

SECTION 5: WATER USE

Residential water use accounts for nearly 80 percent of the City's total water use. Single family homes account for about two-thirds of total water use.

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**WATER USE**

Water use within the City's service area includes residential indoor use, commercial use, and landscape irrigation use.

5.1 OVERVIEW

Water use within the City's service area is variable depending on the time of year or climatic conditions. More specifically, it depends on a number of factors ranging from permanent residential and daytime populations, size and types of businesses, economic conditions, unemployment rate, droughts, conservation programs, plumbing code changes, and customer water usage habits. This section explores the water usage trends within the City and quantifies total usage per customer type.

This chapter also describes current and historic water usage and the methodology

used to project future demands within the City's service area.

5.2 CURRENT CITY WATER NEEDS

As discussed in **Section 1**, the City is an expanding urban area, with a population that has more than doubled in the past 25 years. Due to industrial manufacturing increases in Mexicali, the City has seen an influx of new residents, resulting in the construction of new housing developments, primarily in the northeasterly part of the City. In addition, the City has also seen a slight increase in household densities. As a result of this recent shift, the City constructed the Eastside Reservoir in 2008.



Figure 5.1: Hotel De Anza

To be able to serve the needs of its service area, the City's water system must be equipped for wide fluctuations of water demands, including daily peaks in demands and seasonal increases in demands. As an arid desert community, water usage during hot summer months can be up to twice the typical water usage during winter months. Thus, to adequately meet water needs, the City's water system must be designed for peaks during summer months, not simply peaks during winter months. Since the City does not experience an influx of seasonal residents, and most water service connections are active accounts (i.e. vacant vacation homes are not common), future

design capacities of water infrastructure should be based off of the City's existing and future residents.

Recent Changes to Water Needs

Since the 2010 UWMP, there have been local and statewide influences on recent and future water use in the City. For instance, the City has experienced a small amount of development and population growth, as indicated in **Figures 1.11** and **1.12** of **Section 1**. On a statewide level, there have been a few statewide factors affecting water use in the City. 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, to help cope with the drought, Governor Brown gave an executive order in April 2015 which mandated a statewide 25% reduction in water use, with each agency assigned specific target reductions.

5.3 WEATHER EFFECTS ON WATER USE

California faces changes in water use habits due to a variety of issues including population growth, regulatory restrictions and climate change (including the recent severe drought of 2011-2016). More specifically, increases in precipitation

Due to the inter-dependency of many water agencies in the State, weather impacts on water use will continue to be a forefront issue.

variability (more extreme drought and flood events) poses additional challenges to water agencies. These precipitation pattern alterations impact not water supplies but also water usage patterns.

Changes in water usage habits have a special concern for the State due to the inter-dependence of many agencies for the transfer and use of water. For instance, some agencies are unable to produce water locally and thus entirely dependent on imported water sources (i.e. Imperial Valley agencies), while others are able to produce all water locally (100% sustainability).

Further, some agencies are able to reduce demands without any economic impacts (other than water sales revenues), while other agencies will suffer economically if required by State or local agencies to reduce water consumption (i.e. agricultural & industrial users). Thus, the State will likely see challenges in the near future to find the correct balance of water supply allocations to meet demands under various weather conditions. For IID, facing increases in urban water demands with a fairly constant agricultural water demand, this is an all-too familiar issue.

California Water Plan Update 2013

DWR’s California Water Plan Update 2013 (scheduled for 2018 update) considers climate impacts on water use and supply. The Plan is designed to work alongside the Governor’s Water Action Plan. At more than 3,500 pages, it covers a variety of information, from detailed descriptions of current regional and statewide water conditions to a “Roadmap for Action” intended to achieve desired benefits and outcomes. Volume 1, Chapter 5 of the 2013 California Water Plan, “Managing an Uncertain Future,” evaluated three different scenarios of future water demand based on alternative but plausible assumptions on population growth, land use changes, water conservation and also the effect that future climate change might have on future water demands.



5.4 WATER USE

Past Water Use

Although the population of the City has increased by nearly 50% over the past two decades, overall water use within the City’s service area has declined. This is a result of water conservation, as the efficiency of water use has outweighed the additional water users. Annual water use from 2001 to 2010 listed in the 2010 UWMP ranged from a high of 7,029 AF in 2005 to a low of 6,178 AF in 2010 with an average of 6,806 AF as shown below in **Table 5.1**:

**Table 5.1
Past Water Use (AF)**

Year	Total Consumption (AF)
2010	6,178
2009	6,555
2008	6,603
2007	6,737
2006	6,876
2005	7,029
2004	7,017
2003	7,021
2002	7,021
2001	7,023
Average:	6,806

As the table suggests, the overall water fluctuated a bit, but began to trend downward since 2005. This suggests that the individual water usage (i.e. “per-capita” water use) by the City’s population began to

become efficient enough to outweigh population growth and thus result in lower overall consumption. Based on the numbers in **Table 5.1**, water use had decreased by over 12%, or nearly 3% annually.

Recent Water Use

Recent water use since 2010 has continued the conservation trend of the previous decade, although the recent drought impacted that trend somewhat from 2011-2013. Since the Governor Brown actions of 2014 and 2015 (see **Section 6**), water conservation was given a boost and the trend towards efficiency continued as indicated below in **Table 5.2**:

**Table 5.2
Recent Water Use (AF)**

Year	Tot. Consumption (AF)	Tot. Consumption (MG)
2015	5,753	1,875
2014	6,182	2,014
2013	6,436	2,097
2012	6,698	2,183
2011	6,701	2,184
Avg:	6,354	2,070

See note below Table 5.4

As indicated by **Table 5.2** above, consumption increased from 2010 during the height of the drought years 2011-2013, prior to the Governor Brown State of Emergency declaration in 2014 and 25% Executive Order in 2015.



5.5 WATER USE BY SECTOR

Service Connections/Accounts

Water use in the City is divided into sectors of residential, commercial/institutional, industrial, and landscape irrigation. There are also un-metered flows which include park irrigation and system losses. The City maintains records of water consumption and bills its customers on a monthly basis for its water service. The City currently maintains approximately 8,300 service connections. The current breakdown of accounts is shown in **Table 5.3** below:

Table 5.3
Current Number of Service Connections

Sector	2015 Accounts
Single Family Residential	7,264
Multi-Family Residential	527
Commercial/Institutional	541
Industrial	1
Landscape Irrigation	3
Other	0
Agricultural	0
Total City Service Connections	8,336

Of the 8,300 current service connections listed above, approximately 93 percent are either single family or multi-family residential with the vast majority of the service area containing residential dwellings. Commercial and institutional

connections, on the other hand, account for only six percent of the total current service connections. The City currently had only one industrial account in 2015 (Calexico Tissue Company), but as of the writing of this UWMP, the Calexico Tissue Company is no longer operating in the City. The City has multiple grass-covered landscapes in its service area (including sports fields and parks), yet there are only three landscape irrigation accounts. Most of the parks are City owned and maintained, and the City does not meter these areas.

Water Use by Sector

The water use by each connection type for the past five years is shown in **Table 5.4** on **Page 5-7**. The average proportions (%) of water use by sector listed in this table will be used to analyze projected water use by sector in **Section 5.7**. As expected, total residential water use (single & multi-family) comprised the majority of overall water use,

The residential sector comprises the majority of overall use of water, but at the lowest rate of use per connection.

at nearly two-thirds of overall use in the past five years. In terms of water use intensity, however, landscape accounts accounted for the highest rates of water use, at 156 AF per connection per year. Residential water accounts, on the other hand, had the lowest use per connection, at about half an ace-foot per connection per



Figure 5.2: Adrian C. Cordova Park & Wellness Center

year. As far as seasonal water use is concerned, the City experiences a high degree of fluctuation in monthly usage during the year. Almost all sectors substantially increase consumption during summer months. Since the residential sector accounts for 93 percent of the overall accounts, the majority of the City's summer increases in water production serve the residential sector.

Non-Revenue Water/Losses

As indicated by **Table 5.4** and **Figure 5.3**, “non-revenue” water (losses) accounts for a significant portion of overall water use, at 20 percent over the past 5 years (1,200 AFY). Typically, non-revenue water or “losses” consists of routine flushing,

unmetered use, differences in metered readings, and actual water losses. However, in the City's case, there are a lot of unmetered City-owned landscapes. It is also possible that true losses may play a factor, as the City's water system is built to provide much higher capacity than what is delivered during winter months (to provide for summer month increases). Nonetheless, the City is concerned about water losses and has prepared a water loss audit for this UWMP using AWWA software. A summary of the audit is provided in **Section 7**. In 2015, the City's Leakage Index (the ratio of real loss to unavoidable loss) was 8.74 which indicates room for improvement. This could be achieved by simply metering (but not billing) City-owned landscapes.



**Table 5.4
Water Use by Sector (AF)**

Sector	2010 (2010 UWMP)	2011	2012	2013	2014	2015
Single Family Residential	3,529	4,376	3,518	3,433	3,296	3,058
Multi-Family Residential	500	658	570	459	441	435
Commercial/Institutional	654	884	711	697	669	689
Industrial	0.00	1.53	1.23	1.23	1.18	0.31
Landscape Irrigation	117	354	354	354	339	468
Other	6.14	10.13	8.29	1.23	1.18	0.00
Total Water Sales:	4,806	6,283	5,162	4,945	4,747	4,650
Losses/Unaccounted for Water (Non-Revenue Water)	1,611	418	1,536	1,491	1,431	1,103
Total Water Consumption:	6,417	6,701	6,698	6,436	6,182	5,753

Note: Totals on bottom row reflect water distributed into system.

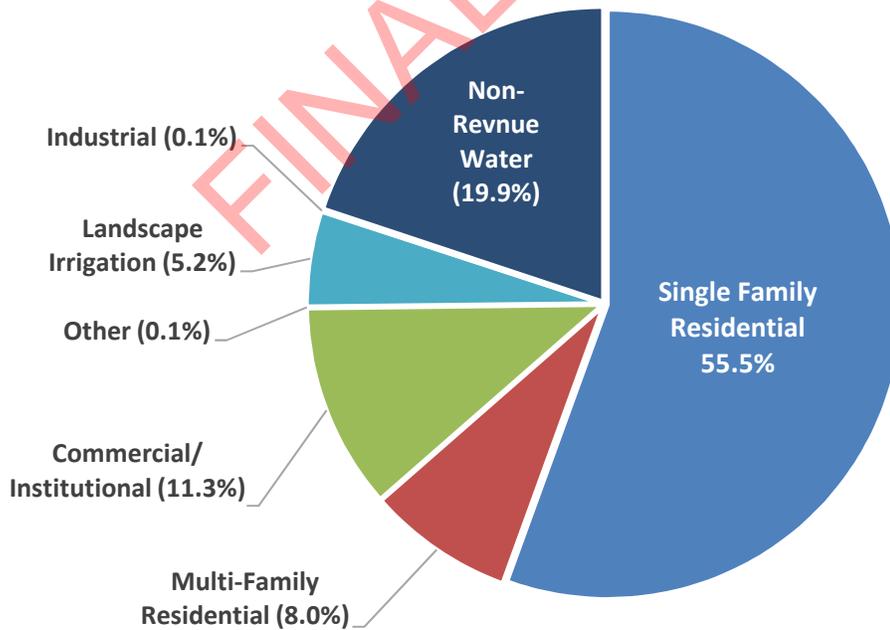


Figure 5.3: Water Use by Sector from 2010 - 2015



5.6 WATER CONSERVATION ACT

5.6.1 SBX7-7 BACKGROUND

Due to reductions of water in the San Joaquin Delta, the Legislature drafted the SBx7-7 to protect statewide water sources. The legislation called for a 20 percent reduction in water use in California by the year 2020. The legislation amended the water code to call for 2020 and 2015 water use targets in the 2010 UWMPs, as well as updates or revisions to these targets in the 2015 UWMPs. SBx7-7 allows DWR to enforce compliance to the new water use standards beginning in 2016. Failure to comply with interim and final targets will make the City ineligible for grants and loans from the State.



Figure 5.4: SBX7-7 Signing by Gov. Schwarzenegger

In addition to an overall statewide 20 percent water use reduction, the objective of SBx7-7 is to reduce water use within each hydrologic region in accordance with the

agricultural and urban water needs of each region. Currently, DWR recognizes 10 separate hydrologic regions in California as shown in **Figure 5.5** on the following page. Each hydrologic region has been established for planning purposes and corresponds to the State's major drainage areas.

The service area of the City is located in the Colorado River Hydrologic Region (#7), which covers about 13 million acres (20,000 sq. miles) and includes all of Imperial County, most of Riverside and San Bernardino Counties, and a portion of San Diego County. The Imperial Valley, Salton Sea, national and state parks, military bases and other public lands comprise most of the land in this region. The Colorado River HR is shown in **Figure 5.6** of this Section.

DWR recognizes 10 unique hydrologic regions to enforce suitable and fair water conservation targets.

Per capita water use, measured in gallons per capita per day (GPCD), in the Colorado River HR varies between different water agencies, depending on the geographic and economic conditions of the agency's service area. The Colorado River HR has an overall baseline per capita water use of 346 GPCD and DWR has established a regional target of 211 GPCD for the region as a compliance target to satisfy SBx7-7.



Figure 5.5: California's 2020 Water Conservation Goals



Alluvial Groundwater Basins and Subbasins within the Colorado River Hydrologic Region

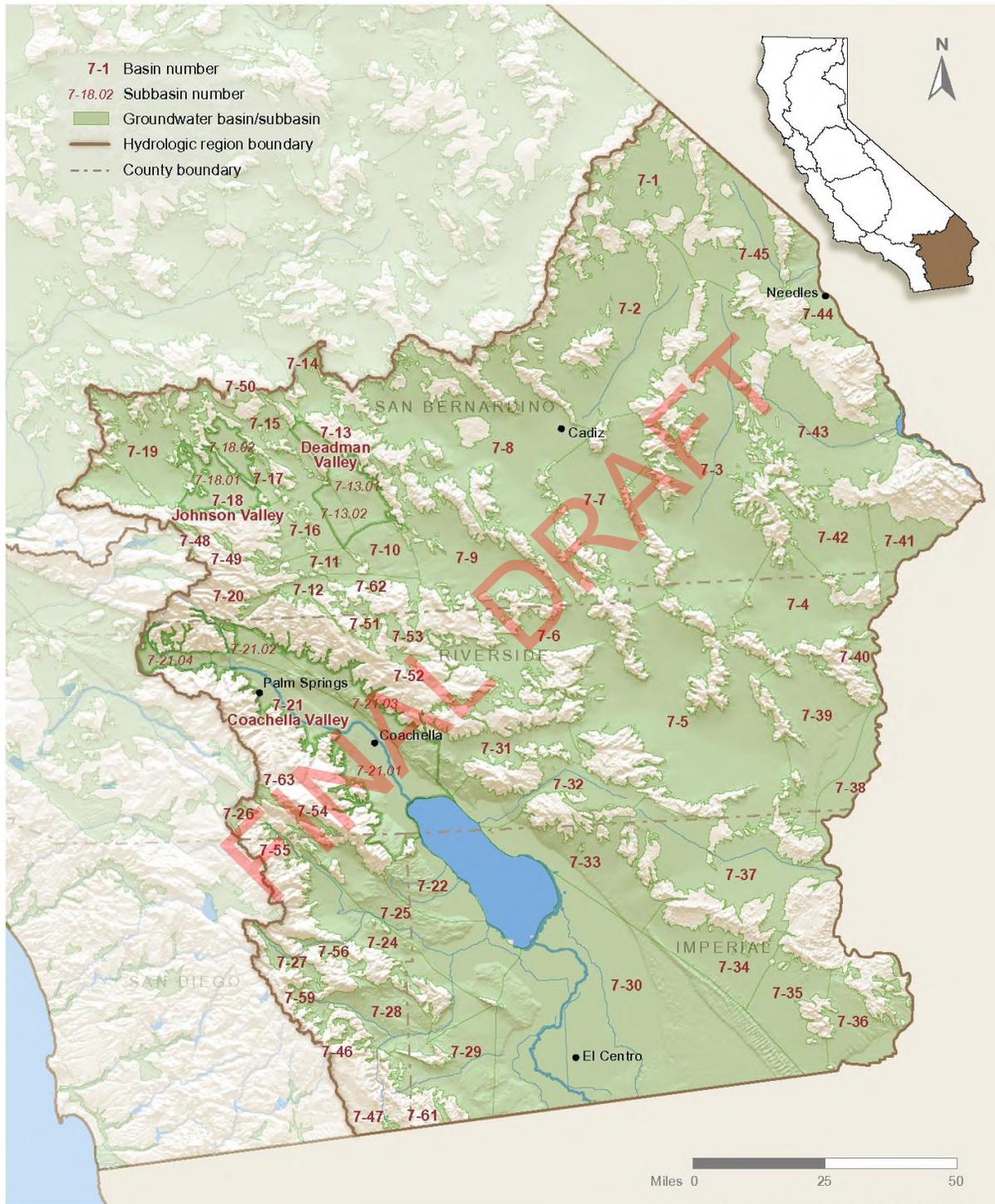


Figure 5.6: Colorado River Hydrologic Region



5.6.2 SBX7-7 METHODOLOGIES

To satisfy SBx7-7 provisions in its 2010 UWMP, the City previously established a per capita water use target for the year 2020 as well as an interim target (2015). DWR provided guidelines for determining these targets in its *Methodologies for Calculating Baseline and Compliance Urban Per Capita Use* (2011) and also in the 2010 and 2015 UWMP Guidebooks. The provisions allow urban water retailers to evaluate their base daily per capita water use using a 10 or 15-year period. The 15-year base period within the range January 1, 1990 to December 31, 2010 is allowed if recycled water made up 10 percent or more of the 2008 retail water delivery. If recycled water did not make up 10 percent or more of the 2008 retail water delivery, then a retailer must use a 10-year base period within the range of January 1, 1995 to December 31, 2010. In the same fashion, the City was responsible for determining a 5-year baseline water use. In the 2010 UWMP, the City's baseline water use was determined based on the City's historic water use. **Figure 5.7** on the following page illustrates the procedure for determining the baseline water use.

The *Methodologies* guidebook made provisions that allowed a water supplier to meet the target requirements by achieving any one of a number of target requirements, provided that the water

supplier's per capita water use is low enough relative to the region within which it supplies water. The basic options included the following:

- **OPTION 1:** A strict 20% reduction from the baseline by 2020 and 10% by 2015
- **OPTION 2:** A budget-based approach by requiring an agency to achieve a performance standard based on three metrics:
 - Residential indoor water use of 55 GPCD
 - Landscape water use commiserate with a Model Landscape Ordinance
 - 10% reduction in baseline CII water
- **OPTION 3:** Requires achievement of 95% of the applicable state hydrologic region target as set forth in the State's 20x2020 Water Conservation Plan
- **OPTION 4:** Requires the subtraction of Total Savings from the Base GPCD:
 - Total Savings includes indoor residential savings, meter savings, CII savings, and landscape and water loss savings

These options were established in order to avoid placing any undue hardship on water agencies that have already been implementing water conservation measures for some time. The basic procedure for determining the applicable water reduction targets via Option 1 or 3 is illustrated by **Figure 5.8** on the following page.

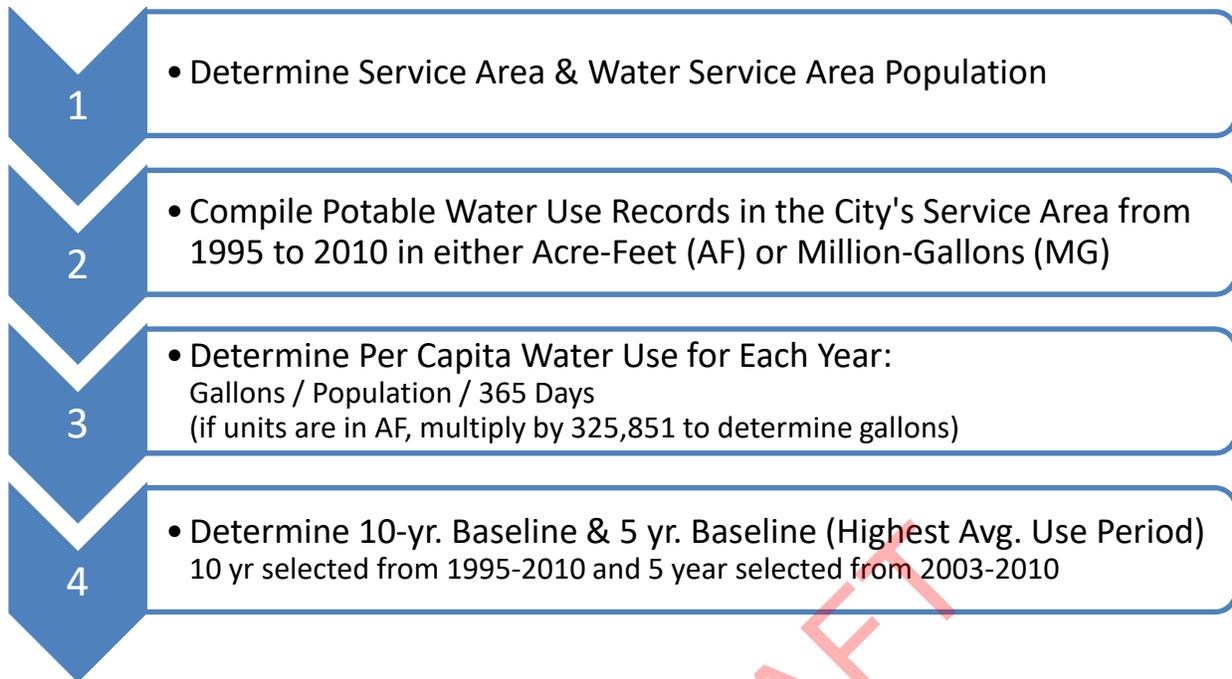


Figure 5.7: Procedure for Determining Baseline Per Capita Water Use

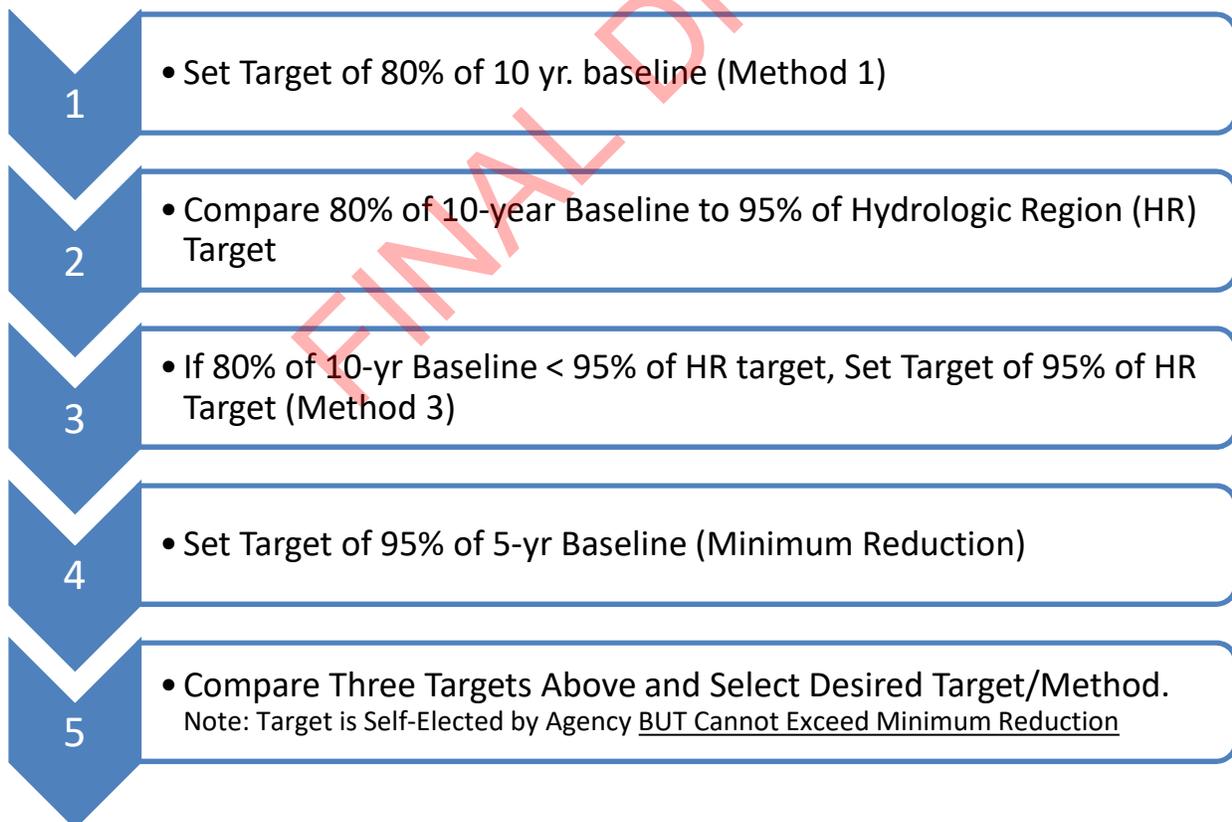


Figure 5.8: Procedure for Determining Target Per Capita Water Use



Exempt Agencies

If an agency has a baseline per capita water use of 100 GPCD or less, that agency will not have to adhere to any reduction targets as that agency is already considered water efficient. In such a case, that agency must document in subsequent UWMPs that its water usage is still under 100 GPCD.

5.6.3 CITY TARGET

Past 2010 UWMP Baseline & Target

Many agencies 2010 UWMPs were flagged by DWR with regard to the SBx7-7 provisions (more specifically with regard to the *Methodologies* handbook) and thus were required to make corrections to either the baseline water use and/or compliance targets.

The City’s 2010 UWMP determined the baseline and target as described on pages 34-39 of that Plan. The baselines and targets were determined to be:

- 10-yr. baseline (2001-2010) of 180 GPCD
- 5-yr. baseline (2003-2007) of 181 GPCD
- 2020 Target of 172 GPCD
- 2015 Interim Target of 176 GPCD

The 2010 UWMP properly assessed the baselines and targets with respect to the legal aspects of SBx7-7 and DWR accepted

the target method that was established in the 2010 UWMP. However, in review of the 2010 UWMP, the procedure with which the baselines and targets were determined had a few issues which require minor adjustments. The first issue was that population estimates for the baseline years (2001-2010) did not seem to match SCAG data or CADoF data (or Census data for that matter). The second issue was that the population data shown in the SBx7-7 data table was not consistent with data show in previous tables listed in the 2010 UWMP. Lastly, the total City water use (MG or AF) was never listed for the baseline years, which renders the yearly per capita amounts (which are calculated from the total water use) something that must be accepted on faith rather than on a step by step basis (i.e. there are missing pieces of the puzzle).

Issues with the previous UWMP’s calculation of SBx7-7 baselines and targets will require adjustments in this UWMP.

Amendments to Baseline & Target

In order to bring consistency to the City’s UWMP, this section hereby adjusts the City’s SBx7-7 baselines and targets using the same procedure as in the 2010 UWMP, but with adjusted (correct) population estimates and an additional column indicating the total water use for the given year so that the reader may understand



how the per capita water use was determined from the total water use and total population. The adjusted baselines and targets are shown in **Table 5.5** below:

**Table 5.5
City of Calexico Baseline Water Use**

Year	Cons.(AF)	Tot. Pop.	GPCD
2010	6,178	38,572	143
2009	6,555	37,999	154
2008	6,603	37,306	158
2007	6,737	36,013	167
2006	6,876	35,485	173
2005	7,029	35,056	179
2004	7,017	33,499	187
2003	7,021	31,497	199
2002	7,021	29,425	213
2001	7,023	27,866	225
10-yr. Baseline (2001-2010) (SB7: 10608.20)			180
5-yr. Baseline (2003-2007) (SB7: 10608.22)			181
Colorado River HR Baseline:			346
Colorado River HR Target:			211

Note: Data from 1995 to 2000 not shown in above table since City did not possess those records at the time SBx7-7 was enacted.

Since recycled water did not make up 10 percent of the 2008 delivery to the City’s retail area (i.e. City does not use recycled water), base Daily Per Capita Water Use has been based on a 10-year period. The 10-year baseline period shown above is consistent with the 2010 UWMP, in that the minor adjustments made in this 2015 still

result in the same baselines of 180 and 181 GPCD. Likewise, the 5-year baseline still spans from 2003-2007. Based on the revised baseline data shown in **Table 5.5**, the revised SBx7-7 targets are as follows:

**Table 5.6
City SBx7-7 2020 Water Use Targets**

Min. Reduction Requirement (10608.22)	20% Target (10608.20) (b)(1)	5% Reduction from Regional Target (10608.20) (b)(3)
172	144	200
Required 2020 Per Capita Target:		172
Interim (2015) Target:		176
Last 10-yr avg. (2006-2015) Per Capita Use (rounded):		152
Last 5-yr avg. (2011-2015) Per Capita Use (rounded):		143

Based on the above, the City has already met its 2020 target. Although this is the case, the City will ensure that future demands are maintained below its target by using the methods of conservation (CUWCC BMPs listed in **Section 7**) in addition to its Ordinances.

5.7 PROJECTED WATER USE

Future water use projections must consider significant factors on water demand, such as new development, economic conditions, conservation, new regulations/codes, and climate patterns. With open lots in the City to



Table 5.7
Projected Potable Water Demand by Sector (AF)
 Based on Conservative Consumption Estimate of 152 GPCD (Last 10-yr Avg.)

Sector	2020	2025	2030	2035	2040
Water Service Area Population (from Table 1.8)	44,967	50,912	56,857	62,802	68,747
Demands					
Single Family Residential	4,251	4,814	5,376	5,938	6,500
Multi-Family Residential	613	694	775	856	938
Commercial/Institutional	863	977	1,091	1,205	1,319
Industrial	1	1	1	1	1
Landscape Irrigation	398	451	503	556	609
Other	5	6	7	7	8
Total Water Sales:	6,132	6,942	7,753	8,564	9,375
Unaccounted for Water	1,524	1,725	1,926	2,128	2,329
Total Water Consumption:	7,656	8,668	9,681	10,693	11,705

be developed, development is expected to impact water use for the City more than typical urban areas in Southern California. As the City's service area population continues to grow over time (see **Section 1.10**) while water conservation measures continue to be implemented, the City should experience steady overall water consumption for the near future as water use efficiency offsets overall population increases (efficiency has increased by 20% in the last 15 years). At some point, however, water use efficiency will be outweighed by population increases. This

may likely happen by 2030/2035. For conservative planning purposes, however, **Table 5.7** shows the City's projected water use based on a constant rate of 152 GPCD (average of last 10 years). The table shows that water demand will increase at the same rate projected for the City's population from 2010 through 2040 (i.e. no increases in efficiency). Regardless of whether water consumption patterns will remain constant or become more efficient over time, the City may consider implementing changes to landscaping and outdoor watering. If landscaping and



outdoor watering remains as-is, the City may need to find additional sources of water or negotiate higher allocation terms from IID to meet future demands.

5.8 LOW INCOME PROJECTED WATER DEMANDS

Senate Bill 1087 requires that water use projections of a UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county in the service area of the supplier.

The City’s 2015 Update to its General Plan does not go into detail on planned low-income developments, but does identify one infill site (Villa Primavera) as an

The 2015 General Plan identifies a few low-income developments and estimates % of low-income residents.

affordable housing site. However, the 2015 General Plan Update does not project the number or location of affordable/low-income housing developments in the future. For this

reason, it is not possible to fully project water use for lower income households separate from overall residential demand. However, the 2015 Update does state that about 27% of households are at the poverty rate. Thus, factoring 27% into the

residential projections shown in **Table 5.7** on the previous page, the low-income projections are shown in **Table 5.8** below:

**Table 5.8
Projected Low-Income Water Needs**

Year	Projected Low-Income Water Needs (AF)
2020	1,484
2025	1,487
2030	1,717
2035	1,834
2040	2,008

Given that the City is already open to affordable housing developments, it is reasonable to assume that approval of affordable housing developments should occur unless one of the following occurs:

- The City specifically finds that it does not have sufficient water supply,
- The City is subject to a compliance order issued by the State Division of Drinking Water that prohibits new water connections, or
- The applicant/developer has failed to agree to reasonable terms and conditions relating to the provision of water service

As a result, the low-income water needs may be offset by the construction of future affordable developments.