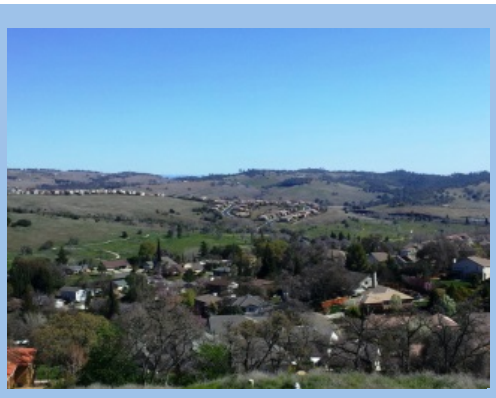

2015 Urban Water Management Plan

Adopted: June 27, 2016

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El Dorado Irrigation District
2015 Urban Water Management Plan

Final
Adopted June 27, 2016

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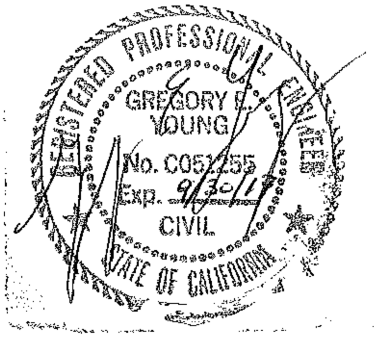
This El Dorado Irrigation Water District 2015 Urban Water Management Plan was prepared under the direction of a California licensed civil engineer.



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CHAPTER 1. INTRODUCTION

The El Dorado Irrigation District (EID or District) has prepared this Urban Water Management Plan (UWMP) to address the Urban Water Management Planning Act (UWMPA) requirements for urban water suppliers. EID provides retail potable, irrigation and recycled water services to municipal and agricultural customers throughout a large area of El Dorado County (County),[1] and also wholesales treated water to the City of Placerville.[2]

The District, organized in 1925 under the Irrigation Act (Water Code §§20500, et seq.) and authorizing statues (Water Code §§22975, et seq.) has a long history of providing water for irrigation, municipal, and commercial purposes. Originally formed to supply irrigation water for farming, over time District's service area has become more urbanized requiring ever expanding services to meet the needs of a growing population. The District's service area expands over approximately 220 square miles, resulting in municipal and agricultural water services to 110,000 people. Since 1925, District has grown from serving 31,500 acres of agricultural lands to serving nearly 150,000 acres of agricultural needs, urban communities, and rural residences.[3]

The District's primary water supply is derived from the natural rainfall and snowpack that falls upon the upper elevations of the Sierra Nevada mountains. The District does not utilize groundwater as a supply, but does capture and treat wastewater from many of the local communities, producing recycled water

Note to DWR

The El Dorado Irrigation District has written this UWMP primarily as a water resources planning tool and secondarily to satisfy the requirements of the UWMPA.

The body of the document provides narratives and discusses data that DWR requests in its 2015 UWMP Guidebook, including changes to the California Water Code since 2010.

To facilitate review by DWR for compliance with the UWMPA, data from the body of the document has been transferred into DWR Tables consistent with the organization of the tables in Section E of the 2015 UWMP Guidebook Appendices. These tables are located in **Appendix A-1.**

Also, this UWMP has been reviewed for adequacy according to the UWMP Checklist as contained in Section F in the 2015 UWMP Guidebook. A completed checklist is included in **Appendix A-2**.

[1] El Dorado Irrigation District is not the only water supplier for the El Dorado community.
[2] Because deliveries to the City of Placerville are only around 1,200 acre-feet annually, EID is not considered a wholesale water purveyor per California Water Code 10608.12(r). This 2015 UWMP is prepared by EID solely from the perspective of a retail water purveyor.
[3] A Brief History of El Dorado Irrigation District, December 2011.

to supplement its primary supplies.

The District's 2015 Urban Water Management Plan (2015 UWMP) documents its water management planning efforts to ensure adequate water supply to meet demands over the next 25 years. The 2015 UWMP specifically assesses the availability of supplies to meet future demands during normal, single-dry and multiple dry years. Verification that future demands will not exceed supplies and assuring the availability of supplies in dry-year conditions are critical outcomes of this UWMP.

The 2015 UWMP is an update to EID's 2010 UWMP and presents new data and analysis as required by the California Department of Water Resources (DWR) and the California Water Code (CWC) since 2010. It is also a comprehensive water planning document which describes existing and future supply reliability, forecasts future demands, presents demand management progress, and identifies local and regional cooperative efforts to meet projected water use.

The current four-year drought has emphasized the importance of planning ahead to meet water demands with potentially at-risk water supplies. Such forward planning is an important outcome of the 2015 UWMP, which also addresses the evolving impact of drought on the District's water supply and operations.

1.1 Urban Water Management Planning Act

The Urban Water Management Planning Act (UWMPA) requires every urban water supplier to prepare an urban water management plan pursuant to California Water Code § 10610 et seq.[4] Because the District is an urban water supplier, it is preparing its 2015 UWMP consistent with the UWMPA. The plan provides a framework for water planning to minimize the negative effects of potential water shortages, and provides useful information to the public about the District and its water management programs.

Specifically, the 2015 UWMP describes and evaluates the reliability of the District's existing and planned water supplies to meet forecasted near and long-term customer water demands; especially the availability and sufficiency of surface and recycled water assets, and the vulnerability of these supplies to seasonal and climatic conditions.

The UWMP also revisits baseline per-capita water use data and target conservation values, first developed and presented in the 2010 UWMP as required by CWC §10608 et seq., and assesses compliance with those targets. This UMWP also includes narratives describing

[4] An "urban water supplier" is a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually." CWC § 10617.

water demand management measures,[5] its long-term plan for efficient water use, and estimated future water savings based on water use projections, where available. Distribution system water loss and information on potential use of recycled water as a water source for the District are included in the UWMP's comprehensive conservation analysis.

Also included in the plan is a comprehensive water shortage contingency analysis, as required by the UWMPA, which details stages of action to be undertaken by the District in response to water supply shortages.[6]

In short, this 2015 UMWP allows the District assess and plan for on-going effective management of its water supplies to meet its evolving water demands.

1.2 Public Participation and Agency Coordination

The UWMPA requires a water purveyor to coordinate the preparation of its UWMP with other appropriate agencies and organizations in and around its service area. This includes coordination with other water suppliers that share a common source, water management agencies, and relevant public agencies. Additionally, the District encouraged active involvement of other diverse sectors of the population prior to and during the preparation of the plan. The District coordinated preparation of its UWMP with the entities listed in **Table 1-1**. Copies of the various notifications are included in **Appendix B-3**. A brief description of other coordinated planning and management efforts and related documents that extend well beyond this update to the UWMP follows:

Table 1-1 – Public and Agency Coordination

Coordinating Agencies	Coordinate regarding Demands	Sent Copy of Draft UWMP	Sent 60-Day Notice	Notice of Public Hearing
Cities, Counties, Customers and Interested Parties				
City of Folsom	√	√	√	√
El Dorado County (Planning Department)	√	√	√	√
El Dorado County Water Agency	√	√	√	√
Sacramento County (Planning Department)			√	√
City of Placerville		√	√	√
Regional Water Authority			√	√
Water Forum			√	√
General Public				√

[5] As detailed in the CWC § 10631 (f)(1) and (2).

[6] A recent amendment to CWC § 10632 and anticipated additional changes forthcoming as required in the Governor's Executive Order B-37-16 will include specific permanent prohibitions on practices deemed wasteful, such as using non-recirculated water in fountains, watering lawns within 48 hours of measurable precipitation, and irrigating ornamental turf on public street medians. The District's responses and water shortage planning (see Chapter 6) will need to reflect these recent changes.

1.2.1 Water Forum

Community leaders, along with water managers from Sacramento, Placer and El Dorado counties negotiated the Water Forum Agreement (WFA), which is a comprehensive package of linked actions that will achieve two coequal objectives: (1) Provide a reliable and safe water supply for the region's economic health and planned development through to the year 2030; and (2) Preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. The District is a signatory to the Water Forum Agreement through a Procedural Agreement, which states the District's intent to meet the WFA.

1.2.2 Regional Water Authority

The Regional Water Authority (RWA) is a joint powers authority that serves and represents the interests of 22 water providers in the greater Sacramento, Placer, El Dorado and Yolo County regions. The Authority's primary mission is to help its members protect and enhance the reliability, availability, affordability and quality of water resources. EID is a member of the RWA. RWA has launched significant programs and services on a regional scale, including: (1) A water efficiency program designed to help local purveyors implement best management practices on a regional basis; (2) implementation of the American River Basin Regional Conjunctive Use Program to build and upgrade water facilities throughout the region to better manage surface and groundwater resources; and (3) development of an Integrated Regional Water Management Planning Program to continually identify the regional projects and partnerships that will help the region best meet its future water needs.

1.2.3 Additional Entities

EID has shared water supply interests with the El Dorado County Water Agency (EDCWA) and overall with the County, as well as shared water interests with neighboring water agencies and relevant public agencies. These parties were sent 60 day notices and encouraged to attend the public hearing prior to the adoption of the 2015 UWMP. Copies of the letters are provided in **Appendix B-3**.

1.3 Plan Adoption

Prior to adoption of its UWMP, the District held a public hearing regarding its 2015 UWMP on June 27, 2016. Before the hearing, the District made a draft of the 2015 UWMP available for public inspection at the District's office and on the District's website. Pursuant to CWC Section 10642, general notice of the public hearing was provided through publication of the hearing date and time,[7] and posting of the hearing at the District's office. The District's Board of Directors received comments at the public hearing.

[7] See **Appendix B-2** for copies of the published notices.

As part of its public hearing, the District received community input regarding its implementation plan for complying with the water conservation requirements contained in CWC § 10608.20 et seq., including the implementation plan's economic impacts.[8] Also, at the public hearing, the District presented the method for determining its urban water use target pursuant to CWC § 10608.20(b).

The District adopted this 2015 UWMP on June 27, 2016.[9] A copy of the adopted 2015 UWMP will be provided to the County and the California State Library, and posted onto EID's website.

1.3.1 Additional Compliance

The District plans to submit all required documentation related to the UWMPA soon after adoption. These include the required DWR UWMP Tables as **Appendix A-1**, the DWR Checklist as **Appendix A-2**, the SB 7-7X compliance forms as **Appendix A-3**, and the AWWA Water Audit worksheet as **Appendix A-4**.

1.4 Previous Reports

The 2015 UWMP has been prepared using a number of related planning documents and previous reports, including, but not limited to:

- 2010 UWMP;
- 2013 Wastewater Facilities Master Plan;
- 2013 Integrated Water Resources Master Plan;
- 2014 Comprehensive Annual Financial Report;
- 2015 Water Resources and Service Reliability Report (and prior years of this annually prepared report;

1.5 Plan Organization

This UWMP is organized as follows:

- Chapter 2 provides a description of the District's (1) service area including climate, demographic and population characteristics, and current and projected land-uses integral to the demand forecasts; and (2) potable and recycled water delivery systems;
- Chapter 3 describes the District's current and future water supplies and the reliability of the supplies;

[8] CWC § 10608.26
[9] The resolution adopting the 2015 UWMP is in **Appendix B-1**.

- Chapter 4 details the demands on the District's system, including the past and future estimated demands;
- Chapter 5 discusses the District's demand management measures;
- Chapter 6 outlines the District's water shortage contingency plan;
- Chapter 7 compares the District's supplies and demands in normal and dry years.

The Appendices include background information, supporting documents, and tables in the formats required by DWR.

CHAPTER 2. WATER SYSTEM INFORMATION

2.1 El Dorado Irrigation District General Service Area

The El Dorado Irrigation District was formed in 1925 to provide water to El Dorado County and was created to secure water supplies, keep irrigation rates reasonable and increase the value of agricultural lands. The District serves approximately 220 square miles on the western slope of the Sierra Nevada mountains in El Dorado County (see **Figure 2-1**). The service area is generally bounded by Sacramento County to the west and the Pollock Pines/Sly Park area to the east and ranges from 500 to more than 4,000 feet in elevation. The area north of Coloma and Lotus establishes the northern-most part of the service area, while the communities of Pleasant Valley and South Shingle Springs establish the southern boundary. The District also has two satellite water systems, one each in the Strawberry and Outingdale communities.

The District is primarily located in two major watersheds, the South Fork American River in the north and the North Fork of the Cosumnes River in the south; the District is hydrologically split by the Placerville Ridge and Highway 50 between these two drainage watersheds. Although the rivers drain east to west, the minor streams mostly travel northwest toward the American River and southwest toward the Cosumnes River. The ridges generally trend in a west to east direction. **Figure 2-1** illustrates the location of the District's service area.

The District serves a combination of agricultural and traditional municipal customers throughout the County. Land uses in the District's service are primarily residential along with agriculture, commercial and retail. The District's growth prospects are predominantly defined by the County's General Plan, with variances to that plan from periodic general plan amendments and specific development plans, several of which have recently been brought before the District requesting water supply assessments.[10] Given the County's most recent growth projections, the District anticipates residential growth during the 2015 UWMP planning horizon to increase by more than 13,500 additional dwelling units by 2035 as detailed in **Section 2.1.3**.

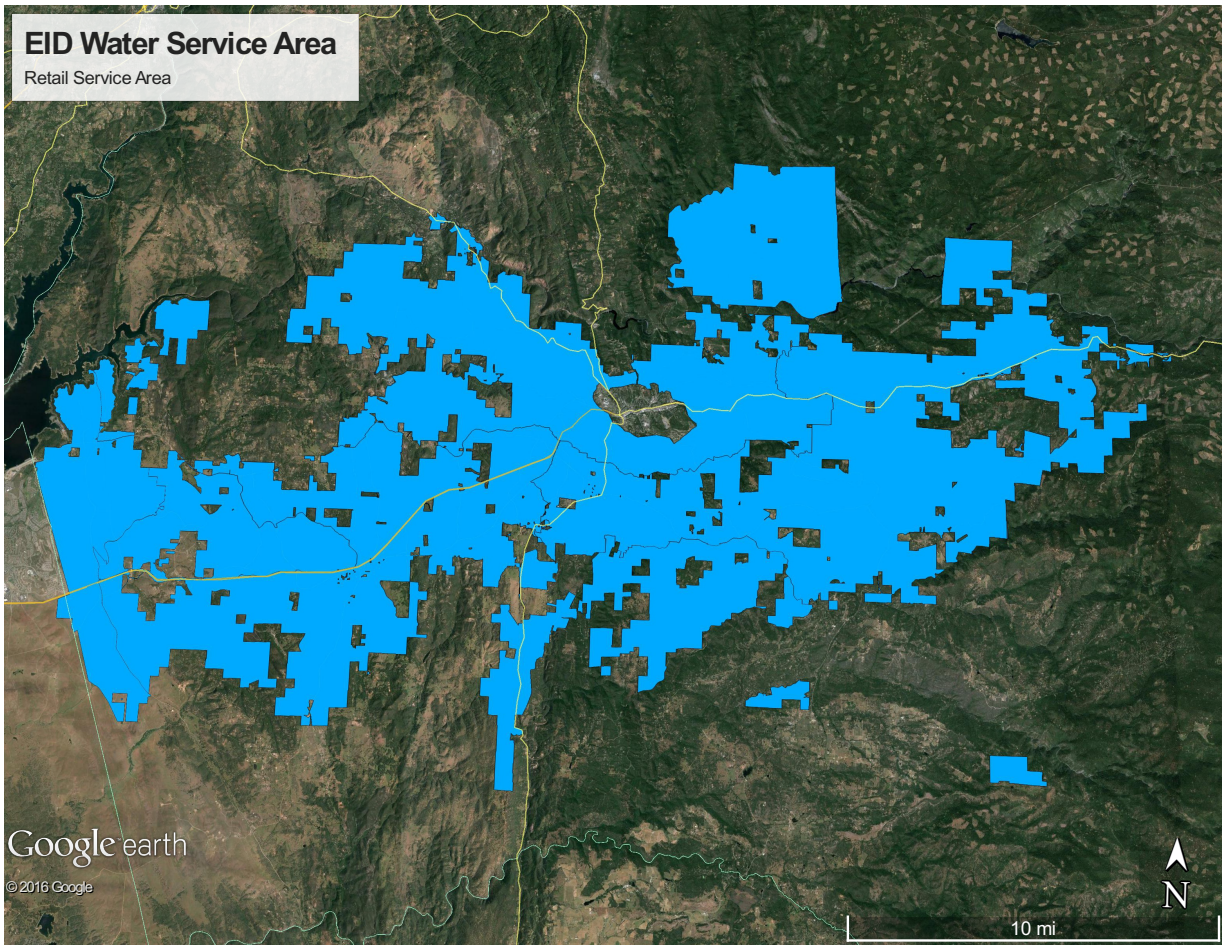
2.1.1 Climate

The District service area is located on the western slope of the Sierra Nevada and covers a geographic region with climate variation due to changes in elevation, topography, and associated weather characteristics. The District is divided into two main service zones: The El Dorado Hills system and the Western/Eastern system. **Table 2-1** and **Table 2-2** present

[10] Water supply assessments are prepared by a water purveyor pursuant to California Water Code Section 10910 et seq.

climate data from multiple locations within the service area to best represent the District's climate.

Figure 2-1 – El Dorado Irrigation Water District Service Area[11]



The El Dorado Hills system and the lower portion of the Western/Eastern system are located just above the California Central Valley floor, ranging in elevation from about 500 to 3,000 feet. These zones have a climate typical to California's central valley and Sierra foothills with cool, wet winters and hot, dry summers. **Table 2-1** summarizes climate values for this zone from the CIMIS station in Diamond Springs located in the southern part of the service zone, and the Western Regional Climate Center's weather station in Placerville, which is located in this zone of the District.

The upper reaches of the Western/Eastern system are at higher elevation, generally between 3,000 to 4,000 feet and is characterized by a Sierra forest climate with warm summers, cold

[11] Map of the District's service area generated through Google Earth.

wet winters, and occasional snow. This zone also has the potential to be more often affected by summer thunderstorms. **Table 2-2** summarizes climate values from the CIMIS Station in Camino. As may be necessary, the District will be using the State's 2015 Model Water Efficient Landscape Ordinance (MWELO) values as provided in the MWELO Appendix A for ETo values in the Eastern Zone. While MWELO Appendix A ETo data represents the suggested ETo values, for the purpose of maintaining the most accurate data, CIMIS station data is presented as a basis for comparison.

Table 2-1 – El Dorado Hills and Lower Western/Eastern system Climate[12]

Month	MWELO Appendix A ETo (inches)	CIMIS Standard Monthly Average ETo (inches)	Average Precipitation (inches)	Average Temperature (Fahrenheit)	Average Maximum Temperature (Fahrenheit)	Average Minimum Temperature (Fahrenheit)
January	0.9	1.84	6.92	42.26	53.4	32.6
February	1.7	2.28	6.65	45.39	56.9	35
March	2.5	3.31	5.76	48.58	60.5	37.6
April	3.9	4.95	3.19	53.16	66.3	40.5
May	5.9	6.36	1.51	60.17	74.8	46.3
June	7.2	7.43	0.44	67.43	83.9	51.9
July	7.8	8.35	0.07	74.18	92.7	57.2
August	6.8	7.73	0.09	72.83	91.4	56.2
September	5.1	5.75	0.54	67.65	85.7	52.1
October	3.1	3.83	2.13	58.56	74.8	45
November	1.5	1.99	4.4	48.37	61.3	37.4
December	0.9	1.41	6.47	42.8	53.8	33.1
Annual :	52.2	55.22	38.17	56.8	71.3	43.7

MWELO Appendix A data from Camino, CA
ETo data from DWR CIMIS Data, Diamond Springs Station, 228, 2011-2015
Precipitation and Temperature data from WRCC - PLACERVILLE, CALIFORNIA (046960), 1900-2011

2.1.2 Demographic and Population Characteristics

The population served by the District includes a mix of users and user classes, ranging from residential and commercial, to agricultural (receiving both potable and raw water supplies) and public customers (for instance schools, governmental facilities and fire stations). Population estimates were derived from census data following the methods set forth by DWR.[13] The historic population and projected population for the District's service area are presented in **Table 2-3**. The population was calculated by removing the population of

[12] The State of California's Model Water Efficient Landscape Ordinance (MWELO) includes evapotranspiration data throughout California in its "Appendix A." The MWELO Appendix A data included in this table represents conditions in Camino, CA. The ETo data is from DWR CIMIS Data, Diamond Springs Station, 228, 2011-2015. The Precipitation and Temperature data is from WRCC - PLACERVILLE, CALIFORNIA (046960), 1900-2011.
[13] CWC Section 10631 and DWR's 2015 UWMP Guidebook at 3-6.

Placerville, since the city's population is not served water directly by the District. However, since the District does provide service to customers on the edges of the city, a small amount of the area within the legal boundaries of the City of Placerville is included in the population calculations.

Table 2-2 – Upper Western/Eastern System Climate[14]

Month	MWELO Appendix A ETo (inches)	CIMIS Standard Monthly Average ETo (inches)	Average Precipitation (inches)	Average Temperature (Fahrenheit)	Average Maximum Temperature (Fahrenheit)	Average Minimum Temperature (Fahrenheit)
January	0.9	1.54	6.71	45.4	54.69	37.98
February	1.7	1.94	6.63	45.6	54.77	37.89
March	2.5	3.38	5.22	48.9	58.61	39.96
April	3.9	4.50	3.71	51.8	61.77	41.85
May	5.9	6.36	2.34	60.0	70.42	48.94
June	7.2	7.72	0.59	68.5	79.73	55.94
July	7.8	8.95	0.04	75.6	87.85	63.26
August	6.8	8.23	0.06	74.4	86.93	62.10
September	5.1	6.13	0.36	69.4	81.85	57.81
October	3.1	3.98	2.16	59.5	70.89	49.47
November	1.5	1.92	3.76	49.7	59.67	41.80
December	0.9	1.27	7.34	43.8	52.42	36.79
Annual :	47.3	55.91	38.91	57.7	68.3	47.8

MWELO Appendix A data from Camino, CA
ETo data from DWR CIMIS Data, Camino Station 013, 1995-2015
Precipitation and Temperature data from DWR CIMIS Data, Camino Station 013, 1995-2015

Table 2-3 – EID's Historic and Projected Population

Year	Population	Year	Population
1997	74,915	2010	107,470
1998	79,838	2011	107,527
1999	81,153	2012	106,762
2000	84,243	2013	106,269
2001	87,324	2014	106,527
2002	90,231	2015	107,578
2003	94,609	2020 (est)	113,118
2004	97,708	2025 (est)	118,944
2005	100,861	2030 (est)	125,069
2006	102,428	2035 (est)	131,511
2007	103,223	2040 (est)	138,283
2008	104,103	2045 (est)	145,405
2009	107,479		

[14] The MWELO Appendix A data is from Camino, CA. The ETo data is from DWR CIMIS Data, Camino Station 013, 1995-2015. The Precipitation and Temperature data is from DWR CIMIS Data, Camino Station 013, 1995-2015.

2.1.3 Current and Projected Land Use

As previously indicated, the District currently serves a variety of land uses including residential, commercial, institutional, and industrial customers. The historic and projected population shown in **Table 2-3** are a reflection of these land uses, with the increased population reflecting continued growth as represented by the County's General Plan, existing and anticipated amendments, and related documents. These anticipated land use changes are the foundation for forecasting the District's future water demands.

To develop a basis for the demands forecasted in Chapter 4, the following three areas of growth are defined: (1) the County's General Plan (GP), (2) minor adjustments to the GP as reflected in Facility Improvement Letters submitted to the District that may result in GP amendments, and (3) known development proposals for which the District has estimated future water demands (as further defined in **Chapter 4**). Anticipated growth is discussed in the following paragraphs for each of these areas.

County GP Growth Estimate

Figure 2-2, from the District's 2013 Integrated Water Resource Management Plan, indicates the County's planned future land use designations from the GP. For purposes of this 2015 UWMP, as recommended by the County as the most current growth projection information, the District is using a West Slope housing unit growth rate defined in a 2013 memo (BAE Memo) to the County for County-defined "market areas."[15] The BAE Memo defined incremental growth in housing units on the West Slope for fourteen unique market areas out to 2035 based upon a 1.03 percent annual growth rate. Acknowledging that most growth occurs in areas that can be served by utility infrastructure such as water and highway access, the majority of this growth is assumed to occur within the District's service area (or expanded service area, as lands are annexed into the District when these land use changes occur). However, the following market areas (as defined by the BAE Memo) were assumed to be less than fully served by the District as they are expected to be served by other urban water purveyors or are otherwise not anticipated to be provided with District infrastructure: (the resulting future percentage served by the District in parentheses) Somerset (10 percent), Cool/Pilot Hill (10 percent), Georgetown/Garden Valley (10 percent), American River (25 percent), and Mosquito (75 percent).

Although the BAE Memo limited its projections to the period of 2035, the same growth rate (converted to housing units) was extended to 2045 using the BAE Memo's average growth rate from 2015 to 2035. **Table 2-4** presents the resulting housing growth assumptions for single family and multi-family residences. Because non-residential growth will accompany the residential growth, the District has assumed an accompanying growth in non-residential

[15] 2035 Growth Projections Memorandum; from BAE Urban Economics to El Dorado County, March 14, 2013, specifically Table 3, p. 8 (see **Appendix C-1)**

connections that equals ten percent of the residential growth (e.g. for every ten housing units there is one non-residential connection).[16]

Table 2-4 – Total Identified Residential Growth[17]

Growth Category (cumulative units beyond current baseline)		2020	2025	2030	2035	2040	2045
GP Growth	Single Family Housing Units	2,459	5,047	7,772	10,621	13,614	16,760
	Multi-Family Housing Units	248	508	783	1,091	1,421	1,775
	Non-residential Connections	68	413	714	1,027	1,319	1,593
FIL Increment		36	172	303	441	591	762
Known Projects (from WSAs)	Central El Dorado Hills	0	399	728	1,028	1,028	1,028
	Dixon Ranch	125	604	604	604	604	604
	Lime Rock Valley	0	65	332	678	800	800
	Village of Marble Valley	0	549	1,544	2,710	3,236	3,236
	Mill Creek (pending WSA)	0	554	632	632	632	632
Total (residential and non-residential)		2,936	8,311	13,412	18,832	23,245	27,190
Total (residential only)		2,859	7,855	12,622	17,695	21,778	25,406

District Facility Improvement Letters

In addition to the assumed growth from the County's GP, additional growth has historically occurred and is expected to continue to occur as a result of lot splits, land-use changes and new services to existing parcels. These changes are captured when landowners submit a Facility Improvement Letter (FIL) to the District that initiates a request for water service and may result in a GP amendment.

FILs allow the District to assess whether infrastructure or supplies are available to serve the proposed project. In some instances, the FILs include proposed land-use zoning changes not previously incorporated into EID water demand projections as would be reflected in the County's GP. The District maintains an FIL as "open" for a period of approximately 3 years, assuming either the project moves forward and pays connection fees, etc. or the project does not occur. As such, the list of FILs is dynamic. Because the District cannot predict FILs into the future and the FILs are cyclic depending on market conditions, an overall additional increment of one percent of the GP growth is assumed for purposes of estimating additional residential and non-residential units. The values are also shown in **Table 2-4**.

Known Development Projects

For large development projects, the District is required to prepare an assessment of water supply reliability pursuant to CWC Section 10910 et seq., formally referred to as Water Supply Assessments (WSA). In the summer of 2013, the District approved four separate

[16] This relationship is consistent with the residential to non-residential relationship for the District's existing service areas.

[17] The values in this table for the GP Growth are adapted from the 2035 Growth Projections Memorandum (see footnote #15).

WSAs, one each for Lime Rock Valley, Dixon Ranch, Central El Dorado Hills, and Marble Valley Specific Plans.[18] Each project has unique land use elements that were analyzed in detail in the respective WSAs. Overall, these four approved WSAs included over 5,600 new housing units (see **Table 2-4**). Though the timing of each development may be different than represented in the WSAs, the District has maintained the same growth projections used in the respective WSAs for purposes of this 2015 UWMP.

In addition to the four projects with adopted WSA's, the District has received a request and is statutorily required to prepare a WSA for the proposed Mill Creek development project shortly after adoption of this 2015 UMWP. Therefore, the projected demands for the Mill Creek project are explicitly included in the demand forecast in **Chapter 4**. The Mill Creek project consists of approximately 630 residential housing units, accompanied by supporting commercial and agricultural elements.

Adjusting Projected Growth

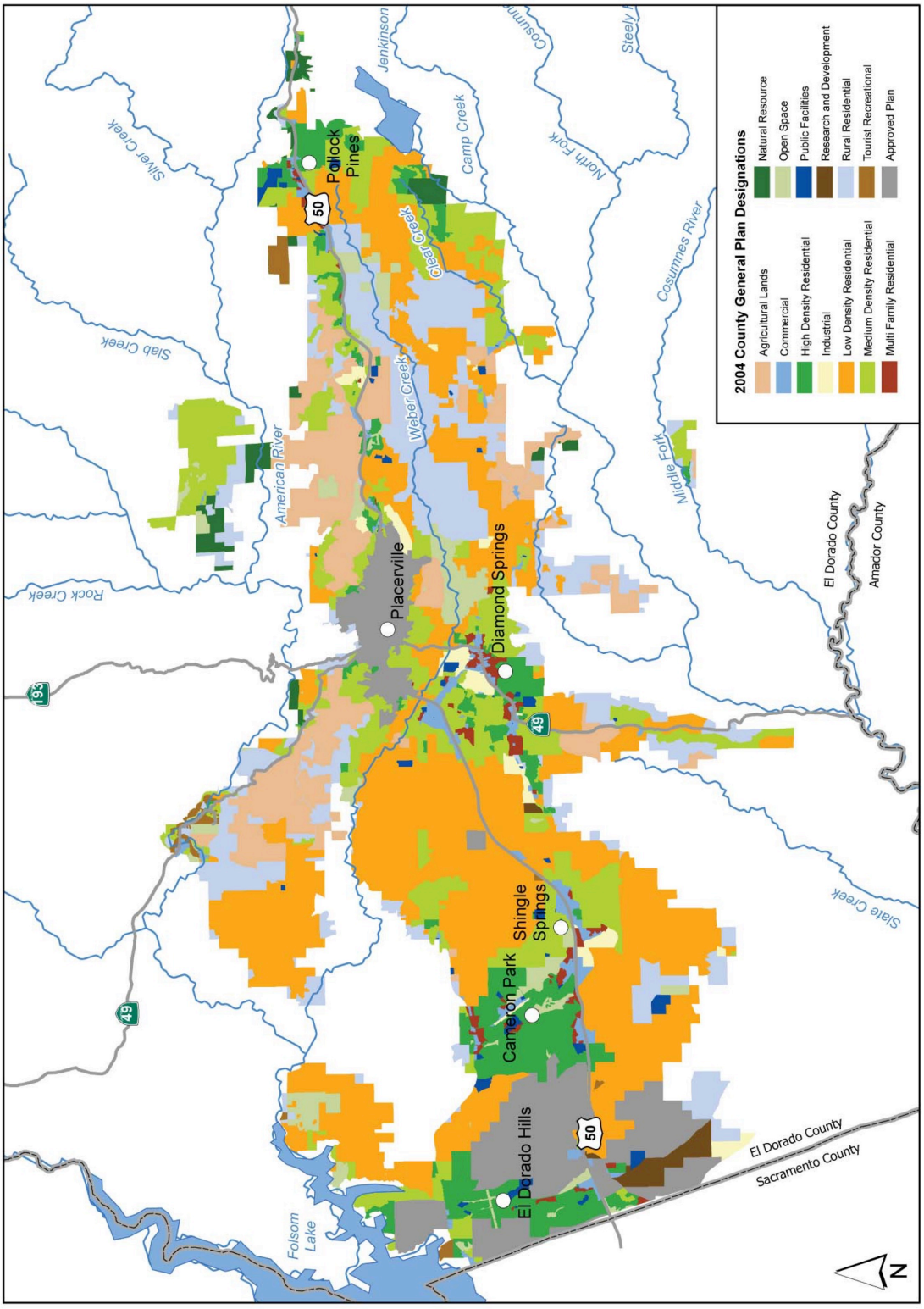
As represented in the prior paragraphs, the District anticipates continued residential growth of about 1.03 percent within its service area – equivalent to the County's estimate. As presented in the BAE Memo, this growth would result in about 14,260 additional residential units within the West Slope area by 2035. When reviewing the total residential units presented in **Table 2-4**, the District recognized that simply adding the Known Projects and the FILs to the GP value resulted in more residential units by 2035 than represented by the County. To be consistent with the County, the District has selected to revise the residential unit counts downward prior to forecasting water demands. Because many factors will ultimately affect the actual number of new residential units served by the District, the downward adjustment was completed by subtracting a set number of units per each 5-year increment so that the total number of new residential units was less than the BAE Memo's represented 14,260 units. **Table 2-5** presents the adjusted values that are used in Chapter 4.

Table 2-5 – Adjusted Residential Unit Growth

Growth Category (cumulative units beyond current		2020	2025	2030	2035	2040	2045
From Table 2-4	Single Family	2,661	6,852	10,727	14,731	18,402	21,608
	Multi-Family	248	1,022	1,869	2,880	3,224	3,578
	Total Residential Units	2,909	7,874	12,596	17,611	21,626	25,186
Adjustment (91% SF/9% MF)		500	1,300	2,500	4,000	5,800	7,600
For Demand Forecasts	Single Family	2,206	5,669	8,452	11,091	13,124	14,692
	Multi-Family	203	905	1,644	2,520	2,702	2,894
	Total Residential Units	2,409	6,574	10,096	13,611	15,826	17,586

[18] Each of these WSAs is available for review on the District's website.

Figure 2-2 – El Dorado Irrigation District General Land Use Map[19]

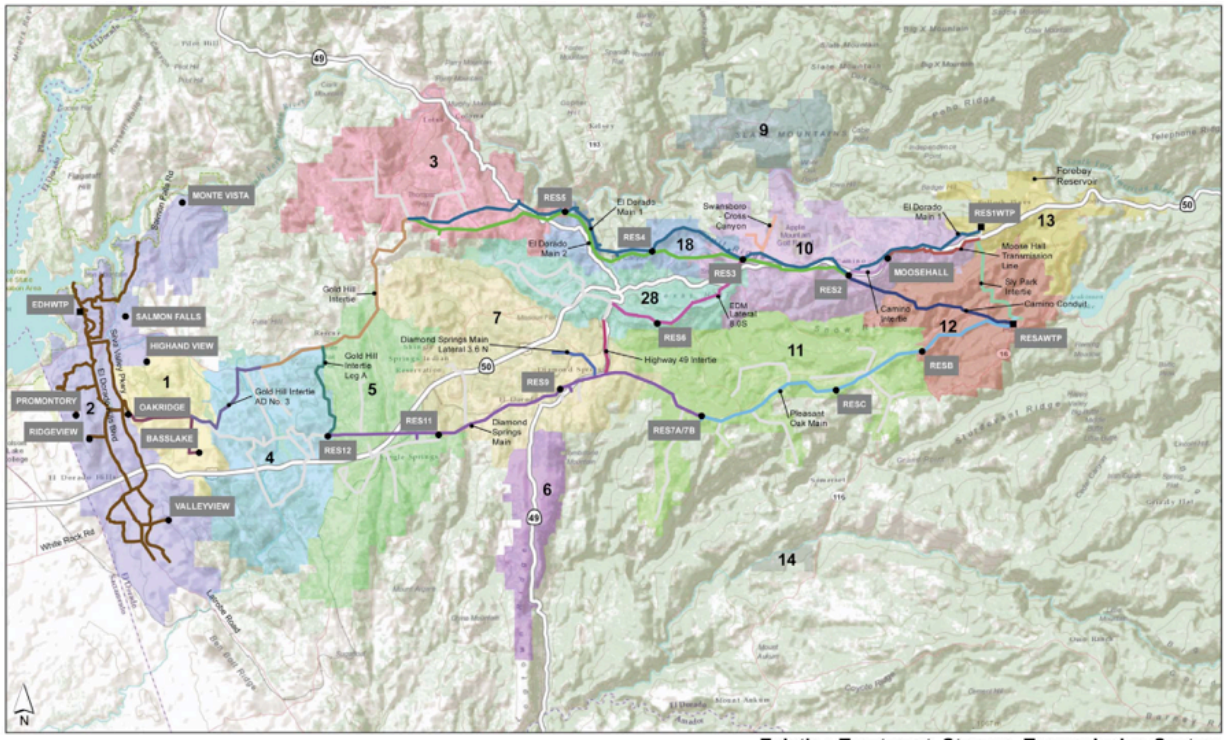


[19] 2013 Integrated Water Resource Management Plan, El Dorado Irrigation District.

2.2 Potable Water Delivery System

The District's water supply system draws the majority of its water from Jenkinson Lake Folsom Reservoir, and Forebay Reservoir, which is supplied with various District water assets associated with Project 184 (see **Chapter 3**). These sources feed its three primary potable water treatment plants and related delivery systems. Combined, the water treatment systems have over 1200 miles of pipeline, 27 miles of ditches, five treatment plants, 34 storage reservoirs with a combined capacity of over 100 million gallons, and 38 pump stations. A map of the primary potable water system can be seen in **Figure 2-3**. The District's 2013 Integrated Water Resource Management Plan has further detail about the specific infrastructure elements throughout the District's service area.

Figure 2-3 – Potable Water Service Area Map[20]



2.3 Non-Potable Water Delivery System

In addition to a potable water system, the District operates a recycled water system that provides tertiary treated recycled water from the Deer Creek and El Dorado Hills wastewater treatment plants to serve the western portions of the service area that are plumbed for recycled water. The water from both plants meets California State Water Resources Control Board Division of Drinking Water Title 22 requirements.

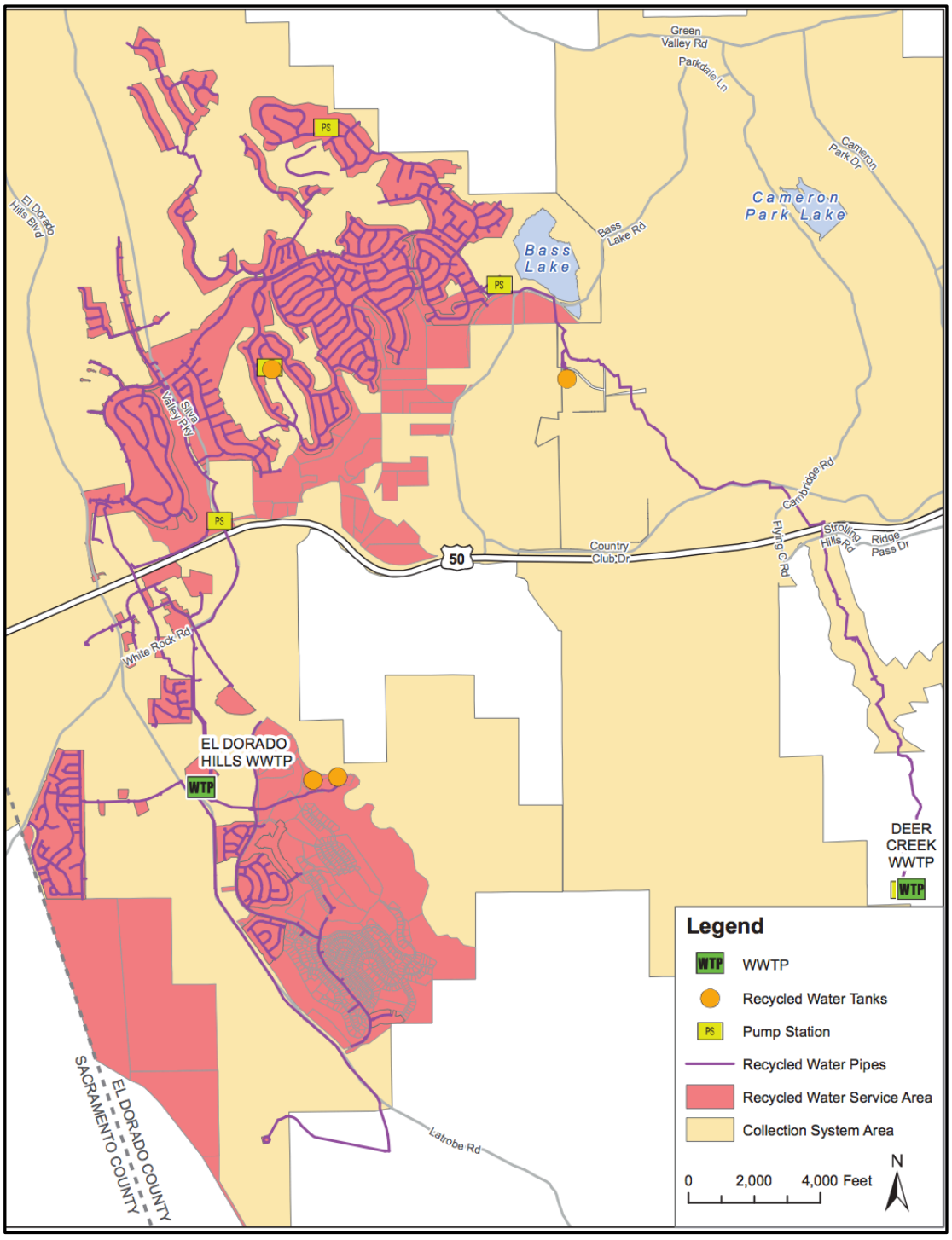
[20] Figure 8-7, Integrated Water Resources Master Plan, EID, March 2013.

The recycled water produced at El Dorado Hills has been used for industrial purposes and golf course irrigation since 1979. Similarly, the Deer Creek water has been used for road median irrigation in addition to industrial purposes and golf course irrigation. In 1997, the distribution systems of both plants were connected allowing recycled water to be transferred between systems. The District has expanded the available use of recycled water to now include commercial and residential irrigation use. **Figure 2-4** illustrates the boundaries and infrastructure for the recycled water system. Further details on the recycled water systems can also be found in the 2013 Integrated Water Resource Master Plan and the Wastewater Master Plan.[21] Recycled water is distributed through a separate set of pipelines and is more fully described in **Section 3.4**.

Presently the peak seasonal demand for recycled water exceeds the quantity of produced recycled water. This has required the District's recycled water supply to be supplemented with potable water as needed during the summer. The two wastewater treatment facilities are currently able to produce approximately 2,400 AFY of recycled water and are projected to expand to 3,500 acre-feet annually by 2040.[22] A 70 million gallon storage reservoir located at the El Dorado Hills wastewater treatment plant is used to store recycled water when production exceeds demand. The District has considered expansion projects for its recycled water supply. Specifically, the District has looked at additional potable water supplementation and the creation of a seasonal recycled water storage reservoir. However, at this time the does not anticipate pursuing such as facility due to economic feasibility.

[21] The 2013 Integrated Water Resource Master Plan and the Wastewater Master Plan are both available on the District's website.
[22] El Dorado Irrigation District Integrated Water Resources Master Plan, March 31, 2013.

Figure 2-4 – Recycled Water Service Area and Infrastructure[23]



[23] 2013 Wastewater Facilities Master Plan.

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CHAPTER 3. WATER SUPPLY CHARACTERISTICS

3.1 Introduction

Chapter 3 describes El Dorado Irrigation District's existing and planned water supplies. The District utilizes water assets derived from its existing sources and is developing additional water assets; portions of these efforts are conducted in concert with El Dorado County Water Agency and the El Dorado Water and Power Authority (EDWPA). This section details the District's available water supplies and entitlements, as well as its planned water supplies and entitlements in both normal water years and dry water years.

The District maintains two primary interconnected potable water systems in its contiguous service area: The El Dorado Hills system and the Western/Eastern system. The District also has a separate recycled water system. The El Dorado Hills system obtains its primary supplies under rights and entitlements from Folsom Reservoir. The Western/Eastern system derives its supplies from sources under rights and entitlements emanating from further up the South Fork American River watershed and the Cosumnes River watershed. The recycled water system delivers treated wastewater from the El Dorado Hills wastewater treatment plant and the Deer Creek wastewater treatment plant.

The water assets can be further categorized by the service area they primarily serve and the treatment plant from where they are produced. Water derived from Folsom Reservoir is delivered to the El Dorado Hills water treatment plant and serves the El Dorado Hills area. Water derived from upstream American River watershed diversions and storage reservoirs generally use the Reservoir 1 Water Treatment Plant to serve the Western/Eastern area while the Cosumnes River diversions use Reservoir A Water Treatment Plant to serve the same area. Water assets from these upstream diversions can be delivered by gravity feed to the El Dorado Hills area, but assets from Folsom Reservoir are not delivered outside the El Dorado Hills area due to infrastructure limitations. The District also has two satellite water systems; one each in Strawberry and Outingdale. The following subsections describe these water supplies and delivery mechanics in more detail. A map of the District Service Area can be viewed in the previous chapter as **Figure 2-1**.

3.2 Treated Water Supplies

The District's treated water supplies are derived from a number of water rights and entitlements as detailed in **Table 3-1**. The maximum available water assets at build-out column in **Table 3-1** does not account for other hydrological, technical, regulatory, and contractual limitations that apply to the water assets for normal year and dry year deliveries. These issues are addressed in the other two columns in the table. The District's water assets available for its uses include water rights and entitlements that the District currently has in its possession, and planned water rights and entitlements that it will control in the future.

3.2.1 Water Rights and Entitlements Description

Generally, the District's water assets are derived from pre-1914 appropriative water rights, licensed and permitted appropriative water rights, a Central Valley Project (CVP) Contract, Warren Act Contracts (that allow non-federal water assets to be wheeled through the federal storage and conveyance facilities), and recycled water generated from the effluent treated at the District's two largest wastewater treatment plants.[24]

As shown in **Table 3-1**, the primary water assets for diversion at Folsom Reservoir are: CVP Contract 14-06-200-1375A-LTR1, and License 2184 and several pre-1914 water rights incorporated into Warren Act Contract 06-WC-20-3315. The District also has an executed 5-year Warren Act Contract for diversion of the Permit 21112 water right at Folsom Reservoir and anticipates converting this contract to a long-term Warren Act Contract in late 2016. The District has additional, unperfected water assets under the El Dorado – Sacramento Municipal Utility District (SMUD) Cooperation Agreement and a CVP water entitlement derived from El Dorado County Water Agency's Fazio water supply along with expansion of recycled water supplies as planned growth occurs. These water assets are described in **Section 3.2.2**.

License 2184 and Pre-1914 Water Rights

Water rights associated with Weber Reservoir, Weber Creek (Farmer's Free Ditch), Slab Creek (Summerfield Ditch), Hangtown Creek (Gold Hill Ditch), and Mill Creek (Project 184) are available to be diverted at Folsom Reservoir under a long-term Warren Act Contract, with up to 4,560 acre-feet available each year combined from these sources. A Warren Act Contract allows the use of federal facilities to take non-CVP water such as these supplies. The annual water diversion season is generally limited to April through November 15, though the diversion schedule for each source is staggered slightly, and under the Contract the water is authorized for use for municipal and industrial purposes in the area El Dorado Hills and Cameron Park areas. It should be noted that the season for diversion into storage at Weber Reservoir runs from October 15 through May 15; however, the water can be released and used during the high-demand season.

Licenses 11835 and 11836

Licenses 11835 and 11836 allow for 33,400 acre-feet of diversion in the District's upstream system in the Cosumnes River watershed. These diversions are stored in Jenkinson Lake, the largest storage reservoir in the District, formed by two earth and rock dams impounding Sly Park Creek (with an associated diversion dam and tunnel on Clear Creek) near Pollock Pines. Jenkinson Lake's maximum capacity is 41,033 acre-feet. The facilities were constructed as part of the Sly Park Unit of the United States Bureau of Reclamation (USBR) CVP in 1955.

[24] Detailed information regarding these water assets can be obtained by contacting the District.

With the transfer of ownership of the Sly Park Unit from the USBR in 2003, the District not only operates and maintains the Jenkinson Lake and Sly Park Dam facilities, including recreational aspects, but also holds the water rights.

The average annual use from this facility is approximately 23,000 acre-feet, though the District's annual water right is for 33,400 acre-feet of total beneficial use. This water supply is used entirely within the District's contiguous service area. Water is released from Jenkinson Lake to the Reservoir A Water Treatment Plant for subsequent treatment, transmission, and distribution. Jenkinson Lake contributes approximately 20,920 acre-feet per year to the District's system firm yield.

Table 3-1 – Water Rights, Entitlements, and Supply Availability

Water Right or Entitlement	Maximum Water Assets Available (Ac-ft)	Average Year Planned Supply Availability (Ac-ft)	Dry-Year Planned Supply Availability (Ac-ft)
Existing Supplies			
License 2184 and Pre-1914 Water Rights	4,560	4,560	3,000
Licenses 11835 and 11836	33,400	23,000	20,920[A]
CVP Contract 14-06-200-1375A-LTR1	7,550	7,550	3,775[F]
Project 184	15,080	15,080	15,080
Permit 21112	17,000	17,000	17,000
Subtotal Existing	77,590	67,190	59,775
Planned Supplies			
CVP Fazio water entitlement (PL 101-514 (1990) Fazio) [D]	7,500	7,500	3,750[F]
Applications 5645X12, 5644X02 and partial assignment of Applications 5645, 5644 with El Dorado-SMUD Cooperation Agreement [E]	40,000	30,000 [B]	5,000[C]
Subtotal Planned	47,500	37,500	8,750
Recycled Water	3,500	3,500	3,500
Total	128,590	108,190	72,025

[A] This is the modeled yield of this water right during a single dry-year. For planning purposes, the second and third dry years of a three-year dry period are assumed to be 17,000 acre-feet, and 15,500 acre-feet, respectfully

[B] Section 5.1.1 of the El-Dorado SMUD Cooperation Agreement indicates that 40,000 acre-feet of SMUD water will be available after 2025. For conservative Normal Year planning purposes, the District uses 30,000 acre-feet of available supply.

[C] Available supply is 15,000 acre-feet in a single dry year but in preparing for multiple dry years the District anticipates using only 5,000 acre-feet per year for a three-year period.

[D] Negotiations led by EDCWA and anticipate supply is available by 2020

[E] Negotiations led by EDWPA and anticipate supply is available starting in 2025

[F] The District anticipates that during future years these supplies would be cut to Health and Safety levels under CVP M&I Shortage Policy in the dry years.

USBR CVP Contract 14-06-200-1375A-LTR1

Surface water from Folsom Reservoir is provided to El Dorado Hills and some of the surrounding area. The District is entitled to 7,550 acre-feet per year by contract with USBR. The contract limits use to a particular area that generally encompasses the El Dorado Hills and Cameron Park areas. Folsom Reservoir is operated by the USBR as part of the CVP, a multipurpose project that provides flood control, hydroelectricity, drinking water, and water for irrigation.

The El Dorado Hills County Water District entered into a USBR Contract in 1964 for water supply from Folsom Reservoir. The contract had a not-to-exceed limit of 37,500 acre-feet per year. When the District annexed the El Dorado Hills County Water District in 1973, the contract was assigned to the District, and subsequently, in 1979, an amendatory contract replaced the original 1964 contract and reduced the maximum annual supply quantity of Folsom Reservoir water to 6,500 acre-feet per year. In 1983, the USBR increased the maximum annual supply quantity from 6,500 to 7,500 acre-feet per year. The District also annexed and succeeded to a USBR Contract for 50 acre-feet per year to supply the Lakehills area in El Dorado Hills. In 2006, these two contracts were consolidated into a single 40-year USBR Contract with a maximum quantity of 7,550 acre-feet per year.

Project 184 Water Rights

The District acquired Project 184 from Pacific Gas and Electric (PG&E) in 1999. Project 184 includes reservoirs and associated dams, 22 miles of canals, flumes and tunnels, a 21-Megawatt powerhouse, and other ancillary facilities. Prior to the transfer of ownership of Project 184 and its water rights, the District held a contract to purchase water from PG&E and its predecessor, Western States Gas and Electric Co. The original water rights claims date back to 1856, with additional claims being filed in the 1860s and 1870s. The water rights for diversions from Echo Lake were confirmed in 1880 in a California Supreme Court decision. Then, in 1918, the California Railroad Commission (predecessor to the California Public Utilities Commission) recognized the use of water from the El Dorado Canal for irrigation and domestic purposes.

The sources of this water supply include natural flows in the South Fork American River and its tributaries, and stored water in Silver, Aloha, Echo, and Caples Lakes. The supply is diverted from the South Fork American River at Kyburz and is conveyed via the El Dorado Canal to the El Dorado Forebay. Some additional water is obtained by diversions into the El Dorado Canal from streams tributary to the South Fork American River. The District takes consumptive use of the water supply at the Main Ditch intake, located at the El Dorado Forebay. The El Dorado Forebay is a wide point within the canal that facilitates more effective diversions and hydroelectric power generation. This particular supply contributes 15,080 acre-feet per year to the District's system firm yield.

Water diversions of up to 156 cfs can be made from the South Fork American River at the diversion dam. These diversions include 70 cfs of direct diversion rights in addition to releases from storage in upper reservoirs for consumptive purposes; the District also maintains 86 cfs of direct diversion rights for power only. In addition to these direct diversion rights, the District has pre-1914 diversion and storage rights associated with portions of the waters stored in Silver Lake, Caples Lake, and Lake Aloha and all of the waters stored in Echo Lake.

This "wide spot" in the canal that is referred to as El Dorado Forebay is the terminus of the El Dorado Canal. The Forebay receives surface water supply from the Project 184 facilities upstream and direct diversions from the South Fork American River for distribution to either the Reservoir 1 WTP or El Dorado powerhouse. The District has a consumptive water entitlement of 15,080 acre-feet per year delivery at the Forebay. The entitlement is a pre-1914 water right, and diversions are made in compliance with the 40-year Federal Energy Regulatory Commission Project 184 operating license issued to the District in October 2006. Because the full entitlement can be provided in all years including the most severe historic single dry years of 1977 and 2015, this source of water is considered assured, and not subject to shortage during droughts.

Permit 21112 and Warren Act Contract

The El Dorado County Water Agency and the District applied to the State Water Resources Control Board (SWRCB) to obtain additional water rights for consumptive use of waters previously stored and released for power generation from Caples, Silver, and Aloha Lakes, as well as certain direct diversions from the South Fork American River, all of which had been previously diverted by Project 184 for hydroelectric power generation or instream flows. The EDCWA later assigned all of its rights under this application to the District. In 2001 the SWRCB granted the right to appropriate 17,000 acre-feet per year of water under Permit 21112, allowing the District to make direct diversions from the South Fork American River at Folsom Reservoir; to store in Caples, Silver, and Aloha Lakes; and to redivert the water released from storage. The sole approved point of diversion for consumptive purposes is Folsom Reservoir, though consumptive use is allowed anywhere within the District's contiguous service area. There are no cutback provisions on this supply; therefore the full 17,000 acre-feet is considered a safe yield even during periods of drought.

A diversion from Folsom Reservoir requires issuance of a Warren Act Contract from USBR as part of Permit 21112. The District diverted water under this right under a temporary urgency basis in 2008 and received a 5-year Warren Act Contract for 8,500 acre-feet in 2015. The long-term Warren Act Contract for the full 17,000 acre-feet is anticipated in fall 2016.

Recycled Water Supplies

The District produces recycled water at both the El Dorado Hills and Deer Creek wastewater treatment plants which is then used by the District's customers for irrigation of residential

and commercial landscape. The availability of recycled water is currently limited to the El Dorado Hills and Cameron Park areas. The District anticipates recycled water supply totaling 3,500 acre-feet per year by 2040 (see **Section 3.4** for further details).

3.2.2 Additional Water Supplies

The District is working with El Dorado Water and Power Authority and El Dorado County Water Agency to acquire and use two additional water supplies within its service area – water under the El Dorado-SMUD Cooperation Agreement and water under EDCWA's Fazio CVP supply, respectively. This section describes these supplies.

El Dorado-SMUD Cooperation Agreement

As shown in **Table 3-1**, the additional supplies include a grouping of water right applications and assignment of existing water right applications totaling approximately 40,000 acre-feet of water. This supply is being developed by EDWPA. EDWPA is a Joint Powers Authority consisting of the County, EDCWA and the District (collectively, El Dorado Parties). EDWPA exists in part to pursue additional water supplies for the western slope of the County to serve planned land uses that will develop over time. This need is identified in the 2014 update of the EDCWA's Water Resources Development and Management Plan (Water Plan).[25]

In 2005, EDWPA negotiated and the El Dorado Parties signed the "El Dorado – SMUD Cooperation Agreement",[26] which would help meet the Water Plan's identified water supply needs. This Agreement requires SMUD to make annual deliveries of up to 30,000 acre-feet of water through 2025 and 40,000 acre-feet thereafter from SMUD's Upper American River Project (UARP) to the El Dorado Parties.

In 2008, EDWPA petitioned the SWRCB for partial assignment of two State-filed water rights applications for diversion and storage to obtain water supplies necessary to trigger SMUD's obligations. The SWRCB noticed the applications as complete in May 2009. EDWPA prepared a draft Water Availability Analysis and a Draft EIR (SCH #2008102090) in support of these applications that was circulated for public review in July, 2010. Comments were received on the Draft EIR. EDWPA elected not to complete the Final EIR, choosing instead to refine the project's objectives for broader, regional water reliability benefits. EDWPA has been working collaboratively with other regional interests toward this goal, and initiated a new CEQA environmental review process by filing a Notice of Preparation of a Draft Environmental Impact Report in March 2014. Two environmental scoping meetings were held in April 2014, with EDWPA currently working on the new Draft EIR as well as addressing stakeholder concerns as part of the water rights protest settlement

[25] http://www.edcgov.us/Water/Documents/Water_Resources_Development_and_Management_Plan.aspx.
[26] Detailed information regarding this water asset can be obtained by contacting the District.

phase at the SWRCB. The CEQA process is anticipated to be completed by 2020 with award of water rights shortly thereafter.

The El Dorado-SMUD Cooperation Agreement also obliges SMUD to provide carryover storage and delivery of up to 15,000 acre-feet of drought protection water supply to be obtained by EDWPA. Based on demand projections, the District anticipates that only 30,000 acre-feet of the 40,000 acre-feet identified in the water right applications and the El Dorado – SMUD Cooperative Agreement will be available to the District in normal years. Moreover, the District has planned that 5,000 acre-feet of the water supply will be available for the District's uses in each dry year when diverted from the White Rock point of take. This number is derived from Appendix H of the El Dorado – SMUD Cooperation Agreement describing deliveries available from carryover storage. Both of these conservative assumptions are shown in **Table 3-1**. The District has planned this supply to be available starting in 2025.

Fazio CVP Supply

The District is also in the final stages of securing at least 7,500 acre-feet of CVP water supplies in conjunction with EDCWA. In 1990, Congress directed the Secretary of the Interior, through the USBR, to enter into a new CVP Municipal and Industrial (M&I) water service contract with EDCWA for up to 15,000 acre-feet of water annually (Section 206 of P.L. 101-514). The CVP water service contract requires requisite compliance by EDCWA and the USBR with CEQA, NEPA, and ESA statutes.

In 2009, a draft EIS/EIR was released for public review and comment for the CVP M&I water rights contract. In 2010, USBR advised EDCWA that it would take at least another 5 years before the CVP-Operations Criteria and Plan (OCAP) related litigation would allow the EIS to move forward. As a result, EDCWA made the decision to detach the EIR from the EIS – essentially separating the CEQA and NEPA processes. EDCWA certified the Final EIR and approved the project in January 2011. EDCWA then prepared and submitted to USBR a draft Biological Assessment (BA) in September 2011 and a draft Final EIS in October 2011. ESA concurrence was received in May 2014 and Final EIS completion is anticipated in 2016.

The CVP contract seeks to acquire 15,000 acre-feet of CVP project water, of which at least 7,500 acre-feet would be made available to the District by subcontracts with EDCWA.[27] Diversions by the District would occur at its existing intake in Folsom Reservoir, conveyed to the El Dorado Hills Water Treatment Plant, and delivered to a specific place of use

[27] Central Valley Project Water Supply Contracts Under Public Law 101-514 (Section 206): Proposed Contract Between the U.S. Bureau of Reclamation and the El Dorado County Water Agency, and Proposed Subcontracts Between the El Dorado County Water Agency and the El Dorado Irrigation District, and Between the El Dorado County Water Agency and the Georgetown Divide Public Utility District Final Environmental Impact Report at ES-1, January 2011.

location in El Dorado Hills and Cameron Park areas as shown in Figure ES-2 of EDCWA's EIR.

The contract negotiations and environmental compliance efforts are ongoing. The approval of the contract terms as well as finalization of the environmental documents will allow the District to apply the water supplies under this contract entitlement to municipal and industrial beneficial uses. The District has planned this water supply to be available beginning in 2020.

3.2.3 Outingdale Service Area

El Dorado Irrigation District holds a 1933 appropriative water right for direct diversion from the Middle Fork Cosumnes River to serve the Outingdale Subdivision. The original water right Permit No. 4071 was issued by the State of California in 1933. The original water right applicant, C.T. Oeste, conveyed the water right to Outingdale Water Company before it was conveyed to the District. The water right allows for a total diversion of approximately 104 acre-feet per year. The water system was transferred to the District in 1970 when the subdivision was annexed to the District. All accompanying water rights related to the subdivision were conveyed to the District at that time. Under the terms of Permit 4071, all water was to be put to beneficial use by 1935. However, since the subdivision has not yet reached build-out conditions, the District has requested and been granted multiple time extensions from the SWRCB. This water supply is an independent satellite potable system and therefore does not contribute to the two main systems.

3.2.4 Strawberry Service Area

The Strawberry service area is located 40 miles east of Placerville. A small portion of the Project 184-related pre-1914 water rights is also used to serve the Strawberry satellite service area. This water is diverted from the upper South Fork of the American River before being treated at the Strawberry water treatment plant. Deliveries range from approximately 30 acre-feet to 60 acre-feet per year.

3.2.5 Water Delivery System Firm Yield

El Dorado Irrigation District's 2015 Water Resources and Service Reliability Report (Report) shows that the District has an "Overall System Firm Yield" of 63,500 acre-feet. The system firm yield is developed from the integration of available water supplies under the water rights and contracts, the District's OASIS hydrologic model that assumes 95 percent reliability of supply delivery, and static system assumptions and operations. The District's firm yield allows for some water shortages in the driest years. Accordingly, the planning assumptions used to calculate system integration in the Report may contain variables that incorporate additional conditions for water supply reliability in certain year types. These conditions are not necessarily the same as reflected in this 2015 UWMP as they are not attempting to reflect "average," "single dry" and "multiple dry" year supply reliability as required by CWC Section 10631(c)(1).

3.3 Groundwater

The District does not currently rely upon groundwater assets to augment its overall supply sources. The District may consider long-term conjunctive use projects within or outside its service area to best utilize its water assets in the future.

3.4 Recycled Water

The District uses recycled water to meet some current non-potable demands within its service area. The District may expand its development and use of recycled water in the future to meet a portion of the non-potable demands associated with various land use activities, as well as other anticipated new demands. The District's current recycled water use is about 2,400 acre-feet per year. This use will expand incrementally over time with 3,500 acre-feet of recycled water per year anticipated to be delivered annually by 2040.[28]

The District's recycled water system consists of supply from the El Dorado Hills wastewater treatment plant and the Deer Creek wastewater treatment plant. These treatment plants have an interconnected network of transmission and distribution pipelines, pump stations, storage tanks, pressure reducing stations, and appurtenant facilities located within the communities of El Dorado Hills and Cameron Park. **Figure 2-4** illustrates the recycled water system.

The District has a 70 million-gallon storage reservoir located adjacent to the El Dorado Hills wastewater treatment plant to help balance the rate of recycled water generation with recycled water demands, and to allow the plant to operate without discharging to Carson Creek during the dry season. The peak period for recycled water demand occurs at night. However, nighttime is also the time when wastewater inflows are lowest. To account for this imbalance between recycled water production and demand, several storage tanks are utilized to store supplies generated during the day that are then withdrawn at night as demand increases. These tanks are also supplemented with potable water when recycled water demands exceed recycled water production.[29]

The District mandates the use of recycled water through Board Policy 7010, wherever economically and physically feasible as determined by the Board, for non-domestic purposes. At this time, non-domestic use includes commercial landscape irrigation (including golf courses), residential or multi-family dual-plumbed landscape irrigation, construction water, and recreational impoundments (during certain times of year).

[28] The El Dorado Irrigation District Integrated Water Resources Master Plan, March 31, 2013 anticipates up to 5,600 acre-feet of recycled water supply available at build-out. For purposes of this plan, the recycled supply is limited to 3,500 acre-feet by 2040 to correlate with estimated demand for and production of recycled water supplies (e.g. growth provides the influent to the wastewater plants and drives the amount of additional recycled water that can be produced).

[29] El Dorado Irrigation District Wastewater Facilities Master Plan, July 2013 at page 160.

Recycled water availability is an outcome of increased municipal and domestic potable water demand, and resulting wastewater production as a byproduct of this demand. In other words, annual recycled water production capabilities are based on the wastewater flows to the treatment plants. The availability of and demand for recycled water will increase with the anticipated growth described in **Chapter 2**. The District calculated the anticipated availability of recycled water based upon its current production levels, estimated regional population growth as described in **Section 2.1.3**, wastewater facility expansion identified in its 2013 IWRMP and WWFMP, treated water discharge requirements, and its ability to capture and store recycled water supplies in the future. Given these factors, the total recycled water available for use by 2040 is estimated to be 3,500 acre-feet per year.[30] Accordingly, **Table 3-2** shows the incremental recycled water assets that would be available over time for the District's non-potable water uses.

Table 3-2 – Timing of Recycled Water and Quantities

Year	Recycled Water Supply (acre-feet/yr)
Current	2,500
2020	2,800
2025	3,000
2030	3,100
2035	3,300
2040	3,500
2045	3,500

The District also has specific criteria for determining whether recycled water is feasible for a particular property or non-domestic use. These include:

- Property is located in the area defined in the most recent Master Plan
- Recycled water is available at a reasonable cost
- Recycled water is of adequate quality for the intended use
- Use of recycled water is consistent with all applicable federal, state, and local rules
- Use of recycled water will not be detrimental to public health and will not adversely affect plant life, fish and wildlife.

The District examined expansion opportunities and augmentation alternatives for the recycled water supply in the 2009 Seasonal Storage Basis of Design Report (BODR). The

[30] The El Dorado Irrigation District Integrated Water Resources Master Plan, March 31, 2013 (at page 221) anticipates greater growth rates resulting in more wastewater plant influent than assumed for this UWMP.

District contemplated building a 2,500 AFY seasonal storage reservoir as another method to increase the District's recycled water supply.[31] However, this project is not considered financially viable at this time. The District will continue to supplement the recycled water system pending future development rates and recycled water demands.

3.5 Desalinated Water

El Dorado Irrigation District has no opportunities for utilizing desalinated water as a supply source.

3.6 Transfer and Exchange Opportunities

The District has not developed nor plans to develop opportunities to transfer other sources of water into the District's service area. Because of the District's highly reliable and diverse water assets, transfers are not practical or necessary.

The District, however, has transferred its water assets to others outside of the District's service area. In 2015, the District entered into a water transfer agreement with Westland's Water District to transfer up to 3,110 acre-feet of water from Silver Lake and Weber Reservoir. The transfer ultimately resulted in 2,110 acre-feet from Silver Lake and 502 acre-feet from Weber Reservoir being delivered to Folsom Reservoir for eventual conveyance to Westland's Water District. Silver Lake has a capacity of 8,640 acre-feet and Weber Reservoir has a capacity of 1,125 acre-feet.

The District transferred water right License 2184 water from Weber Reservoir under the Water Code's temporary transfer provisions (Section 1725) for post-1914 appropriative water rights. The District transferred water from Silver Lake subject to reporting under Statement of Diversion and Use S004708. Reclamation and Westland's Water District negotiated a Warren Act Contract to allow the water to move to Folsom Reservoir and through the federal conveyance facilities to Westland's Water District's service area.

In order to complete a water transfer Reclamation required the District to adhere to reservoir refill criteria established by Reclamation, which has the potential to affect the amount of water made available for transfer in a subsequent year. As of February 2016, the District satisfied all refill reservation obligations and has refilled the reservoirs affected by the 2015 transfer agreement.

Due to the success of the 2015 transfer, the District will continue to seek opportunities to transfer its water assets when practical.

[31] El Dorado Irrigation District Wastewater Facilities Master Plan, July, 2013 at page 158.

3.7 Water Supply Reliability

As described in prior sections, the District has significant water assets to meet its short-term and long-term needs. These assets include pre-1914 appropriative water right; post-1914 appropriative water rights and entitlements, as well as recycled water. As required by CWC Section 10631(c)(1), the District needs to address the reliability of these assets for average, single dry and multiple dry water year conditions. The reliability for each asset under each hydrologic condition is governed by the specific rights' conditions or entitlements' provision.

3.7.1 Average Year Water Supply Availability

As shown in **Table 3-1**, the District's total water entitlements under its existing and planned supplies are not representative of the supply available on average. Rather, as a result of operational management policies and practices, the average supply equates to 67,190 acre-feet per year of existing supplies and 37,500 acre-feet per year of planned supplies. Combined, the District anticipates the total average future water supplies to equal 108,190 acre-feet annually.

The 67,190 acre-feet of average year existing (secured) supplies includes:

1) Appropriative water right License 2184 and pre-1914 appropriative water rights associated with Slab, Hangtown, Mill, and Weber Creeks. The maximum value of 4,560 acre-feet is assumed available for average years.

2) Appropriative water right licenses 11835 and 11836. Although the rights allow up to 33,400 acre-feet, and the District has diverted as much as 25,745 acre-feet, 23,000 acre-feet is used for planning purposes for an average year. This value is supported by the District's OASIS hydrologic modeling.[32]

3) CVP Contract 14-06-200-1375A-LTR1. The maximum value of 7,550 acre-feet is assumed available for average years.

4) Pre-1914 appropriative water rights on the American River. For purposes of this document, these are collectively called the Project 184 pre-1914 water rights. The total volume of water available under Project 184 water rights is 15,080 acre-feet in average years.

5) Appropriative water right Permit 21112 is a secured supply for purposes of this 2015 UWMP. Permit 21112 allows the District to divert up to 17,000 acre-feet of water per year provided by the operation of Project 184 from Folsom Reservoir to be used in the District's service area. The District diverted water under this permit as part of a temporary urgency in 2008 and currently diverts up to 8,500 acre-feet annually

[32] 2015 Water Resources Report

under a five-year Warren Act Contract. The District anticipates finalizing its long-term Warren Act Contract to divert the full 17,000 acre-feet from Folsom Reservoir by fall 2016. Based upon the availability of the supply in Permit 21112, the ability to store the water in Caples, Silver, and Aloha lakes, and the pending long-term Warren Act Contract with USBR, the average-year availability of this supply is 17,000 acre-feet.

As described above, the District's planned water supplies include the CVP Fazio supply of 7,500 acre-feet or more as authorized under federal law. Once secured, the District should receive normal-year deliveries of the full entitlement consistent with CVP M&I contract holders on the American River system. This supply will be reduced in dry conditions consistent with Reclamation's M&I Shortage Policy.

Last, as described above, the District's planned water supplies derived from the EDWPA appropriative water right applications filings and assignments, as well as the El Dorado – SMUD Cooperation Agreement, indicate that the District should receive normal-year water deliveries of 30,000 acre-feet per year starting in 2025 and then as much as 40,000 acre-feet of deliveries thereafter. Based on demand projections, and for conservative planning purposes, the District uses 30,000 acre-feet of normal-year deliveries under these collective applications and the El Dorado-SMUD Cooperation Agreement.

3.7.2 Dry-Year Water Supply Availability

As shown in **Table 3-1**, the District anticipates less water being available in dry years than is otherwise available in normal years as described in **Section 3.7.1**. Dry-year supplies include supply reductions attributable to hydrologic droughts and regulatory curtailments. The dry-year water supplies are described in this section.

The District's entire normal-year secured and planned water assets total 108,190 acre-feet per year. In dry years, the District's total water assets equal 74,125 acre-feet. Of this total supply, 59,775 acre-feet are secured water assets and 8,750 acre-feet are planned water assets plus an additional 3,500 acre-feet of existing and planned long-term usage of recycled water assets.

As described above, the secured water assets include License 2184 and the additional pre-1914 appropriative rights that are included in Warren Act contract 06-WC-20-3315, Licenses 11835 and 11836, CVP Contract 14-06-200-1375A-LTR1, the Project 184 pre-1914 water rights grouping, and Permit 21112. All of these water rights are subject to different regulatory and hydrological restrictions that could result, in some instances, in reduction of the water supplies available under the right or entitlement in dry years.

The water rights contained in the Warren Act Contract 06-WC-20-3315 have some level of regulatory restrictions and hydrological uncertainty. The District indicates that the estimated dry-year yield associated with this water asset is 3,000 acre-feet per year based upon regional

hydrologic conditions.[33] Accordingly, based upon the presumed hydrologic conditions, the dry-year reliability for this supply in three consecutive dry years is 3,000 acre-feet per year.

Licenses 11835 and 11836 have a full diversion entitlement of 33,400 acre-feet per year. Of that amount, carryover storage in Jenkinson Lake and diminished inflow reduce that entitlement to a normal-year supply of 23,000 acre-feet per year. In dry years, this amount is further reduced based upon hydrologic conditions as well as carryover storage needs for future years from Jenkinson Lake. Accordingly, based upon the OASIS hydrologic modeling report, the District reduces this supply's availability to 20,920 acre-feet in a single dry year. Thus, 20,920 acre-feet per year is assumed as the available supply for a single dry year. For conservative planning purposes, the District plans for this supply to be further reduced during year two and again in year three of three consecutive dry years. This UWMP uses 17,000 acre-feet and 15,500 acre-feet as the available supply in year two and year three of a multi-year drought, respectfully.

CVP Contract 14-06-200-1375A-LTR1 has a normal-year entitlement of 7,550 acre-feet per year. The USBR, however, assesses the dry-year supply availability of its CVP M&I contracts through the CVP M&I Shortage Policy. Based on inflow and storage criteria, USBR can reduce contract water supplies under the CVP M&I Shortage Policy related to historic use with various adjustments made for population, use of non-CVP water and extraordinary conservation actions.[34] With these adjustments in mind, USBR calculates the reduced CVP M&I delivery essentially based upon the average of the three previous normal allocation years of use under the CVP contract. Under the strictest interpretation of this policy, if the water under the CVP contract was not used, then the dry year water is not available. But, USBR has considered that use of non-CVP supplies in lieu of CVP water use may be used to calculate use under this shortage policy. For purposes of this analysis, however, we have determined that based upon normal growth in demand in the District's service area, the District's customers would utilize the entire contract entitlement in normal years in the future. As such, the District calculates its dry-year reduction for this Proposed Project based upon three years of full use of its contract allocation as well as meeting its Health and Safety baseline needs. Accordingly, the dry year supply under this water contract entitlement is 3,775 acre-feet per year. However, for conservative planning purposes given the allocation in 2015, this supply is further constrained in the third year of the three-year multiple dry year scenario, equating to 1,888 acre-feet (see **Table 3-3** below).

The District's Project 184 pre-1914 water rights have a normal-year reliability of 15,080 acre-feet per year. Based upon the early priority date of these water assets, the storage capability within the District's system associated with these water assets, and water available

[33] El Dorado Irrigation District Urban Water Management Plan 2010 Update, July 2011 at page 4-6 of 22. Follow-up discussion with the District Counsel on water availability on April 5, 2016.
[34] Reclamation has the authority to reduce the supply volumes even further under extreme conditions – Health and Safety criteria. The District's drought contingency plans address these situations.

and delivered under these rights in 2015, they are not reduced in a single dry year or three consecutive dry years.

Permit 21112 is another secure dry-year water asset. In the two driest years on record – 1977 and 2015 – the District experienced no cutback in this supply.[35] As such, the dry year reliability of Permit 21112 is 17,000 acre-feet per year.

As described above, the District's planned supplies include the CVP Fazio supply, and the pending water rights applications and established contract rights that make up the UARP SMUD water. All of these assets combined have a dry year supply reliability of 72,025 acre-feet per year.

The CVP Fazio supply is another CVP M&I contract supply that is subject to the same Municipal and Industrial shortage provisions described above for the District's other CVP contract entitlement. The District's expected portion of the Fazio supply has a normal-year contract allocation of 7,500 acre-feet per year. Assuming under the rules described above that the District is able to use its entire contract entitlement in the future, shortages of up to 50 percent of contract entitlement reduce the delivery by 3,750 acre-feet per year. As such, the single dry year reliability and the first two of the three consecutive dry year reliability under this contract is 3,750 acre-feet per year. To be conservative and considering the 2015 allocation, the District has assumed the supply is further reduced to only 25 percent of the contact amount in the third year of the multiple dry year scenario, equating to 1,875 acre-feet (see **Table 3-3**).

Last, the El Dorado-SMUD Cooperative Agreement water could be severely curtailed in dry years. Appendix H of the Agreement states that annual deliveries can be superseded and deliveries from carryover drought storage can be reduced to as little as 5,000 acre-feet in a declared Critically Dry year if SMUD reservoir storage drops below 100,000 acre-feet (approximately 25 percent). For conservative planning purposes, the District anticipates only 5,000 acre-feet of carryover drought-supply water would be available each year over the course of a three-year drought.

3.7.3 Water Supply Summary

The District has two broad categories of water assets that are available for its use in its service area – the secured water assets and planned water assets. Collectively, these supplies total 108,190 acre-feet in normal water years and 72,025 acre-feet in a single dry water year. In year two and year three of a multi-year drought, supplies are further reduced to 68,105 acre-feet and 62,843 acre-feet, as seen in **Table 3-3.**

[35] This assertion was reconfirmed in a telephone conversation with the District's Counsel on April 5, 2016.

Table 3-3 – Water Supply Summary after 2040[36]

Water Asset	Normal Year	Single Dry Year	Multi-Dry Year		
			Year 1	Year 2	Year 3
Existing Supplies					
License 2184 and Pre-14 rights	4,560	3,000	3,000	3,000	3,000
Licenses 11835 and 11836	23,000	20,920	20,920	17,000	15,500
CVP Contract	7,550	3,775	3,775	3,775	1,888
Project 184	15,080	15,080	15,080	15,080	15,080
Permit 21112	17,000	17,000	17,000	17,000	17,000
Subtotal Existing	67,190	59,775	59,775	55,855	52,468
Planned Supplies					
CVP Fazio water	7,500	3,750	3,750	3,750	1,875
Applications 5645X12, 5644X02 (El Dorado-SMUD Agreement)	30,000	5,000	5,000	5,000	5,000
Subtotal Planned	37,500	8,750	8,750	8,750	6,875
Recycled Water	3,500	3,500	3,500	3,500	3,500
Total Supplies	108,190	72,025	72,025	68,105	62,843

As described above, the secured water assets include appropriative water right License 2184 and the accompanying pre-1914 appropriative water rights held under Warren Act Contract 06-WC-20-3315, appropriative water right Licenses 11835 and 11836, CVP Contract 14-060200-1375A-LTR1, the pre-1914 American River storage and diversion appropriative water rights, and Permit 21112. The normal year water supplies available to the District under the secured assets total 67,190 acre-feet per year. In dry years, the water supplies available to the District under the secured assets total 59,775 acre-feet per year.

The planned water assets, although partially secured, are not yet available for the District's use to serve the District's needs contemplated in this UWMP. As described above, these assets are sufficiently secure to be considered planned supplies for the District by 2035. In normal years, the water supplies under these assets total 37,500 acre-feet. In dry years, the

[36] Fazio water supplies become available in 2020 and the El Dorado-SMUD Agreement water is anticipated by 2025. Recycled water is anticipated to incrementally increase from the current 2,400 af to 3,500 af by 2040.

water supplies under these assets total 8,750 acre-feet, conservatively reducing further to 6,875 in the third year of consecutive dry years (see **Table 3-3**).

Finally, the recycled water assets in both normal and dry years, derived from planned growth and continual indoor water usage regardless of year type, total 3,500 acre-feet by 2040.

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CHAPTER 4. WATER DEMAND CONDITIONS

Understanding water demand characteristics is essential to enable the El Dorado Irrigation District to reliably and cost-effectively manage its water supplies to continue to meet customer needs. This section characterizes the District's customer demands – current and forecast over the next few decades. Specific water demand characteristics such as how demands vary among different land use classifications and under differing hydrologic conditions, all help illustrate customer needs under variable conditions. This section is organized as follows:

- Review and refinement of the *2020 Urban Water Use Target* - This subsection presents the review and refinement of 2015 and 2020 water use targets as allowed under CWC §10608.20(g).[37]
- Compliance with *Interim 2015 Urban Water Use Target* – This subsection documents the derivation of the 2015 GPCD value and comparison to the 2015 interim target.
- Historic and Current Water Demands – This subsection presents data reflecting the historic and current water demand conditions for residential and non-residential customers in the District.
- Future Water Demands – This subsection presents the derivation of future demands for potable water within the District's service area, including land-use classifications, unit demand factors, and estimation of non-revenue water.
- Summary of Water Demands – This subsection presents a summary of the projected current and future water demands in five-year increments.

4.1 Review and Refinement of GPCD Targets

Population, residential connections, and water production data were used to generate a gallon per capita day (GPCD) baseline.[38] From this GPCD baseline, the District assessed and determined a *2020 Urban Water Use Target* and an *Interim 2015 Urban Water Use Target*.

[37] 10608.20(g): *An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).*

[38] GPCD represents the per-capita use of all water produced by the District (the "gross water"), divided by the residential population. The "gross water" value includes all system losses, in addition to all non-residential and residential demands. For further details regarding this calculation please refer to the District's 2010 UWMP.

These values were determined to be 225 GPCD and 253 GPCD, respectively, as presented in the 2010 UWMP.[39]

According to the DWR Guidebook, a retail water purveyor who did not use actual 2010 Census data must re-calculate its baseline using the available 2010 Census data in the 2015 UWMP.[40] For the District's 2010 UWMP, the 2010 Census data was not fully available, requiring the District to use other methods to estimate 2010 population.[41] Thus, the District must recalculate its baseline GPCD and re-establish its target and interim-target values with the available 2010 Census data.[42]

To recalculate the annual GPCD values using the 2010 Census data, the District utilized the available population tool from DWR. Use of this tool requires uploading of specific files that define the District's service area for 1990, 2000, and 2010 – as each of those periods represent a service area boundary that is modified as additional properties annex to the District. The result of the analysis provided a new population value for 2010 and, based upon the prior connection data, new population estimates for the entire baseline period used to define the District's GPCD targets in compliance with CWC Section 10608.12(b). To calculate new annual GPCD values, however, the District's "gross water" calculation also required refinement (inclusion or exclusion of certain consumptive uses) to conform to DWR Guidelines. For example, in the 2010 UMWP, recycled water served by the District to urban customers was included in the gross water determination. Per statute, recycled water should be excluded.[43] The District began delivering recycled water in 1999, serving slightly more than 1,000 acre-feet. By 2009, recycled water deliveries averaged around 3,000 acre-feet annually. A comparison of the gross water values from the 2010 UWMP to the 2015 UWMP is provided in **Table 4-1**. New population values divided into the new gross water values provided revised GPCD values for this period. **Table 4-1** compares the yearly population and GPCD estimates from the 2010 UMWP and as revised for the 2015 UWMP using 2010 Census data and the DWR population tool.

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[39] El Dorado Irrigation District 2010 UWMP, p. 3-9 (available at: http://www.water.ca.gov/urbanwatermanagement/2010uwmps/El%20Dorado%20Irrigation%20District/).

[40] "*If an agency did not use 2010 U.S. Census data for its baseline population calculations in the 2010 UWMP (the full census data set was not available until 2012) the agency must re-calculate its baseline population for the 2015 UWMPs using 2000 and 2010 Census data. This may affect the baseline and target GPCD values calculated in the 2010 UWMP, which must be modified accordingly in the 2015 UWMP.*" (2015 Urban Water Management Plans: Guidebook for Urban Suppliers, DWR, January 2016, p. 5-8)

[41] The District's 2010 UWMP used a population projection referenced to a June 2007 El Dorado County Water Agency Report.

[42] According to CWC Section 10608.20(g), the District may also re-assess the methodology chosen to determine its 2015 and 2020 GPCD targets and update these targets, even if the 2010 population data was appropriate.

[43] CWC Section 10608.12(g)(1).

Using the revised annual GPCDs, new values were calculated for four of the six baseline periods to allow comparative to the 2010 UWMP and to evaluate potential baseline periods with the highest average GPCD. The comparative results are shown in **Table 4-2**. The use of 2010 Census data effected the estimated baseline values, as well as the resulting 2015 Interim GPCD Target and 2020 GPCD Target.

Table 4-1 – Revised Annual GPCD using 2010 Census Data

Year	From 2010 UWMP			For 2015 UWMP		
	Gross Water Use	Population	GPCD	Revised Gross Water Use	Revised Population	Revised GPCD
1997	25,203	83,100	271	25,233	74,915	301
1998	22,515	86,000	234	22,553	79,838	252
1999	28,564	87,800	290	27,498	81,153	302
2000	30,692	90,100	304	27,472	84,243	291
2001	30,916	93,300	296	30,274	87,324	310
2002	31,252	96,400	289	30,813	90,231	305
2003	27,556	101,100	243	27,159	94,609	256
2004	36,741	104,700	313	35,288	97,708	322
2005	33,492	108,300	276	31,367	100,861	278
2006	36,517	110,200	296	34,609	102,428	302
2007	Not included in 2010 UWMP		--	36,830	103,223	319
2008			--	38,037	104,103	326
2009			--	34,461	107,479	286

Pursuant to CWC 10608.20(g) the District may also choose to select a different method than used in 2010 for calculating its 2020 GPCD target as part of its 2015 UWMP update. Upon review of the analysis in the 2010 UMWP that resulted in the choice of Method 1, the District finds no reason to vary from the prior method choice. Thus, the District is officially using Method 1 to establish its 2020 GPCD target. However, to accurately reflect the use of the 2010 Census data, the refined gross water determinations, and using a base period of 1999-2008, **the District will modify its 2020 GPCD Target to be 241 gallons per capita per day** (see **Table 4-2**).

Table 4-2 – Comparison of Baseline and Target Values

Baseline Period	Baseline Values		2015 Target		2020 Target	
	Original	Revised	Original	Revised	Original	Revised
1997-2006	281	292	253	263	225	234
1998-2007	n/a	294	n/a	264	n/a	235
1999-2008	n/a	301	n/a	271	n/a	241
2000-2009	n/a	299	n/a	269	n/a	240

4.2 Compliance with 2015 Interim Target

Pursuant to CWC Section 10608.40, the District is to report to DWR on its progress in meeting its urban water use targets as part of its 2015 UWMP. As part of this reporting, the

District is required to include its "compliance daily per capita water use" (Compliance Value), which is the gross water use during the final year of the reporting period (2015), reported in gallons per capita per day.[44] Documentation of the Compliance Value must include the bases for determining the estimates, including references to supporting data. Furthermore, pursuant to CWC Section 10608.24(a), the District must demonstrate that it has met its 2015 Interim GPCD Target as of December 31, 2015 through its calculation of its 2015 Compliance Value.

Extending the population analysis that was revised during the reassessment of the baseline GPCD, the District is able to calculate its 2015 Compliance Value. **Table 4-3** presents the extended population calculation for 2010 through 2015, the associated gross water use in each year, and the resulting annual GPCD.[45] As demonstrated, the District's 2015 Compliance Value is 187 gallons per capita per day, which is significantly below the 2015 Interim GPCD value of 271.

Table 4-3 – Annual GPCD for 2011 through 2015[46]

Year	Population	Total Water Production (af/yr)	Gross Water Use (af/yr)	GPCD
2010	107,470	37,862	30,503	253
2011	107,527	35,407	28,510	237
2012	106,762	38,816	29,758	249
2013	106,269	42,394	32,278	271
2014	106,527	32,218	24,131	202
2015	107,578	30,167	22,581	187

While overall GPCD over the past five years has decreased compared to the baseline period displayed in **Table 4-1**, the low 2015 GPCD was influenced by two factors: (1) weather conditions in 2015, and (2) mandatory conservation requirements imposed by the State Water Resources Control Board. While normalizing for weather is recognized and suggested in statute,[47] and DWR hosts a tool to perform the calculation, the State-mandated conservation (and corresponding water use restrictions imposed by the EID Board) likely had a greater downward effect on the 2015 Compliance Value.

[44] CWC § 10608.12(e).
[45] The Total Water Production represents the potable water produced by the District prior to delivery of slightly over 1,100 acre-feet (on average) to the City of Placerville, and from 3,500 to 6,000 acre-feet delivered to irrigated agricultural customers. The District's Gross Water removes these deliveries as allowed under statute.
[46] The Total Water Production column includes potable water served to agricultural customers, potable water wholesaled to the City of Placerville, and recycled water served to residential and commercial customers.
[47] CWC Section 10608.24(d)(1)(A).

Although adjustments for weather are allowed, they are not required.[48] Because the District's 2015 Compliance Value demonstrates that the District is in compliance with the statutes, it has elected to not adjust the 2015 Compliance Value for weather. However, it has chosen to evaluate adjustments to the value to understand what 2015 GPCD conditions may have been absent the State conservation mandate so that it can appropriately assess progress toward its 2020 Target GPCD.

One option for the District to assess its progress toward the 2020 Target GPCD is to look at the most recent "average" year, which would be 2012 or 2013. In both of these years there were no mandatory conservation measures, weather was not significantly different than average conditions (though 2013 was the beginning of the current drought cycle), and the region was recovering from the recent recession. The GPCD values for 2012 and 2013 were 249 and 271 GPCD respectively, already at or below the revised 2015 Interim Target GPCD value of 271 GPCD with the 2013 figure approaching the revised 2020 Target GPCD of 241 GPCD (see **Table 4-3**).

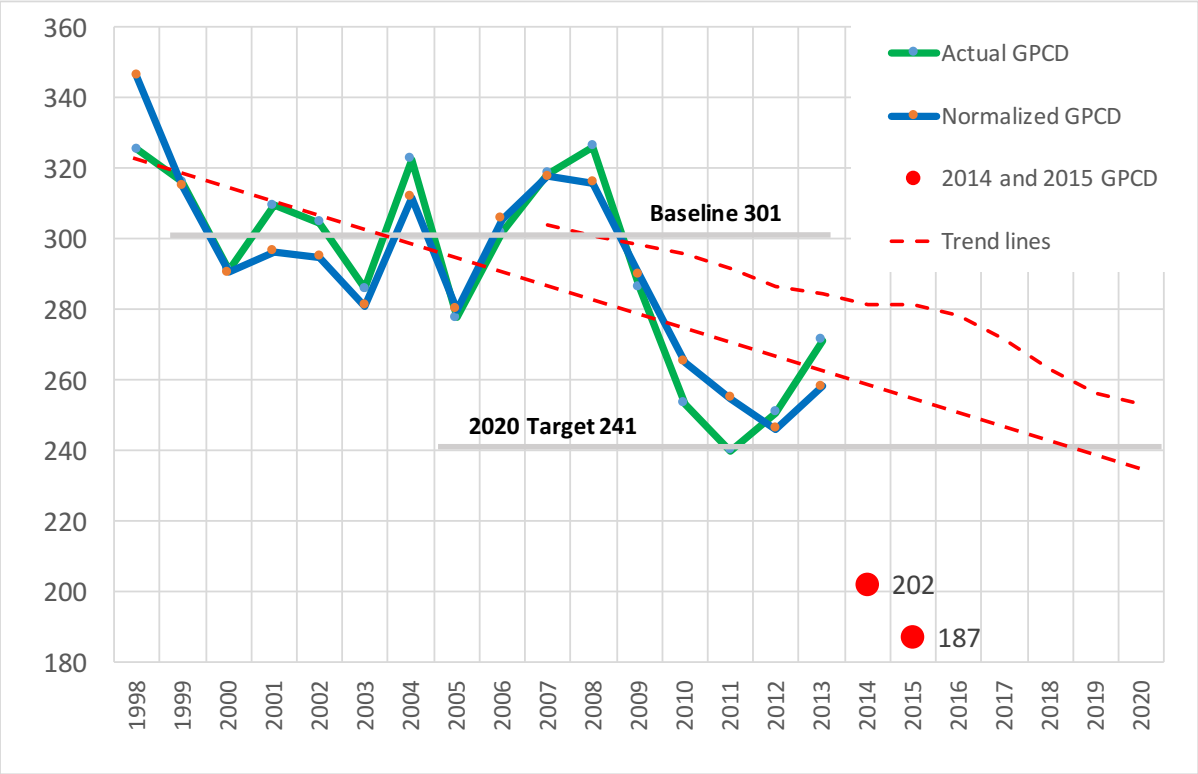
Another option is to adjust the 2015 GPCD value to remove the conservation achieved by the District during its efforts to comply with the State's mandate. The State had mandated the District meet a 28 percent conservation goal between June 2015 and February 2016. Through December 2015, the District successfully achieved a 30.3 percent cumulative savings (compared to 2013 conditions – which was the State's baseline).[49] There are multiple methods to normalize the 2015 water use for the months of June through December.[50] Using a few simple multiplier approaches,[51] the actual gross water production in 2015 of 22,581 acre-feet could have increased to between 27,800 and 29,200, depending on the amount of "normalized" treated water deliveries to the City of Placerville and to agricultural users.[52] But for illustrative purposes, using both of these values, the 2015 GPCD would adjust from 187 GPCD to between 231 and 242 GPCD. This normalized value is still below the 2015 Interim GPCD Target, but with one actually exceeding the 2020 Target GPCD and the other essentially matching the target.

A third option is to perform a weather normalized trend analysis of the GPCD values up to and including 2013. Using DWR's weather normalization tool, the District performed an

[48] CWC Section 10608.24(d)(2).
[49] Based on report from the SWRCB available at: http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/2016feb/suppliercompliance_020216.pdf.
[50] Adjustments are limited to the June through December period to reflect the period during 2015 when the State's mandated conservation target was in place. Prior to June, the mandate was not in effect.
[51] Methods included (1) taking 95% of the 2013 monthly values for June through December and adding them to the 2015 values for January through May, and (2) increasing the monthly 2015 actual values for June through December by 30.3%, then adding the estimated values to the actual 2015 January through May values. Other methods are available, but these provided simplistic mechanisms to adjust actual 2015 water use.
[52] For purposes of this normalization exercise, the average deliveries from 2011 to 2014 to the City of Placerville and for potable agriculture were subtracted.

analysis to determine allowable adjustments to each annual GPCD from 1998 through 2013. The results are displayed in **Figure 4-1**. The figure plots the actual GPCD value, the "normalized" value, the actual 2014 and 2015 GPCD values (as single points), and trend lines.[53] Notably, because of many variables, even the normalized GPCD currently trends toward meeting the 2020 GPCD Target. But there is also risk of missing the target if trends do not continue downward. The two depicted trend lines use (1) a linear trend extending the 1997 through 2013 normalized GPCD values through 2020, and (2) a 10-year running average for the same data set.

Figure 4-1 – Analysis of Annual GPCDs and Potential Trends



From the results of these three optional evaluations of trending, the District concludes that if the current trend continues it is likely to achieve its 2020 GPCD Target when it reports the 2020 Compliance Value in its next UWMP update. But, it also recognizes that relaxing its current water efficiency efforts would create unnecessary risk. Therefore, the District intends to continue its water use efficiency outreach efforts and continues to pursue projects that reduce gross water use. For example, the Main Ditch piping project is estimated to reduce water losses by up to 1,300 acre-feet per year. This project alone is expected to reduce gross water use and corresponding GPCD values by as much as 8 gpcd. Continued water efficient

[53] One trend line is a simple linear trend of the entire data set, the other is a 10-year moving average, that has less available years to average as it progress from 1998 to 2013.

practices by District customers and targeted projects to reduce losses should help the District achieve the 2020 Compliance value.

4.3 Current and Forecast Water Demands

Based on available records for water production, water sales, and deliveries, the District's potable municipal water production for the past five years was previously presented in **Table 4-3**. Accompanying those values were the population estimates for the same period (see Chapter 2 for population derivation information). As demonstrated by the listed populations, the District has experienced limited overall growth since the 2010 UWMP. However, as described in **Chapter 2**, overall the District anticipates continued growth into the future.

Forecasting future demand requires several considerations: the future water use habits of existing customers that are expected to lower their existing use, the land-use plans demonstrating types of anticipated growth, and the various laws and regulations that govern future water use factors such as fixtures, appliances, and landscaping.

4.3.1 Existing Customers

As described in **Chapter 2**, the District serves a variety of residential and non-residential customers with varying uses throughout western El Dorado County. With considerable historic meter data, the District is able to understand the characteristics of its customers' use, especially how those uses vary between the primary service areas (e.g., the El Dorado Hills Supply area compared to the Western and Eastern Supply areas). Existing customers within these three supply areas are generally categorized in fairly broad land-use classifications: single family residential, multi-family residential, commercial/institutional, and recreational turf irrigation. The District, however, also has two unique classifications associated with its residential customers receiving recycled water for outdoor uses: single-family dual potable, and single-family dual recycled.

With account numbers and meter data, the existing unit demand factors for each land-use classification are routinely determined and documented by the District in annual reports, such as the 2015 Water Resources and Service Reliability Report.[54] As presented within such reports, unit demand factors for the various land-uses are reported annually. This information also provides a baseline for estimating the future demands of the District's existing customers. **Table 4-4** provides the baseline demand factors for each land-use category using 2013 account and meter data. The District used 2013 as more representative of the most recent average conditions, understanding the use of 2014 or 2015 data would skew results if used for baseline conditions. This is confirmed further when reviewing the GPCD values in **Table 4-3**, which show GPCD values dropping due to mandatory conservation efforts.

[54] Available from the District's website at: http://www.eid.org/home/showdocument?id=5102.

Existing customers' future unit demand factors are assumed to change mostly from drivers such as general homeowner fixture replacements and upgrades, increased awareness and management by homeowners of landscape irrigation scheduling, the District's water efficiency awareness and incentive programs, and other factors affecting a general increased awareness of water conservation. The future unit demand factors for existing customers reflect a reduction from the current value in all categories resulting from minor conservation reductions indicated by the percentages in the far right column of the table. This reduction is reasonable as it reflects expected benefits of on-going District and customer efficiency efforts, coupled with the use of 2013 for baseline conditions.[55]

[55] Customer conservation values represent reduced unit demand factors as of 2035. The 5-year time-step analysis presented later uses interim conservation values as part of trending toward these assumed conditions.

Table 4-4 – Existing Customer Characteristics

	Land-class by Supply Area (units or accounts)	Existing Customers: Current Number of Connections or Acres	Current Demand Factors (af/unit)	Future Demand Factors (af/unit)	Assumed Conservation
Eastern	Single Family	9,651	0.35	0.32	10%
	Multi-family	2,007	0.19	0.18	7%
	Commercial	360	1.50	1.40	7%
	Recreational Turf	28	8.00	7.06	12%
Western	Single Family	13,557	0.50	0.45	10%
	Single Fam. (dual potable)	2,422	0.18	0.18	1%
	Multi-family	3,968	0.23	0.21	7%
	Commercial	910	1.40	1.30	7%
	Recreational Turf	51	13.90	12.26	12%
El Dorado Hills	Single Family	7,972	0.70	0.63	10%
	Single Fam. (dual potable)	1,981	0.14	0.14	1%
	Multi-family	1,430	0.18	0.17	7%
	Commercial	462	2.81	2.62	7%
	Recreational Turf	36	10.08	8.89	12%
Agriculture		(values per account)			
	Agricultural Metered	227	15.4	15.0	3%
	Small Farm Irr.	702	2.71	2.71	0%
	Ditches	14	2.71	2.71	0%
Recycled		(values per account)			
	Single Fam. (dual recycled)	4,403	0.35	0.33	6%
	Commercial	152	0.48	0.47	2%
	Recreational Turf	12	49	48	2%

4.3.2 Future Customers

There are several factors that affect the development of future unit water demand, which in turn affect the forecasted water demand for future customers. These factors range from state mandates to changes in the types of housing products being offered. These are incorporated into the determination of future unit water demand factors, discussed later in this chapter. Characteristics of the most important factors are described in the following paragraphs.

4.3.2.1 Factors Affecting Future Water Demands

These following factors are generally recognized to result in lower per-unit demand factors for future residential and non-residential customers. A brief discussion of each follows:

Water Conservation Objectives:

On November 10, 2009, Governor Arnold Schwarzenegger signed SB X7-7, which required each urban water supplier to reduce their per-capita water use by 2020, with a statewide goal of achieving a 20-percent reduction by 2020.[56] As discussed previously, the District has established a 2020 Target GPCD in response to this requirement and is tracking toward compliance with that target by 2020.

Achieving the District's 2020 conservation target will require the District to continue its on-going efficiency efforts, and perhaps enhance efforts to maintain success experienced in 2014 (though not as drastically as mandated by the State in 2015). New customers will likely further reduce the District's annual GPCD because the factors described below are designed to further reduce per capita water use. But those new customers may not have a mitigating effect on the District's 2020 Compliance Value, because most growth is projected to occur beyond 2020.

Indoor Infrastructure Requirements

In January 2010, the California Building Standards Commission adopted the statewide mandatory Green Building Standards Code (CAL Green Code) that requires the installation of water-efficient indoor infrastructure for all new projects beginning after January 1, 2011. The CAL Green Code was revised in 2013 with the revisions taking effect on January 1, 2014. However these revisions do not have substantial implications to the water use already contemplated by the 2010 CAL Green Code.[57] The CAL Green Code applies to the planning, design, operation, construction, use and occupancy of every newly constructed building or structure.

All new developments must satisfy the indoor water use standards directed by the CAL Green Code, which essentially require new buildings and structures to reduce overall potable water use by 20 percent. Expected future customers will satisfy the standards through the use of appliances and fixtures such as high-efficiency toilets, faucet aerators, on-demand water

[56] California Water Code § 10608.20.
[57] "The 2010 CAL Green Code was evaluated for updates during the 2012 Triennial Code Adoption Cycle. The state evaluated stakeholder input, changes in technology, implementation of sustainable building goals in California, and changes in statutory requirements. As such, the scope of the CAL Green Code was increased to include both low-rise and high-residential structures, additions and alterations." *Guide to the 2013 California Green Building Standards Code (Residential)*, California Department of Housing and Community Development, 2013.

heaters, or other fixtures as well as Energy Star and California Energy Commission-approved appliances.

California Model Water Efficient Landscape Ordinance

The Water Conservation in Landscaping Act was enacted in 2006, requiring the California Department of Water Resources (DWR) to update the Model Water Efficient Landscape Ordinance (MWELO).[58] In 2009, the Office of Administrative Law (OAL) approved the updated MWELO, which required a retail water supplier or a county to adopt the provisions of the MWELO by January 1, 2010, or enact its own provisions equal to or more restrictive than the MWELO provisions.[59]

In response to the Governor's executive order dated April 1, 2015, (EO B-29-15), DWR updated the MWELO and the California Water Commission approved the revised MWELO on July 15, 2015. The changes include a reduction to 55 percent for the maximum amount of water that may be applied to a landscape for residential projects, which reduces the landscape area that can be planted with high water use plants, such as turf. The MWELO applies to new construction with a landscape area greater than 500 square feet (the prior MWELO applied to landscapes greater than 2,500 sf).[60] For residential projects, the coverage of high water use plants is reduced to 25 percent of the landscaped area (down from 33 percent in the 2010 MWELO).

California Urban Water Conservation Council BMPs

The District is a signatory to the California Urban Water Conservation Council (CUWCC) Best Management Practices (BMP) Memorandum of Understanding (MOU). Due to this affiliation, the District has modified existing BMPs and implemented others to follow that of the CUWCC. These practices further reduce the District's demands. Further details on the District's efficiency efforts can be found in **Chapter 5**.

4.3.2.2 Future Unit Demand Factors

When considering the various factors discussed above, coupled with a review of current customer use characteristics, the District has established the demand factors presented in **Table 4-5** for estimating future customer demand.

As previously indicated, the District anticipated its service area will experience growth as represented in **Table 2-4** related to the County's General Plan and the District's FILs. The District also anticipates continued incremental growth of potable supplies to its agricultural

[58] Gov. Code §§ 65591-65599

[59] California Code of Regulations (CCR), Tit. 23, Div. 2, Ch. 27, Sec. 492.4. The MWELO provides the local agency discretion to calculate the landscape water budget assuming a portion of landscape demand is met by precipitation, which would further reduce the outdoor water budget.

[60] CCR Tit. 23, Div. 2, Ch. 27, Sec. 490.1.

customers. The agricultural growth is expected to continue as originally represented by the District in its 2013 Integrated Water Resources Master Plan (IWRMP)[61] and in the EDCWA's 2014 West Slope Update.[62] The growth studied by subarea as part of the IWRMP included evaluating expected growth in the District's categories of agricultural metered irrigation, ditches, and small farm irrigation. The 2014 West Slope Update identified future agricultural acreage to be in excess of 7,000 acres for two primary categories (Deciduous Orchard, and Vineyard, Christmas Trees, Olive/Citrus, Berries). The County's annual crop report (2014 Crop Report)[63] identifies approximately 3,700 existing acres of existing fruit and nut crops in the two counties (El Dorado and Alpine) – though this acreage is not split between each county. Assuming the existing two-county value is not all within El Dorado County, the incremental agricultural growth of 3,377 acres assumed for this 2015 UWMP is within the anticipated growth likely to be experienced by 2045 within the District's service area, as the cumulative value would be within the 2014 West Slope Update's total of over 7,000 acres just in the western slope of the County.

Importantly, for purposes of this 2015 UWMP, the District anticipates the two primary crop categories recognized in the 2014 West Slope Update to have a demand factor that reflects a blend between the two types. The 2014 West Slope Update indicates Deciduous Orchards have a demand factor of 2.8 acre-feet per acre per year, while the other group has an assumed value of 1.3. For purposes of estimating demand, this 2015 UWMP used 2.0 acre-feet per acre as the annual factor before considering distribution system losses (discussed later in this chapter).

When considering the various factors discussed previously, coupled with a review of current customer use characteristics discussed in the prior section, the District has established unit demand factors it expects represent the average needs of each of these new customers. These assumed unit demand factors are presented in **Table 4-5** along with the representative future increment of new customers within each land-use classification using the growth rate discussed in **Section 2.1.3**.

Additionally, as also described in **Chapter 2**, the District is recognizing the potential incremental demand that would result from several known development projects that are or will be seeking various land-use approvals from the County (see **Section 2.1**). A detailed demand analysis was completed as part of prior WSAs adopted by the District for four of the

[61] See Appendix C, Table 2, Table 3 and Table 4, of 2013 IWRMP, available on the District's website at: http://www.eid.org/about-us/document-library.
[62] El Dorado County Water Agency; *Water Resources Development and Management Plan (December 2007), 2014 West Slope Update*, November 2014.
[63] 2014 El Dorado & Alpine Counties Crop Report, prepared by El Dorado and Alpine Counties, Department of Agriculture, Weights and Measures.

projects. The demands represented in these adopted WSAs are recognized as still applicable and included in **Table 4-6**.[64]

Table 4-5 – Future Customer Accounts and Demand Factors

Land-class by Supply Area (units or accounts)	New Customers by 2045 (Units or Acres)	Future Demand Factors (af/account)
Single Family	12,767	0.43
Single Fam. (dual potable)	1,925	0.18
Single Fam. (dual recycled)	1,925	0.25
Multi-family	2,894	0.16
Non-residential	1,121	1.3
FIL Growth	468	0.65
City of Placerville	927	0.65
Agriculture (potable)	3,377	2.0

The County has recently requested a WSA from the District for the Mill Creek development. To accommodate this request, coupled with the timing of this 2015 UWMP, an initial demand assessment was completed for purposes of overall District demand forecasting. The proposed Mill Creek project encompasses approximately 650 acres, with over 300 acres dedicated as open space. A proposed collection of villages would result in about 630 single-family homes with lot sizes ranging from 9,000 square feet to over 2 acres. The estimated demand for Mill Creek is also included in **Table 4-6**.

In addition to the anticipated County GP growth, the District's FILs, increased agricultural demand, and the known projects, the District expects growth in future potable deliveries to the City of Placerville and a category referred to as "other authorized uses." This latter designation includes the following:

- Environmental augmentations (aesthetic flows)
- Private Fire Services
- Temporary Water Use Permit

[64] The adopted WSAs are available on the District's website at: http://www.eid.org/about-us/document-library. The demand included in the Central El Dorado Hills WSA has been modified to reflect a portion of the demand anticipated to be met through dual-plumbed connections, with outdoor demands met by recycled water. The recycled portion of demand is reflected in Table 4-5 as part of the 1,925 future units to receive this source.

- Bulk Water Stations – Permanent/Temporary
- Lift Stations
- Collection System Flushing
- Water Line Break and System Flushing

Table 4-6 – Other Anticipated Future Forecast Demands

Land-class	Estimated Future Demand (af/year)	Notes
Existing WSAs		
Village of Marble Valley SP	1,927	see WSA
Lime Rock Valley SP	507	see WSA
Central El Dorado Hills SP	263	see WSA; add'tl change for recycled use
Dixon Ranch	427	see WSA
Future WSA		
Mill Creek	800	WSA pending
Other Future Demands		
Other Authorized Uses	640	
City of Placerville	600	based on City's housing updates

Of these existing uses, aesthetic flows comprise over 80 percent of the annual volume (though much of this water is rediverted and made available to ditch users), while lift stations and temporary water use program connections comprise another 10 percent. The current demand of this category is approximately 2,500 acre-feet. The District anticipates a minor increase in water demand for this category associated with the planned urban growth.

For the City of Placerville, the District anticipates the City to add approximately 930 additional connections, based upon information detailing projected growth within the City.[65]

These additional future demands are also listed in **Table 4-6**.

[65] http://www.sacog.org/sites/main/files/file-attachments/appendix_e3_land_use_forecast_background_documentation.pdf (p. 121).

4.3.3 Demand Forecast Summary

Water demand projections within the District's service area reflect the combination of continued conservation by existing customers and the addition of new customers over the planning horizon. **Table 4-7** provides the summation of this analysis and the resulting expected demands for each 5-year planning horizon.

Table 4-7 – Projected Water Demands

Land-class		Forecast Demand (af/yr)					
		2020	2025	2030	2035	2040	2045
Existing Potable Use:	Single Family	15,737	14,950	14,950	14,202	14,202	14,202
	Single Fam. (dual potable)	713	713	713	706	706	706
	Multi-family	1,551	1,474	1,474	1,444	1,444	1,444
	Commercial	3,144	2,989	2,989	2,929	2,929	2,929
	Recreational Turf	1,296	1,166	1,166	1,143	1,143	1,143
	City of Placerville	1,331	1,264	1,264	1,201	1,201	1,201
	Subtotal	23,772	22,556	22,556	21,626	21,626	21,626
New Customers	Single Family (GP)	779	1,455	1,951	2,386	2,809	3,423
	Single Fam. (dual potable)	35	87	173	260	329	346
	Multi-family (GP)	32	62	89	115	140	167
	Non-residential	273	752	1,158	1,563	1,817	2,016
	Known Projects	383	2,011	2,868	3,576	3,922	3,922
	FIL Growth	65	130	194	194	259	324
	City of Placerville	120	240	360	480	600	600
	Subtotal	1,687	4,736	6,793	8,575	9,877	10,800
Total Municipal		25,459	27,293	29,349	30,202	31,503	32,426
Other	Other Authorized Uses	2,618	2,749	2,857	2,952	3,035	3,128
	Agriculture (potable)	6,981	7,966	9,047	10,128	11,208	12,559
	Distribution System Loss	5,259	5,701	6,188	6,492	6,862	7,217
Total Potable Demand		40,318	43,709	47,441	49,773	52,609	55,330
Recycled	Single Fam. (dual recycled)	1,541	1,464	1,464	1,435	1,435	1,435
	Commercial	730	714	714	714	714	714
	Recreational Turf	588	576	576	576	576	576
	New Recycled customers	48	120	241	361	457	481
	Distribution System Loss	253	250	261	268	277	279
	Total Recycled Demand	3,160	3,125	3,256	3,354	3,459	3,485
Total District Demand		43,477	46,833	50,696	53,128	56,068	58,815

4.3.4 Distribution System Water Losses

The demand factors presented earlier in this chapter represent the demand for water at each customer location. To fully represent the demand, water system losses must also be included. Often, system losses represent water that is lost due to system leaks, fire protection, water quality flushing, unauthorized connections, and inaccurate meters.

Essentially, this is the water that does not make it to the treated water customer – either as a real loss or an apparent loss (e.g. such as may result when a customer meter under-reports actual use or water is lost to seepage, such as with the flows in the Main Ditch).

In most instances, the predominant source of system losses is from leaks that inevitably exist throughout the many miles of pipes and fittings that bring water to the District's customers. However, the District also operates the unlined Main Ditch which experiences a large amount of water loss as a result of seepage.

Pursuant to CWC 10631(e)(3)(B), the District must quantify and report the real and apparent water system loss for 2015 using methodology developed by the American Water Works Association (AWWA) and provided as a worksheet through DWR. Using the available worksheet, the District calculated a loss equal to 20.5 percent of the water supplied into the distribution system in 2015. The AWWA spreadsheets are included as **Appendix A-4**.

For purposes of estimating future demand from new connections, the water system loss is assumed to be 13 percent beginning in 2020 to reflect on-going District programs to address meter inaccuracies, find and fix identified system leaks and pursue water loss projects like the Main Ditch piping.[66]

4.3.5 Low-Income Water Demands

CWC Section 10631.1 requires water suppliers to include a projection of water use by lower income households as defined by Health and Safety Code Section 50097.5. The housing element of the El Dorado County General Plan provides the income distribution used for this analysis.[67] This housing element, adopted in October 2013, uses data from U.S. Census Bureau 2005-2009 American Community Survey. The income limits for "lower income" come from U.S. Department of Housing and Urban Development's 2009 income guidelines.[68] The percentage of low income was used from the same housing element table.

[66] For purposes of estimating this quantity when viewed from the customer meter looking back to the "beginning" of the water supply distribution system, a slightly higher value is multiplied by the customer demands, then added to those demands to reflect a total projected demand. The District's current estimated distribution system losses are between 15 and 20 percent. The currently scheduled Main Ditch piping project would help to help achieve the planned rate of 13 percent.
[67] El Dorado County General Plan- 2013-2021 Housing Element Update, p. 4-14.
[68] The income guidelines place households who make less than 80% of the median family income for an area as "low income." This is in line with the CWC 10631.1 income threshold.

According to the 2007-2011 American Community Survey (ACS), 5-year report, 5.5 percent of all families in El Dorado County are those whose income in the last 12 months is below poverty level. Using 5.5 percent of the projected population, a demand factor from the multi-family housing units of approximately 0.16 acre-foot per year, and 1.65 people per multi-family housing unit (per the 2010 Census data), the current and future demand from "lower income" customers is estimated (see **Table 4-8)**. These demands are already incorporated in the demand forecast presented in **Table 4-7**.

Table 4-8 – Projected Low Income Household Water Demands

Land-class	Forecast Demand (af/yr)					
	2020	2025	2030	2035	2040	2045
Low Income Households	679	714	750	789	830	872

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CHAPTER 5. WATER DEMAND MANAGEMENT MEASURES

5.1 Agency Participation and California Urban Water Conservation Council

CWC § 10631 requires that an UWMP include a description of the urban water supplier's water demand management measures. CWC § 10631 also provides that members of the California Urban Water Conservation Council shall be deemed in compliance with the UWMPA demand management measure requirements by complying with all the provisions of the CUWCC MOU and by submitting the annual reports.[69]

The CUWCC MOU for Best Management Practices is organized into five categories. Two categories, utility operations and education, are "Foundational BMPs" because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into residential indoor and landscape, commercial/industrial/institutional (CII) indoor and landscape, and CII dedicated large landscape categories.[70] All the categories are outlined in **Table 5-1**.

The District is a current member of CUWCC and has submitted annual reports to the Council, complying with CWC § 10631. A copy of the most recent report from 2014-2015 is available in **Appendix C-2**. As a signatory to the CUWCC MOU, the District is committed to implementing best management practices designed to achieve water conservation across existing and future demand sectors. The CUWCC MOU requires that a water utility implement only the BMPs that are economically feasible. The District's continued implementation of the CUWCC BMPs should reduce some of the unit demand factors for its existing connections and help maintain the unit demand factors for future connections.

[69] CWC § 10631(j).
[70] https://www.cuwcc.org/Resources/BMP-Resources.

Table 5-1 – CUWCC BPM Requirements[71]

FOUNDATIONAL BMPS
1. Utility Operations Programs
1.1 Operations Practices
Staff and maintain the position of a trained conservation coordinator
Enact and enforce an ordinance designed to prevent water waste
Enact and enforce an ordinance designed to promote water efficient design in new development
Enact and enforce an ordinance designed to facilitate water shortage response measures
1.2 Water Loss Control
Compile a standard water audit and balance annually
Improve data accuracy and completeness of water audit during first four years
During 5th through 10th year, demonstrate progress in water loss control
1.3 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections
Initiate volumetric billing for all metered customers within one year after signing MOU
Complete meter installations for all connections no later than July 1, 2012
Assess feasibility of moving mixed-use metered landscape uses to dedicated landscape meters
Develop a written plan, policy or program to test, repair or replace meters
1.4 Retail Conservation Pricing
Develop water rates such that 70% of revenue is generated from volumetric billing
Develop conservation pricing for retail sewer service
2. Education Programs
2.1 Public Information Programs
Implement public information programs to promote water conservation and water-conservation benefits
2.2 School Education Programs
Educate students about water conservation and efficient water use
PROGRAMMATIC BMPS
3. Residential
Develop a Residential Assistance Program - including leak detection assistance, conservation surveys, and efficiency suggestions, as well as provision of high-efficiency appliances
Perform site-specific landscape water surveys
Provide financial incentives for, or institute ordinances requiring, purchase of efficient clothes washers
Provide incentives or ordinances for replacement of toilets using 3.5 or more gallons per flush
4. Commercial, Industrial and Institutional
Implement measures to achieve water savings for Commercial, Industrial and Institutional (CII) accounts of 10% compared to baseline water use (i.e., 2008 water use by CII accounts)
5. Landscape
Identify accounts with at least one dedicated irrigation meter and assign an ETo based budget of no more than an average of 70% of ETo for metered irrigation uses; "Recreational" areas may be so designated and may use up to 100% of ETo
Provide notices to irrigation meter customers comparing actual use to the water budget
Offer site-specific technical assistance to those accounts at least 20% over budget
Target and market landscape surveys to CII accounts with mixed-use meters, and those CII accounts with large landscapes and offer financial incentives to both

[71] https://www.cuwcc.org/Resources/BMP-Resources.

CHAPTER 6. WATER SHORTAGE CONTINGENCY PLAN

As an urban water purveyor, El Dorado Irrigation District must meet the minimum health and safety requirements of a drinking water purveyor to El Dorado County communities at all times. The District has created a water shortage contingency plan to help meet this goal during water shortages.

The strategy for allocating water during shortages for the District is complex. The system reliability and constraints are described in the 2008 Drought Preparedness Plan[72] and the 2015 Drought Action Plan Update, which is available in **Appendix C-3**. Detailed discussion of water supply, water shortage actions, catastrophic failure, financial impacts, and prohibitions during shortages is also provided in the District's Drought Preparedness Plan.

6.1 Water Shortage Contingency Resolution

The District relies on the Jenkinson Reservoir monthly water level elevations to serve as its primary indicator of a water shortage. The stages of action are triggered by the monthly water levels and calculated based on projected monthly demand and inflows, actual District reservoir levels at Jenkinson Reservoir, Echo Lake, Lake Aloha, Silver Lake, and Caples Lake, current ENSO episode, current DWR water year type, and the current month's drought status. These levels are based on the data and analysis from the District's Drought Status SRI Model contained within the 2008 Drought Preparedness Plan in **Appendix C-3**. When a shortage occurs, the District Board assesses if the stages of action discussed in **Section 6.2** should be implemented.

6.2 Stages of Action and Reduction Goals

The District has developed a four-stage shortage contingency plan as shown in **Table 6-1**. Each stage corresponds to an increased demand reduction target to align with anticipated supply availability. The shortage contingency plan includes voluntary and mandatory actions that expand under each stage, depending on the cause, severity, and anticipated duration of the water supply shortage. The details of these stages are provided in the 2008 Drought Preparedness Plan and 2015 Drought Plan Update. The 2015 Drought Action Plan Update specifically addresses the Governor's Executive Order (EO) requiring the District to achieve a 28 percent water use associated with the current ongoing drought. The 28 percent reduction goal is not presented in **Table 6-1**, since the changes in the 2015 Drought Action Plan Update related to the EO are not intended to continue indefinitely. These changes are discussed in **Section 6.5**.

[72] The 2008 Drought Preparedness Plan is available at http://www.eid.org/home/showdocument?id=129.

Table 6-1 – Drought Stages Contingency Plan[73]

Water Supply Conditions	Drought Stage	Stage Title	Stage Objective	Response Actions
Normal Water Supply	**None** - Ongoing water conservation and enforcement of water waste prohibition.	Normal Conditions	Public awareness of water efficiency practices and prohibition of water waste.	Public outreach and education for ongoing water efficiency practices and the prohibition of water waste.
Slightly Restricted Water Supplies Up to 15% Supply Reduction	**Stage 1** Introductory stage with voluntary reductions in use.	Water Alert	Initiate public awareness of predicted water shortage and encourage conservation.	Encourage voluntary conservation measures to achieve up to a 15% demand reduction.
Moderately Restricted Water Supplies Up to 30% Supply Reduction	**Stage 2** Voluntary and mandatory reductions in water use.	Water Warning	Increase public awareness of worsening water shortage conditions. Enforce mandatory measures such as watering restrictions.	Voluntary conservation measures are continued, with the addition of some mandatory measures to achieve up to a 30% demand reduction.
Severely Restricted Water Supplies Up to 50% Supply Reduction	**Stage 3** Mandatory reductions in water use.	Water Crisis	Enforce mandatory measures and/or implement water rationing to decrease demands.	Enforce mandatory measures to achieve up to a 50% demand reduction.
Extremely Restricted Water Supplies Greater than 50% Supply Reduction	**Stage 4** Water rationing for health and safety purposes.	Water Emergency	Enforce extensive restrictions on water use and implement water rationing to decrease demands.	Enforce mandatory measures to achieve greater than 50% demand reduction.

[73] 2015 Drought Action Plan Update at page 5.

6.3 Mandatory Prohibitions on Water Waste

EID instituted Administrative Regulation (AR) 1041, a water waste prohibition, that was last revised on May 10, 2016. The regulation prohibits intentional or unintentional water waste and encourages beneficial water use.[74] Allowing water fixtures to leak, gutter flooding, maintaining ponds or decorative basins without recirculation devices, and irrigation of landscaping during or within 48 hours of rainfall are a few examples of actions that qualify as water waste under the regulation. A full list of prohibited activities under AR 1041 is in **Appendix C-4**. Details on the prohibited types of use for each stage of action are also outlined below in **Section 6.5**.

6.4 Penalties

AR 1041.5 provides the stages of penalties for violators of the water waste regulation. An initial violation results in a warning to the customer and cease and desist letter from the District. A second violation results in levy fine on the violator's bill of $100 or 20 percent for the two-month water bill, whichever is greater. A third violation results in a $200 fine and if all three violations occur within a 12 month period, the District may elect to discontinue service of the water supply that had been wasted. A fourth violation results in a $500 fine and if four violations occur within an 18-month period, the District may elect to discontinue service.[75] AR 1041 also lays out an appeal process for charges of water waste violations. Water users will also incur additional charges once a drought is declared. Further details of these charges are discussed for each stage of action in **Section 6.5**.

6.5 Consumption Reduction Methods

CWC 10632 (a)(1) requires that all water purveyors establish stages of action to be undertaken in the event of a water shortage. It is also specified that a 50 percent reduction in supply must be addressed. This specific supply reduction is addressed at Stage Three in **Section 6.5.3**.

The ongoing drought impacted the 2015 update to the Drought Action Plan in order to comply with additional conservation measures that have been instituted state-wide. It should be noted that the following sections on each stage of action are a summary of the key points established by the District in the 2008 Drought Preparedness Plan and the 2015 Drought Action Plan Update as well as AR 5011. For the full body of text and all the details of each stage please refer to **Appendix C-3.** The District intends to revisit its Drought Action Plan during 2016 now that the State has revised the drought restrictions and updated conservation target methods.

[74] EID AD 1041.
[75] EID AR 1041.5.

6.5.1 Stage One – Water Alert

If water supplies become slightly restricted, the Plan calls for an introductory Stage 1 drought response, during which customers are informed of possible shortages and asked to voluntarily conserve 15 percent.

This stage includes performing public outreach and education about the shortage and methods individuals can implement to reduce their water use.[76] Additionally customers are requested to comply with the voluntary water saving guidelines associated with Stage 1 as outlined in the Drought Action Plan. This includes using weather information to regulate irrigation, avoiding sprinkler runoff, and requesting local restaurants only serve drinking water if requested. The District will also monitor water demands on a weekly basis and notify customers promptly whenever evidence of a leak on the end-user's side of the connection is evident.

6.5.2 Stage Two – Water Warning

In the event Stage Two is implemented under normal circumstances, the District will continue to encourage community-oriented voluntary conservation measures, enforce some conservation measures and implement mandatory water use reduction measures to decrease "normal" demand by up to 30 percent. Stage Two activities include a continuation of activities described under Stage 1, as well as greater conservation and water use restrictions.[77]

During this stage the District will refrain from releasing water from valve blow-offs, consider suspending potable supplementation to the recycled water program and launch a monthly-automated telephone message to increase customer awareness on mandatory watering restrictions.[78]

In addition to continuing to encourage customers to voluntarily reduce water use regarding turf watering, fillings pools, etc., mandatory-watering restrictions will be implemented on all outside irrigation. Specifically, non-agricultural irrigation will be restricted to occurring between 7 PM and 10 AM, and watering days will be limited to between one and three days per week depending on the time of year. Additionally restaurants are required to only offer drinking water upon request, hotels must provide guests the options of not having linens and towels laundered daily and all non-irrigation water features may not be filled.[79] Moreover

[76] 2015 Drought Action Plan Update at page 19.
[77] 2015 Drought Action Plan Update at page 19-23
[78] 2015 Drought Action Plan Update at page 17-18.
[79] CWC 10632(b) requires that that the urban water management plan update due July 1, 2016, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas. The 2015 Drought Action Plan Update complies with

agricultural users not participating in the District's Irrigation Management Services Program will be required to submit a conservation plan demonstrating water savings consistent with that required of all other customers.[80]

6.5.3 Stage Three – Water Crisis

Stage Three's primary purpose is to ensure the protection of the water supply for all public health and safety purposes. This Stage will require reductions in water demand by up to 50 percent as required by CWC 10632 (a)(1). Based on the Board action on March 26, 2012 a 50 percent drought surcharge will be added to commodity rates.

Under this stage the use of potable water for construction use, filling swimming pools or ponds, washing vehicles at home with potable water and mist systems are prohibited.[81] Additionally mandatory restrictions will continue to be imposed on irrigation practices. The District will implement a 50 percent drought surcharge on all commodity rates, restrict filming in recreational areas due to fire danger, and ensure cross agency communication to further assist in meeting the 50 percent reduction in water use goal.

6.5.4 Stage Four – Water Emergency

Stage Four focuses on reducing water demands by more than a fifty percent reduction. This stage decreases releases to Clear Creek to no more than 1.0 cfs. A 100 percent drought surcharge would be added to the commodity rates if approved by a Board action, and the District staff will also implement a rapid alert email notification system to advise customers of use restrictions. To address supply issues, a temporary change in the point of diversion of water taken from Folsom Reservoir may be implemented.[82] Even more restrictive water use measures would be implemented including prohibiting all automatic sprinkler systems, and limiting residential meters to a 50 GPCD allotment for health and safety purposes. Small farm customers must reduce their usage by 65 percent. It should be noted that an exception is allowed for vital healthcare and public safety uses.[83]

6.6 Revenue and Expenditure Impacts

When a drought or water shortage occurs, the District's costs will increase due to the additional activities and duties of instituting a stage of action. Not only will there be costs for materials, and time from permanent staff, but additional staff may need to be hired to assist in implementing the Drought Preparedness Plan. In order to ensure these impacts are

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this as restrictions throughout the stages of action separately identify pools and other types of artificial water features.

[80] 2015 Drought Action Plan Update at page 19-20.
[81] 2015 Drought Action Plan Update at page 21-22.
[82] 2015 Drought Action Plan Update at page 23.
[83] 2015 Drought Action Plan Update at page 24.

tracked, a specific charge code for drought/shortage related activities should be created and implemented.

As conservation measures and requirements increase and the water supply decreases, the District will potentially see a reduction in revenue. To combat this and help pay for the expenses discussed above, several of the stages authorize a drought surcharge to be added to all commodity charges that is equivalent to the stage's water use reduction goal.[84]

6.7 Conservation Rate Structures

As discussed above in **Section 6.5**, drought surcharges may be added to all commodity rates in the event of water shortage, and increased progressively through each stage of action. Specifically, a surcharge of 50 percent may be added in Stage Three, and a surcharge of 100 percent in Stage Four.

6.8 Reduction Measuring Mechanism

In order to determine the District's success in achieving its conservation goals, the actual water savings will be determined by quantifying the water treatment plants' output. Additionally in Stages 3 and 4, water meter data will be collected and compared to the baseline data for the last normal year.[85] Drought monitoring may also be performed by the District utilizing two primary tools,[86] the National Drought Monitor and the Supply Remaining Index (SRI) Model. The National Drought Monitor tool provides weekly updates with a map and narrative on drought conditions and weekly predictions of future conditions. The SRI Model is helpful in monitoring a drought's current status and utilizes real-time data to calculate water supply levels.[87]

6.9 Catastrophic Supply Interruption

In addition to climate, other factors that can cause water supply shortages are earthquakes, chemical spills, dam failures, canal breaks, waterline ruptures, and energy outages at treatment and pumping facilities. The District has an adopted Emergency Operations Plan, which provides procedures and guidance to District personnel in responding to emergency situations including catastrophic events, both natural and manmade.[88] The plan provides procedures for preparing, mobilizing and employing District resources and coordinating outside resources during an emergency. The District provides periodic training, including simulated events and responses to keep District personnel fully trained on implementation of

[84] 2015 Drought Action Plan Update at page 26.
[85] EID's Board of Director Meeting Packet from 3/28/16 at page 23.
[86] CWC 10632(a)(9) requires a mechanism for determining actual realized reductions in water use.
[87] EID 2015 Drought Action Plan Update at page 7.
[88] EID's Emergency Operation Plan was last updated 4/18/2011.

emergency procedures. Mobilization is consistent with Standardized Emergency Management and the Incident Command System.

6.10 Minimum Supply Next Three Years

Refer to **Section 3.7** for discussion of minimum supply availability. Any potential shortfall in supply that may occur may be addressed through combinations of demand reductions as detailed in the Water Shortage Contingency Plan and the use of interties and supplemental sources, as may be available from neighboring water purveyors if needed. Overall, the District is estimated to have a total supply for the next three years as presented in **Table 6-2**. For 2016, the District has full availability of its current supplies and therefore is reflecting that value. For 2017 and 2018, the District is assuming supplies are limited equivalent to the third year of a multi-dry year scenario, as described in **Section 3.7**.

Table 6-2 – Minimum Supply for 2016-2018[89]

Water Source	2016 (Normal Year)	2017	2018
License 2184 and Pre-14 rights	4,560	3,000	3,000
Licenses 11835 and 11836	23,000	15,500	15,500
CVP Contract	7,550	1,888	1,888
Project 184	15,080	15,080	15,080
Permit 21112	8,500	8,500	8,500
Recycled Water	2,500	2,500	2,500
Total Supply	61,190	46,468	46,468

6.11 Current Drought

As discussed above the current drought has impacted the District's drought and water shortage plans through Executive Orders and new statewide conservation goals. Executive Order B-29-15 required the District to achieve 28 percent water use reduction by June 2015. The District successfully petitioned the SWRCB to lower this amount by 4 percent. From June 1, 2015 through March 18, 2016, the District exceeded the requirement by successfully

[89] The supply values in this table are in compliance with CWC Section 10632(a)(2) and are reflective of predicted conditions for 2017 and 2018. These values are not intended to be consistent with the District's values likely to be submitted in compliance with the SWRCB's recent emergency regulations concerning self-certification for conservation targets for 2016. Under those emergency regulations, the SWRCB is requiring the supplies for 2016 through 2018 to be consistent with available supplies in 2013 through 2015. The District had ample water during 2013 through 2015 and anticipates a zero percent conservation target will be submitted to the SWRCB.

reducing its potable water use consumption by 30 percent.[90] However with improved supply conditions the State Board adopted a new statewide water conservation approach on May 18, 2016 that replaced the prior percentage reduction-based conservation standard. The new regulation establishes standards with locally developed conservation standards based upon each agencies specific circumstances and requires water suppliers to self-certify the level of available water supplies they have assuming three additional dry years and the level of conservation necessary to assure adequate supply over that time.

Presently, the District has met its conservation goals and is no longer implementing a reduction stage from its drought preparedness plan as the District's water supplies have returned to normal conditions.

[90] EID Board of Directors Minutes Packet, 3/28/2016 at page 23.

CHAPTER 7. SUPPLY & DEMAND INTEGRATION

The purpose of this chapter is to compare the total water supply sources available to the District with the total projected water use over the next 30 years, in five-year increments, for an average water year, a single-dry water year, and multiple dry water years.[91] Water supply and demand data presented in this section is presented in prior sections of this 2015 UWMP.

7.1 Average Water Year Conditions

Under this water supply scenario, the District would anticipate full availability of its water asset portfolio as represented in **Table 3-3**. The resulting total supplies from **Table 3-3** and the forecasted demands from **Table 4-6** are shown in **Table 7-1**. As demonstrated, the District projects adequate water supplies through 2045 under average hydrologic conditions.

Table 7-1 – Supply and Demand Comparison (Average Year)

(acre-feet/yr)	2020	2025	2030	2035	2040	2045
Supplies	77,490	107,690	107,790	107,990	108,190	108,190
Demands	43,477	46,833	50,696	53,128	56,068	58,815
Difference	34,013	60,857	57,094	54,862	52,122	49,375

7.2 Single Dry Year Conditions

In a single dry year condition, the District anticipates reductions to its surface water supplies consistent with the projection in **Table 3-3**.

For purposes of this UWMP, the District's forecast water demands are expected to increase in a single dry year. This increase represents the generalized expansion of the landscape irrigation season due to limited rainfall and lack of restrictions on water usage due to adequate supply conditions – meaning customers begin demanding supplies from the District earlier in the spring than during a normal year when rainfall would otherwise satisfy landscape water needs. Though the increase is dependent on actual conditions, it is represented by adjusting the normal year annual forecast demand value upward by 5 percent for each 5-year increment through 2045. This adjustment reflects rudimentary relationships between historic use variances and other conditions and is meant only to highlight the anticipated increase in demands for purposes of District planning.

[91] This is consistent with CWC Section 10635, but extends the period an additional 10 years to provide "20 year" analysis coverage for the intervening years between UWMP updates.

As shown in **Table 7-2**, and with the represented demand adjustments, the District anticipates adequate water supplies through 2045 during the single driest years.

Table 7-2 – Supply and Demand Comparison (Single Driest-Year)

(acre-feet/yr)	2020	2025	2030	2035	2040	2045
Supplies	66,325	71,525	71,625	71,825	72,025	72,025
Demands	45,651	49,175	53,231	55,784	58,871	61,756
Difference	20,674	22,350	18,394	16,041	13,154	10,269

7.3 Multiple Dry Year Conditions

For purposes of this 2015 UMWP, the District has assessed a three-year series of dry conditions. As detailed in **Chapter 3**, the District again anticipates reductions in available water supplies during these multiple dry years, primarily with the supplies from Jenkinson Lake diminishing with each successive year, significant reduction of supplies available from the El Dorado-SMUD Cooperation Agreement in dry years, and reductions in CVP entitlements from Folsom Reservoir.

Similar to the single dry year scenario, demand also varies across the time horizon as well as in each successive year. This variance is represented by setting the forecast demands for the first of three years equal to the demand used in the single dry year scenario. In the second year, the District would anticipate that its water shortage contingency plan (WSCP) would be triggered, resulting in a demand reduction for that year. However, to be conservative, the District is assuming it would only achieve a 5 percent reduction in demand (essentially equal to the average year condition). Similarly, in the third year, the District would expect further reductions resulting from implementing further WSCP actions. For this third year, the District's assumed conservative reduction target is 10 percent.

This resulting analysis has been represented in **Table 7-3**. During each sequence of multiple dry years that affects supply, along with the demand adjustments discussed above, the District anticipates adequate water supplies being available during each of the three successive dry years.

Table 7-3 – Supply and Demand Comparison (multiple dry years)

	(acre-feet/yr)	2020	2025	2030	2035	2040	2045
Year 1	Supplies	66,325	71,525	71,625	71,825	72,025	72,025
	Demands	45,651	49,175	53,231	55,784	58,871	61,756
	Difference	20,674	22,350	18,394	16,041	13,154	10,269
Year 2		2020	2025	2030	2035	2040	2045
	Supplies	62,405	67,605	67,705	67,905	68,105	68,105
	Demands	43,369	46,716	50,569	52,995	55,928	58,668
	Difference	19,036	20,889	17,136	14,910	12,177	9,437
Year 3		2020	2025	2030	2035	2040	2045
	Supplies	57,143	62,343	62,443	62,643	62,843	62,843
	Demands	41,086	44,258	47,908	50,206	52,984	55,580
	Difference	16,056	18,085	14,535	12,437	9,858	7,262

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