

# CHAPTER 7. COMPARISON OF SUPPLY AND DEMAND

## WATER SERVICE RELIABILITY

*10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.*

*(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.*

*(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.*

*(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.*

As a summary of the City's future water supply plan (discussed in Chapters 4 and 5), Figure 7-1 provides an overview of the anticipated water supplies proposed to be used to meet the City's projected demands through the year 2030 during normal year water supply conditions. As shown, the future water supplies include treated surface water, groundwater, and recycled water.

This chapter presents the City's anticipated water service reliability, in terms of supply versus demand, for normal water years, single dry water years, and multiple dry water years.

### Normal Water Years

Based on the existing and projected future water supplies discussed in Chapter 4, and the projected reliability of those supplies as described in Chapter 5, Table 7-1 presents the City's projected normal water year supply through the year 2030. As shown, the existing and future supplies include groundwater, treated surface water, and recycled water.

Table 7-2 presents the City's projected normal water year demand through the year 2030. As previously described in Chapter 6, these projected demands include additional conservation and unaccounted for water.

Table 7-3 presents a comparison of the projected normal water year supply and demand. As shown, the projected supply equals the projected demand, indicating no supply shortfalls in normal years.

Figure 7-2 graphically shows the projected normal water year supply and demand to the year 2030, in five-year increments.

**Table 7-1. Projected Normal Water Year Supply (DWR Table 40)**

Supply Source	Projected Normal Year Water Supply <sup>(a)</sup> , af/yr				
	2010	2015	2020	2025	2030
Groundwater	131,750	95,800	82,000	85,000	100,600
Treated Surface Water	30,800	92,500	123,400	123,400	123,400
Recycled Water	750	1,000	1,000	25,000	25,000
<b>Total Supply</b>	<b>163,300</b>	<b>189,300</b>	<b>206,400</b>	<b>233,400</b>	<b>249,000</b>
% of Normal Year	100%	100%	100%	100%	100%

**Table 7-2. Projected Normal Water Year Demand (DWR Table 41)**

Demand	Projected Normal Year Water Demand <sup>(b)</sup> , af/yr				
	2010	2015	2020	2025	2030
Projected Future Demand	171,900	199,300	229,300	259,300	276,700
Additional Conservation, %	5%	5%	10%	10%	10%
Conservation Savings	(8,600)	(10,000)	(22,900)	(25,900)	(27,700)
<b>Future Demand with Conservation</b>	<b>163,300</b>	<b>189,300</b>	<b>206,400</b>	<b>233,400</b>	<b>249,000</b>
% of Year 2005	104%	120%	131%	148%	158%

**Table 7-3. Projected Normal Water Year Supply and Demand Comparison (DWR Table 42)**

	Supply and Demand Comparison, af/yr				
	2010	2015	2020	2025	2030
Total Supply	163,300	189,300	206,400	233,400	249,000
Total Demand	163,300	189,300	206,400	233,400	249,000
Difference (Supply - Demand)	-	-	-	-	-
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

<sup>(a)</sup> See Chapter 5.

<sup>(b)</sup> See Chapter 6.

## Single Dry Water Years

Based on the existing and projected future water supplies discussed in Chapter 4, and the projected reliability of those supplies as described in Chapter 5, Table 7-4 presents the City's projected single dry year water year supply through the year 2030. Supply reliabilities in single dry years are based on assumed Critical-low conditions (as defined in the 2006 Settlement Agreement) and are summarized as follows:

- Groundwater: 100 percent reliable in single dry years
- Treated Surface Water: 71 to 100 percent reliable in single dry years
- Recycled Water: 100 percent reliable in single dry years

Groundwater supplies are assumed to be 100 percent reliable, even in Critical-low conditions. This is because even though there may be limited groundwater recharge during Critical-low conditions, due to the large storage volume in the groundwater basin, adequate groundwater supplies will be available within the groundwater basin to meet the City's needs during a single dry year. As shown in Table 7-4, groundwater pumpage for a single dry year in 2020 has been increased somewhat above normal year groundwater pumpage to account for reduced surface water availability under critical-low conditions.

Treated surface water is anticipated to be 71 to 100 percent reliable in single dry years due to reduced availability of surface water supplies. The range in reliabilities is a result of the changing surface water treatment capacities over time. For example, the 71 percent reliability is based on surface water availability under Critical-low conditions in 2020 (87,800 af/yr) (see Table 5-5) with a planned surface water treatment capacity of 123,400 af/yr. The 100 percent reliability is based on surface water availability under Critical-low conditions in 2010 (76,900 af/yr) (see Table 5-5) with a planned surface water treatment capacity of 30,800 af/yr. Treated surface water reliabilities in 2015, 2025, and 2030, are 89 percent, 76 percent, and 78 percent, respectively.

Recycled water supplies are also assumed to be 100 percent reliable, even in Critical-low conditions. This is because recycled water supplies are considered to be essentially "drought-resistant" as the wastewater flows which generate the recycled water originate primarily from indoor water uses (e.g., toilet flushing, showers, clothes washing, etc.) are not significantly reduced during drought conditions.

Table 7-5 presents the City's projected single dry water year demand through the year 2030. As previously described in Chapter 6, these projected demands include additional conservation and unaccounted for water, and are assumed to be reduced by an additional 15 percent in single dry years due to mandated water conservation measures, in accordance with the provisions of the City's Water Shortage Contingency Plan (see Chapter 9).

Table 7-6 presents a comparison of the projected single dry year water supply and demand. As shown, the projected supply is greater than the projected demand, largely because of the assumed demand reduction in single dry years.

Figure 7-3 graphically shows the projected single dry year water supply and demand to the year 2030, in five-year increments.

**Table 7-4. Projected Single Dry Year Water Year Supply (DWR Table 43)**

Supply Source	Projected Single Dry Year Water Supply <sup>(a)</sup> , af/yr				
	2010	2015	2020	2025	2030
Groundwater	131,750	95,800	86,600 (c)	85,000	100,600
Treated Surface Water	30,800	82,300	87,800	93,300	96,800
Recycled Water	750	1,000	1,000	25,000	25,000
<b>Total Supply</b>	<b>163,300</b>	<b>179,100</b>	<b>175,400</b>	<b>203,300</b>	<b>222,400</b>
% of Projected Normal	100%	95%	85%	87%	89%

**Table 7-5. Projected Single Dry Year Water Year Demand (DWR Table 44)**

Demand	Projected Single Dry Year Water Demand <sup>(b)</sup> , af/yr				
	2010	2015	2020	2025	2030
Projected Future Demand	171,900	199,300	229,300	259,300	276,700
Additional Future Conservation, %	5%	5%	10%	10%	10%
Future Conservation Savings	(8,600)	(10,000)	(22,900)	(25,900)	(27,700)
Future Demand with Conservation	163,300	189,300	206,400	233,400	249,000
Mandated Conservation in Single Dry Year, %	15%	15%	15%	15%	15%
Mandated Conservation Savings	(24,500)	(28,400)	(31,000)	(35,000)	(37,400)
<b>Total Demand</b>	<b>138,800</b>	<b>160,900</b>	<b>175,400</b>	<b>198,400</b>	<b>211,600</b>
% of Projected Normal	85%	85%	85%	85%	85%

**Table 7-6. Projected Single Dry Year Supply and Demand Comparison (DWR Table 45)**

	Supply and Demand Comparison, af/yr				
	2010	2015	2020	2025	2030
<b>Total Supply</b>	<b>163,300</b>	<b>179,100</b>	<b>175,400</b>	<b>203,300</b>	<b>222,400</b>
<b>Total Demand</b>	<b>138,800</b>	<b>160,900</b>	<b>175,400</b>	<b>198,400</b>	<b>211,600</b>
Difference (Supply - Demand)	24,500	18,200	-	4,900	10,800
Difference as % of Supply	15%	10%	0%	2%	5%
Difference as % of Demand	18%	11%	0%	2%	5%

<sup>(a)</sup> See Chapter 5.

<sup>(b)</sup> See Chapter 6. Demands reduced by 15% in single dry years.

<sup>(c)</sup> In 2020, in single dry years, the surface water supplies are reduced such that required groundwater pumping is increased (to 86,600 af/yr), which is above that required in normal years (82,000 af/yr).

## Multiple Dry Water Years

For each of the multiple dry year scenarios described below, a five-year period has been assumed with different hydrologic conditions as defined in the 2006 Settlement Agreement, with the first two years being Normal-dry, the third and fourth years being Dry, and the fifth year being Critical-low (as assumed for the Single Dry Water Year discussed previously). For each case, supply reliabilities (described in Chapter 5) are summarized as follows:

- Groundwater: 100 percent reliable in Normal-dry, Dry and Critical-low years
- Treated Surface Water: 100 percent reliable in Normal-dry and Dry years and 71 to 100 percent reliable in Critical-low years
- Recycled Water: 100 percent reliable in Normal-dry, Dry and Critical-low years

Also, in accordance with the provisions of the City's Water Shortage Contingency Plan provided in Chapter 9 of this UWMP, projected demands in the third and fourth years of a multiple dry year period are assumed to be reduced by 10 percent due to mandated conservation measures consistent with Dry year conditions. For the fifth year of a multiple dry year period, projected demands are assumed to be reduced by 15 percent due to mandated conservation measures consistent with Critical-low conditions.

### Multiple Dry Years Ending in 2010

Table 7-7 shows the projected supply during a multiple dry year period ending in 2010. Table 7-8 shows the projected demand during a multiple dry year period ending in 2010. Table 7-9 shows the supply and demand comparison during a multiple dry year period ending in 2010. As shown, as a result of reduced demands in the Dry third and fourth years and Critical-low fifth year, there are no projected supply shortfalls.

### Multiple Dry Years Ending in 2015

Table 7-10 shows the projected supply during a multiple dry year period ending in 2015. Table 7-11 shows the projected demand during a multiple dry year period ending in 2015. Table 7-12 shows the supply and demand comparison during a multiple dry year period ending in 2015. As shown, as a result of reduced demands in the Dry third and fourth years and Critical-low fifth year, there are no projected supply shortfalls.

### Multiple Dry Years Ending in 2020

Table 7-13 shows the projected supply during a multiple dry year period ending in 2020. Table 7-14 shows the projected demand during a multiple dry year period ending in 2020. Table 7-15 shows the supply and demand comparison during a multiple dry year period ending in 2020. As shown, as a result of reduced demands in the Dry third and fourth years and Critical-low fifth year, there are no projected supply shortfalls.

**Table 7-7. Projected Supply During Multiple Dry Year Period Ending in 2010 (DWR Table 46)<sup>(c)</sup>**

Supply Source	Projected Multiple Dry Year Water Supply <sup>(a)</sup> , af/yr				
	2006	2007	2008	2009	2010
Groundwater	136,050	145,150	137,450	140,150	131,750
Treated Surface Water	19,700	20,650	28,300	28,300	30,800
Recycled Water	-	-	750	750	750
Total	155,750	165,800	166,500	169,200	163,300
% of Projected Normal	100%	100%	100%	100%	100%

**Table 7-8. Projected Demand During Multiple Dry Year Period Ending in 2010 (DWR Table 47)**

Demand	Projected Multiple Dry Year Water Demand <sup>(b)</sup> , af/yr				
	2006	2007	2008	2009	2010
Projected Future Demand	155,750	165,800	166,500	169,200	171,900
Additional Future Conservation, %	0%	0%	0%	0%	5%
Future Conservation Savings	-	-	-	-	(8,600)
Future Demand with Conservation	155,750	165,800	166,500	169,200	163,300
Mandated Conservation in Multiple Dry Year, %	0%	0%	10%	10%	15%
Mandated Conservation Savings	-	-	(16,700)	(16,900)	(24,500)
Total Demand	155,750	165,800	149,800	152,300	138,800
% of Projected Normal	100%	100%	90%	90%	85%

**Table 7-9. Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2010 (DWR Table 48)**

	Supply and Demand Comparison, af/yr				
	2006	2007	2008	2009	2010
Total Supply	155,750	165,800	166,500	169,200	163,300
Total Demand	155,750	165,800	149,800	152,300	138,800
Difference (Supply - Demand)	-	-	16,700	16,900	24,500
Difference as % of Supply	0%	0%	10%	10%	15%
Difference as % of Demand	0%	0%	11%	11%	18%

<sup>(a)</sup> See Chapter 5.

<sup>(b)</sup> See Chapter 6. Demands reduced by 10% in Dry years (3rd and 4th years) and 15% in Critical-low years (5th year).

<sup>(c)</sup> Supply and demand values for 2006 and 2007 are based on actual production data for those years.

**Table 7-10. Projected Supply During Multiple Dry Year Period Ending in 2015 (DWR Table 49)**

Supply Source	Projected Multiple Dry Year Water Supply <sup>(a)</sup> , af/yr				
	2011	2012	2013	2014	2015
Groundwater	136,900	142,150	147,300	152,450	95,800
Treated Surface Water	30,800	30,800	30,800	30,800	82,300
Recycled Water	800	850	900	950	1,000
Total	168,500	173,800	179,000	184,200	179,100
% of Projected Normal	100%	100%	100%	100%	95%

**Table 7-11. Projected Demand During Multiple Dry Year Period Ending in 2015 (DWR Table 50)**

Demand	Projected Multiple Dry Year Water Demand <sup>(b)</sup> , af/yr				
	2011	2012	2013	2014	2015
Projected Future Demand	177,400	182,900	188,400	193,900	199,300
Additional Future Conservation, %	5%	5%	5%	5%	5%
Future Conservation Savings	(8,900)	(9,100)	(9,400)	(9,700)	(10,000)
Future Demand with Conservation	168,500	173,800	179,000	184,200	189,300
Mandated Conservation in Multiple Dry Year, %	0%	0%	10%	10%	15%
Mandated Conservation Savings	-	-	(17,900)	(18,400)	(28,400)
Total Demand	168,500	173,800	161,100	165,800	160,900
% of Projected Normal	100%	100%	90%	90%	85%

**Table 7-12. Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2015 (DWR Table 51)**

	Supply and Demand Comparison, af/yr				
	2011	2012	2013	2014	2015
Total Supply	168,500	173,800	179,000	184,200	179,100
Total Demand	168,500	173,800	161,100	165,800	160,900
Difference (Supply - Demand)	-	-	17,900	18,400	18,200
Difference as % of Supply	0%	0%	10%	10%	10%
Difference as % of Demand	0%	0%	11%	11%	11%

<sup>(a)</sup> See Chapter 5.

<sup>(b)</sup> See Chapter 6. Demands reduced by 10% in Dry years (3rd and 4th years) and 15% in Critical-low years (5th year)

**Table 7-13. Projected Supply During Multiple Dry Year Period Ending in 2020 (DWR Table 52)**

Supply Source	Projected Multiple Dry Year Water Supply <sup>(a)</sup> , af/yr				
	2016	2017	2018	2019	2020
Groundwater	101,500	107,200	112,900	118,600	86,600 (c)
Treated Surface Water	92,500	92,500	92,500	92,500	87,800
Recycled Water	1,000	1,000	1,000	1,000	1,000
Total	195,000	200,700	206,400	212,100	175,400
% of Projected Normal	100%	100%	100%	100%	85%

**Table 7-14. Projected Demand During Multiple Dry Year Period Ending in 2020 (DWR Table 53)**

Demand	Projected Multiple Dry Year Water Demand <sup>(b)</sup> , af/yr				
	2016	2017	2018	2019	2020
Projected Future Demand	205,300	211,300	217,300	223,300	229,300
Additional Future Conservation, %	5%	5%	5%	5%	10%
Future Conservation Savings	(10,300)	(10,600)	(10,900)	(11,200)	(22,900)
Future Demand with Conservation	195,000	200,700	206,400	212,100	206,400
Mandated Conservation in Multiple Dry Year, %	0%	0%	10%	10%	15%
Mandated Conservation Savings	-	-	(20,600)	(21,200)	(31,000)
Total Demand	195,000	200,700	185,800	190,900	175,400
% of Projected Normal	100%	100%	90%	90%	85%

**Table 7-15. Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2020 (DWR Table 54)**

	Supply and Demand Comparison, af/yr				
	2016	2017	2018	2019	2020
Total Supply	195,000	200,700	206,400	212,100	175,400
Total Demand	195,000	200,700	185,800	190,900	175,400
Difference (Supply - Demand)	-	-	20,600	21,200	-
Difference as % of Supply	0%	0%	10%	10%	0%
Difference as % of Demand	0%	0%	11%	11%	0%

<sup>(a)</sup> See Chapter 5.

<sup>(b)</sup> See Chapter 6. Demands reduced by 10% in Dry years (3rd and 4th years) and 15% in Critical-low years (5th year).

<sup>(c)</sup> In 2020, in multiple dry years, the surface water supplies are reduced such that required groundwater pumping is increased (to 86,600 af/yr), which is above that required in normal years (82,000 af/yr).

### Multiple Dry Years Ending in 2025

Table 7-16 shows the projected supply during a multiple dry year period ending in 2025. Table 7-17 shows the projected demand during a multiple dry year period ending in 2025. Table 7-18 shows the supply and demand comparison during a multiple dry year period ending in 2025. As shown, as a result of reduced demands in the Dry third and fourth years and Critical-low fifth year, there are no projected supply shortfalls.

### Multiple Dry Years Ending in 2030

Table 7-19 shows the projected supply during a multiple dry year period ending in 2030. Table 7-20 shows the projected demand during a multiple dry year period ending in 2030. Table 7-21 shows the supply and demand comparison during a multiple dry year period ending in 2030. As shown, as a result of reduced demands in the Dry third and fourth years and Critical-low fifth year, there are no projected supply shortfalls.

Figure 7-4 graphically shows the projected multiple dry year water supply and demand to the year 2030, in five year increments.

**Table 7-16. Projected Supply During Multiple Dry Year Period Ending in 2025 (DWR Table 55)**

Supply Source	Projected Multiple Dry Year Water Supply <sup>(a)</sup> , af/yr				
	2021	2022	2023	2024	2025
Groundwater	87,400	92,800	98,200	103,600	85,000
Treated Surface Water	123,400	123,400	123,400	123,400	93,300
Recycled Water	1,000	1,000	1,000	1,000	25,000
<b>Total</b>	<b>211,800</b>	<b>217,200</b>	<b>222,600</b>	<b>228,000</b>	<b>203,300</b>
% of Projected Normal	100%	100%	100%	100%	87%

**Table 7-17. Projected Demand During Multiple Dry Year Period Ending in 2025 (DWR Table 56)**

Demand	Projected Multiple Dry Year Water Demand <sup>(b)</sup> , af/yr				
	2021	2022	2023	2024	2025
Projected Future Demand	235,300	241,300	247,300	253,300	259,300
Additional Future Conservation, %	10%	10%	10%	10%	10%
Future Conservation Savings	(23,500)	(24,100)	(24,700)	(25,300)	(25,900)
Future Demand with Conservation	211,800	217,200	222,600	228,000	233,400
Mandated Conservation in Multiple Dry Year, %	0%	0%	10%	10%	15%
Mandated Conservation Savings	-	-	(22,300)	(22,800)	(35,000)
<b>Total Demand</b>	<b>211,800</b>	<b>217,200</b>	<b>200,300</b>	<b>205,200</b>	<b>198,400</b>
% of Projected Normal	100%	100%	90%	90%	85%

**Table 7-18. Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2025 (DWR Table 57)**

	Supply and Demand Comparison, af/yr				
	2021	2022	2023	2024	2025
Total Supply	211,800	217,200	222,600	228,000	203,300
Total Demand	211,800	217,200	200,300	205,200	198,400
Difference (Supply - Demand)	-	-	22,300	22,800	4,900
Difference as % of Supply	0%	0%	10%	10%	2%
Difference as % of Demand	0%	0%	11%	11%	2%

<sup>(a)</sup> See Chapter 5.

<sup>(b)</sup> See Chapter 6. Demands reduced by 10% in Dry years (3rd and 4th years) and 15% in Critical-low years (5th year)

**Table 7-19. Projected Supply During Multiple Dry Year Period Ending in 2030 (DWR Optional Table)**

Supply Source	Projected Multiple Dry Year Water Supply <sup>(a)</sup> , af/yr				
	2026	2027	2028	2029	2030
Groundwater	88,100	91,200	94,300	97,400	100,600
Treated Surface Water	123,400	123,400	123,400	123,400	96,800
Recycled Water	25,000	25,000	25,000	25,000	25,000
Total	236,500	239,600	242,700	245,800	222,400
% of Projected Normal	100%	100%	100%	100%	89%

**Table 7-20. Projected Demand During Multiple Dry Year Period Ending in 2030 (DWR Optional Table)**

Demand	Projected Multiple Dry Year Water Demand <sup>(b)</sup> , af/yr				
	2026	2027	2028	2029	2030
Projected Future Demand	262,800	266,300	269,800	273,300	276,700
Additional Future Conservation, %	10%	10%	10%	10%	10%
Future Conservation Savings	(26,300)	(26,600)	(27,000)	(27,300)	(27,700)
Future Demand with Conservation	236,500	239,700	242,800	246,000	249,000
Mandated Conservation in Multiple Dry Year, %	0%	0%	10%	10%	15%
Mandated Conservation Savings	-	-	(24,300)	(24,600)	(37,400)
Total Demand	236,500	239,600	218,400	221,200	211,700
% of Projected Normal	100%	100%	90%	90%	85%

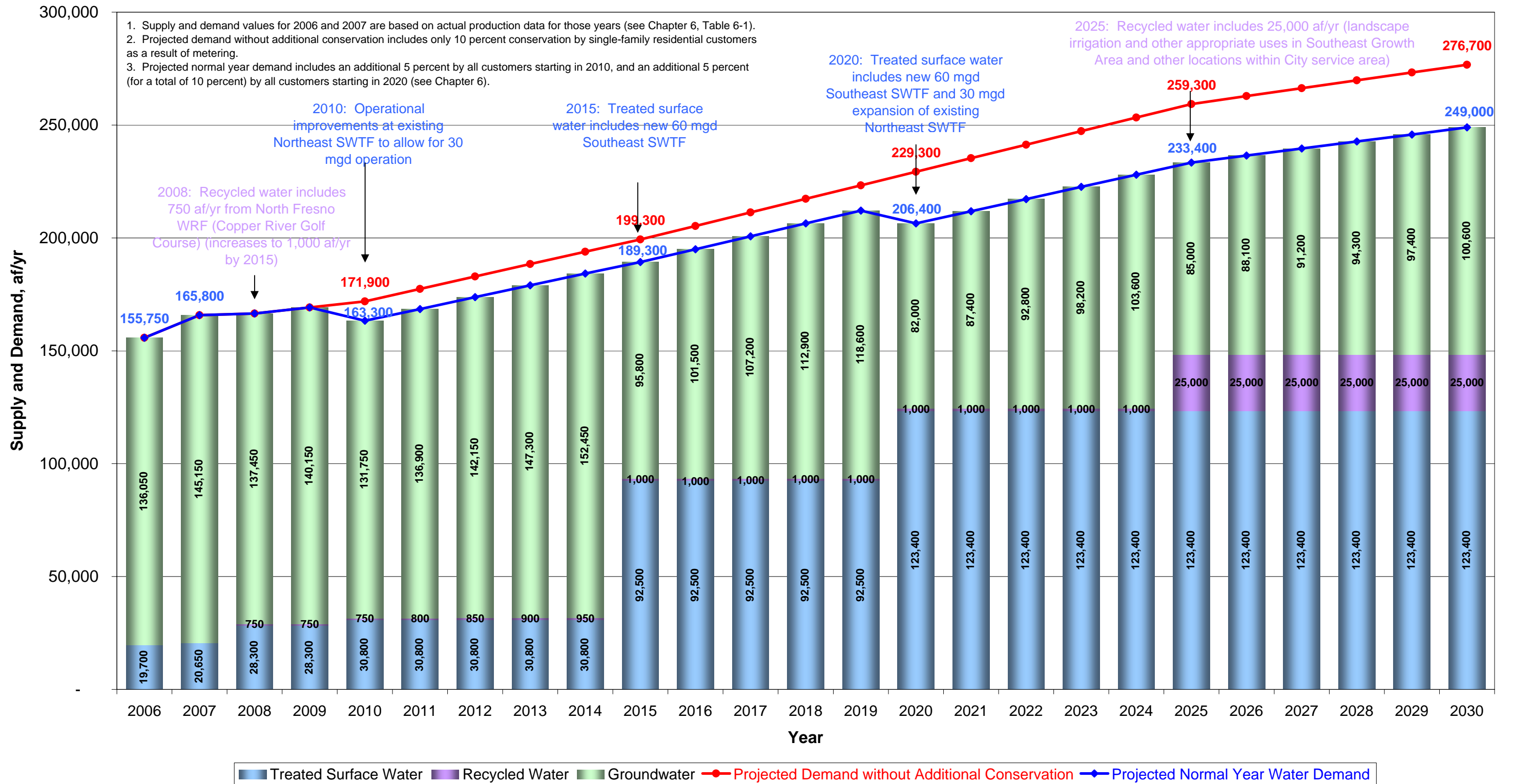
**Table 7-21. Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2030 (DWR Optional Table)**

	Supply and Demand Comparison, af/yr				
	2026	2027	2028	2029	2030
Total Supply	236,500	239,600	242,700	245,800	222,400
Total Demand	236,500	239,600	218,400	221,200	211,700
Difference (Supply - Demand)	-	-	24,300	24,600	10,700
Difference as % of Supply	0%	0%	10%	10%	5%
Difference as % of Demand	0%	0%	11%	11%	5%

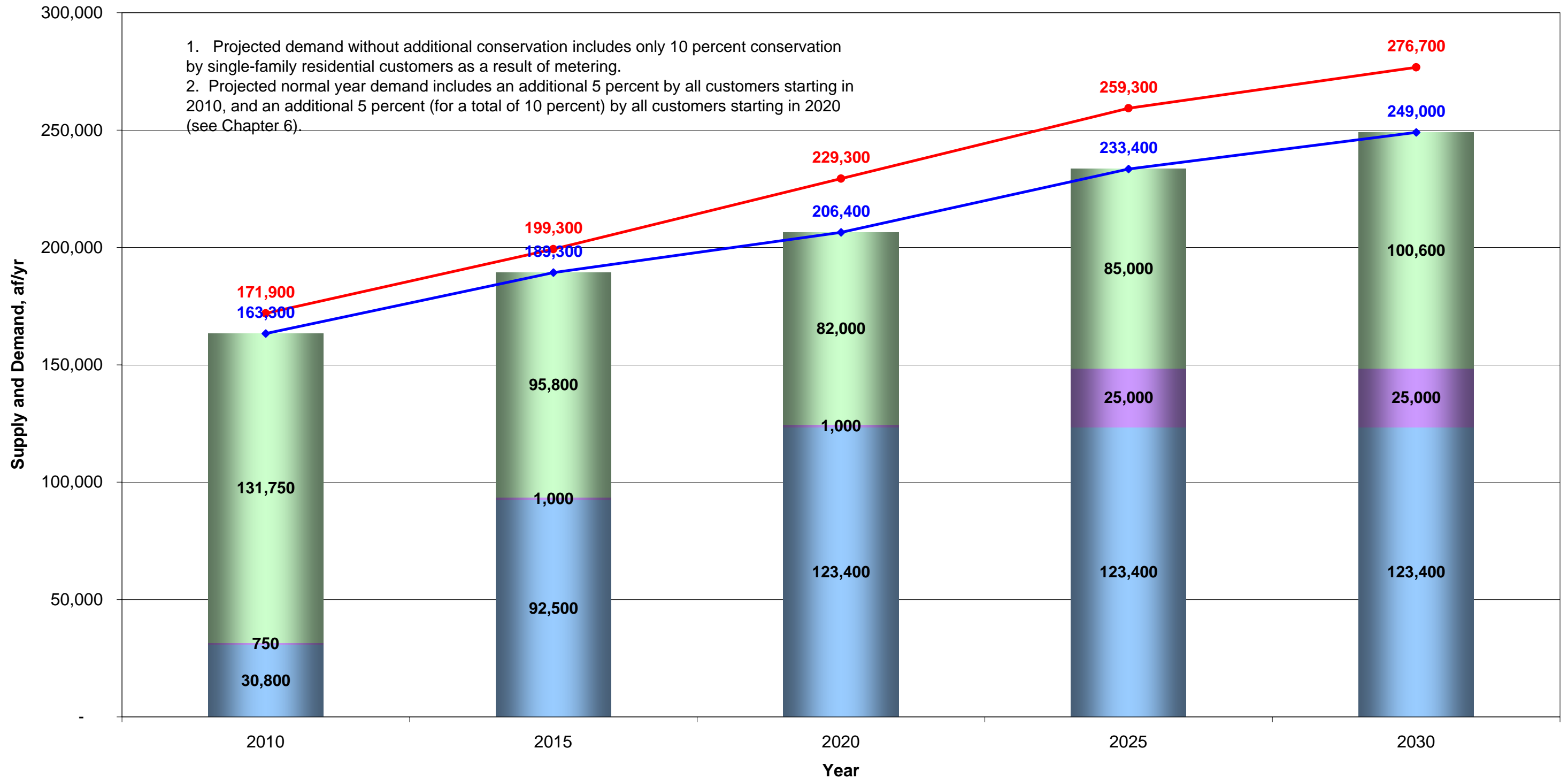
<sup>(a)</sup> See Chapter 5.

<sup>(b)</sup> See Chapter 6. Demands reduced by 10% in Dry years (3rd and 4th years) and 15% in Critical-low years (5th year)

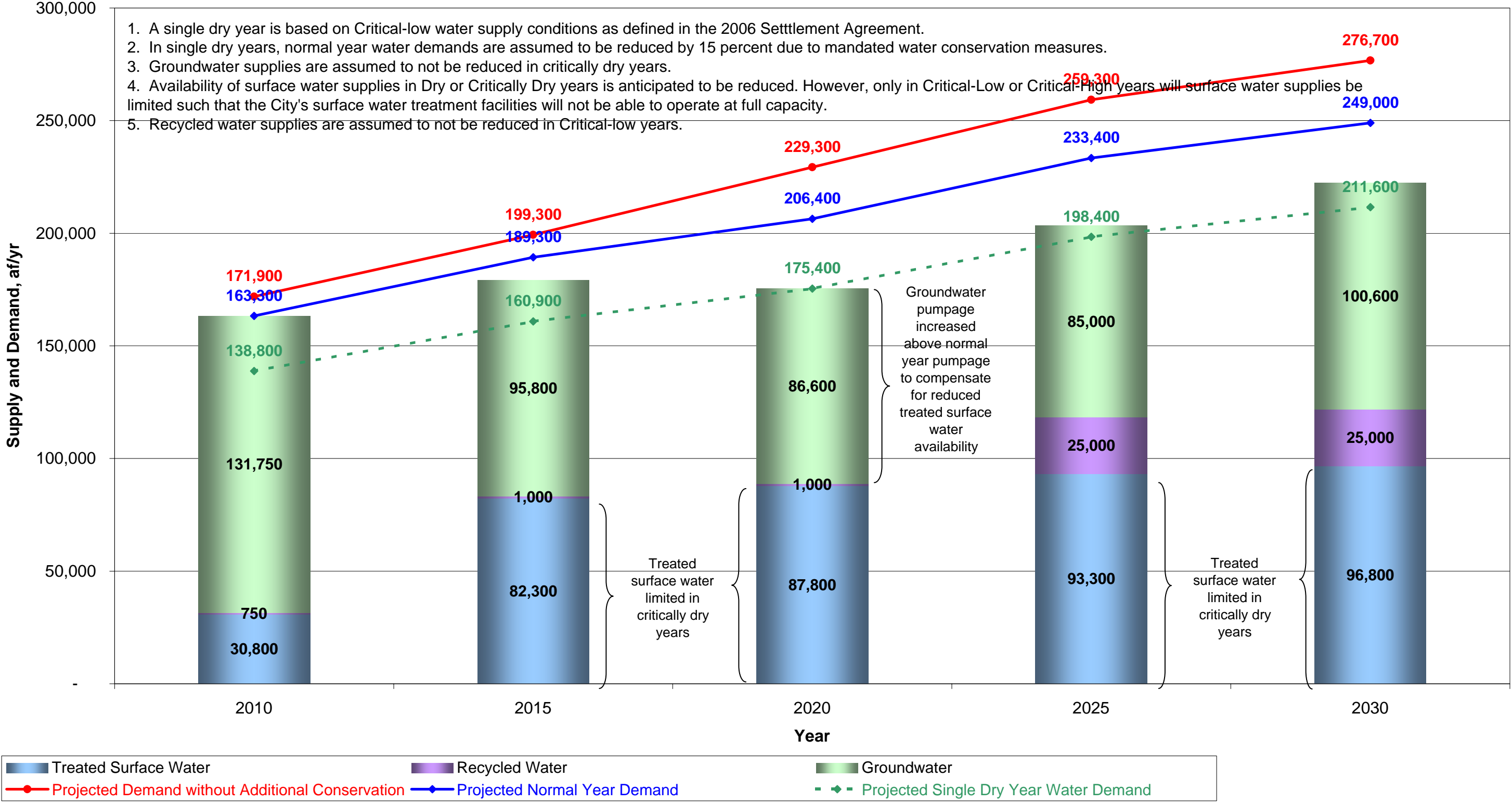
**Figure 7-1. Projected Normal Year Annual Water Supply and Demand (2006 to 2030)**



**Figure 7-2. Projected Normal Water Year Supply and Demand**



**Figure 7-3. Projected Single Dry Year Water Supply and Demand**



**Figure 7-4. Projected Multiple Dry Year Water Supply and Demand**

