		
Normal / Mult. Dry Demand	**8,871**	**9,073**	**9,452**	**9,658**	**9,806**
Normal Year Demand	8,871	9,073	9,276	9,478	9,681
% of Normal Year	100%	100%	102%	102%	101%
Supply/Demand Comparison					
	Normal Years		**Multiple Dry Years**		
Supply/Demand Difference	**1,210**	**1,008**	**629**	**423**	**275**
Supply/Demand (%)	**114%**	**111%**	**107%**	**104%**	**103%**

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Table is intended only to show City has the supply capacity* to meet demands** per the following:

1. Total Demand based on a conservative consumption rate of 152 GPCD (avg. of last 10 yrs. which is under SBx7-7 target) multiplied by population projections shown above and by multiple dry years increases of 102%, 102%, and 101%

2. All other items derived in similitude to Table 6.2 (i.e. no changes in supplies for dry years).

**See notes below Table 6.2 for explanation of supply/demand.*

Table 6.7
City Water Supply Availability & Demand Projections (AF)
Multiple Dry Years (2031-2035)

Water Sources	2031	2032	2033	2034	2035
Population					
Service Area Pop	58,046	59,235	60,424	61,613	62,802
Supply					
	Normal Years		Multiple Dry Years		
Imported (Surface) Water	10,081	14,000	14,000	14,000	14,000
Groundwater	0	0	0	0	0
Total Supply	**10,081**	**14,000**	**14,000**	**14,000**	**14,000**
Normal Year Supply	10,081	14,000	14,000	14,000	14,000
% of Normal Year	100%	100%	100%	100%	100%
Demand					
	Normal Years		**Multiple Dry Years**		
Normal / Mult. Dry Demand	**9,883**	**10,085**	**10,483**	**10,690**	**10,832**
Normal Year Demand	9,883	10,085	10,288	10,490	10,693
% of Normal Year	100%	100%	102%	102%	101%
Supply/Demand Comparison					
	Normal Years		**Multiple Dry Years**		
Supply/Demand Difference	**198**	**3,915**	**3,517**	**3,310**	**3,168**
Supply/Demand (%)	**102%**	**139%**	**134%**	**131%**	**129%**

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Table is intended only to show City has the supply capacity* to meet demands** per the following:

1. Total Demand based on a conservative consumption rate of 152 GPCD (avg. of last 10 yrs. which is under SBx7-7 target) multiplied by population projections shown above and by multiple dry years increases of 102%, 102%, and 101%

2. All other items derived in similitude to Table 6.2 (i.e. no changes in supplies for dry years).

**See notes below Table 6.2 for explanation of supply/demand.*

Table 6.8
City Water Supply Availability & Demand Projections (AF)
Multiple Dry Years (2035-2040)

Water Sources	2036	2037	2038	2039	2040
Population					
Service Area Pop.	63,991	65,180	66,369	67,558	68,747
Supply					
	Normal Years		**Multiple Dry Years**		
Imported (Surface) Water	14,000	14,000	14,000	14,000	14,000
Groundwater	0	0	0	0	0
Total Supply	**14,000**	**14,000**	**14,000**	**14,000**	**14,000**
Normal Year Supply	14,000	14,000	14,000	14,000	14,000
% of Normal Year	100%	100%	100%	100%	100%
Demand					
	Normal Years		**Multiple Dry Years**		
Normal / Mult. Dry Demand	**10,895**	**11,098**	**11,515**	**11,721**	**11,857**
Normal Year Demand	10,895	11,098	11,300	11,503	11,705
% of Normal Year	100%	100%	102%	102%	101%
Supply/Demand Comparison					
	Normal Years		**Multiple Dry Years**		
Supply/Demand Difference	**3,105**	**2,902**	**2,485**	**2,279**	**2,143**
Supply/Demand (%)	**128%**	**126%**	**122%**	**119%**	**118%**

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Table is intended only to show City has the supply capacity* to meet demands** per the following:

1. Total Demand based on a conservative consumption rate of 152 GPCD (avg. of last 10 yrs. which is under SBx7-7 target) multiplied by population projections shown above and by multiple dry years increases of 102%, 102%, and 101%

2. All other items derived in similitude to Table 6.2 (i.e. no changes in supplies for dry years).

**See notes below Table 6.2 for explanation of supply/demand.*

Table 6.9
City Water Supply Availability & Demand Projections (AF)
Restricted Supply Scenario: IID Equitable Distribution Plan

Water Sources	2020	2025	2030	2035	2040
Population					
Water Service Area Population	50,800	50,911	58,800	62,800	68,744
Difference from 2006 Service Area Pop.	9,482	15,427	21,372	27,317	33,262
Supply					
Base Imported Water (2006) (IID Equitable Distribution Plan)	6,876	6,876	6,876	6,876	6,876
Additional (IID Equitable Distribution Plan)	1,614	2,627	3,639	4,651	5,663
Groundwater	0	0	0	0	0
Total Supply	**8,490**	**9,503**	**10,515**	**11,527**	**12,539**
Normal Year Supply	10,081	10,081	10,081	14,000	14,000
% of Normal Year	84%	94%	104%	82%	90%
Demand					
Total Dry Year Demand	**7,901**	**8,946**	**9,990**	**11,035**	**12,080**
Normal Year Demand	7,656	8,668	9,681	10,693	11,705
% of Normal Year	103%	103%	103%	103%	103%
Supply/Demand Comparison					
Supply/Demand Difference	**589**	**557**	**524**	**492**	**460**
Supply/Demand (%)	**107%**	**106%**	**105%**	**104%**	**104%**

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Table is intended only to show City has the supply capacity* to meet demands** per the following:

1. Total Demand based on a conservative consumption rate of 152 GPCD (avg. of last 10 yrs. which is under SBx7-7 target) multiplied by population projections shown above and by single dry year increase of 103%.

2. Per IID Equitable Distribution Plan, supply is based on the water consumed in 2006 (6) plus the per capita rate (152 GPCD) multiplied by the difference in populations shown above from the 2006 population.

**See notes below Table 6.2 for explanation of supply/demand.*

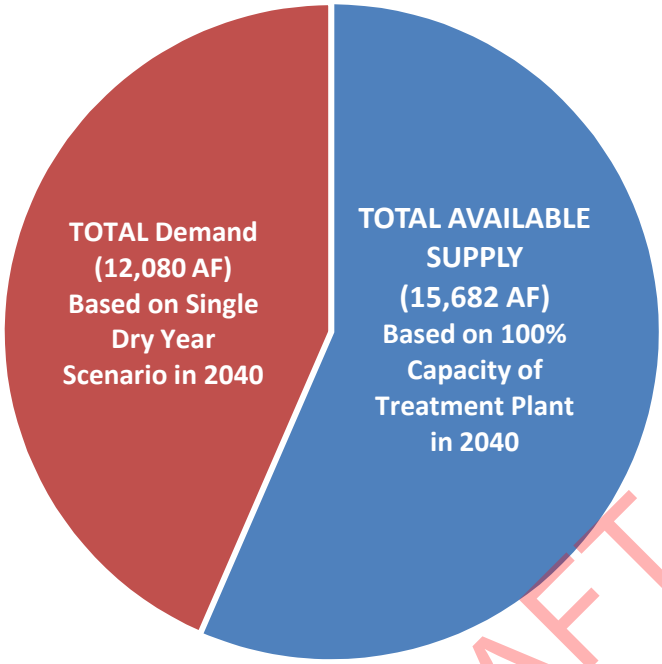

Figure 6.6: Worst-Case Full Water Supply Scenario (NO IID EDP): Single Dry Year in 2040

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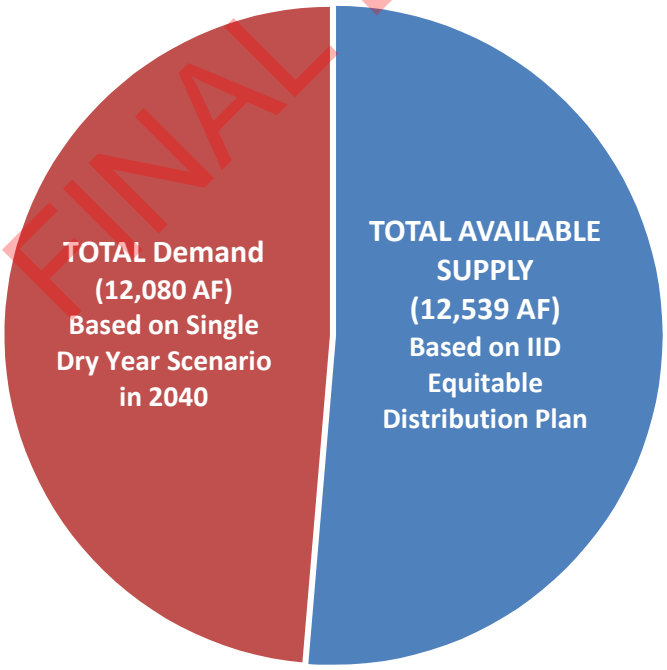

Figure 6.7: Worst-Case Restricted Water Supply Scenario (IID EDP): Single Dry Year in 2040

6.8 ENSURING ADEQUATE SUPPLY

As indicated by **Tables 6.2** to **6.9** and **Figures 6.6 & 6.7**, the City will be able to meet demands through 2040 for all future climatic conditions, even during implementation of IID's EDP. However, if supplies need to be increased in the future, this can most likely be accomplished through expansion of the City's Water Treatment Plant or Construction of an East-Side Water Treatment Plant, as opposed to development of alternative water sources (i.e. groundwater or recycled water). Besides expanding supplies, there is the additional measure of conservation/demand management, which has more immediate impacts and helps demands to be met using the supplies that are already at hand.

During normal operations, the City will continue to implement its conservation measures (see **Section 7**) to increase water use efficiency.

For emergencies, the response would follow the mandates and/or prohibitions of the City's Ordinances along with participation in regional programs, such as IID's Equitable Distribution Plan or MWD's Water Surplus & Drought Management Plan (WSDM). These programs are discussed in **Section 8.**

For these reasons, the City is confident that an adequate amount of supply can be provided to meet demands for all weather conditions through 2040.

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