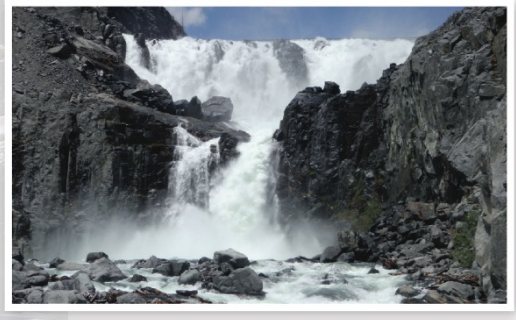

2015 Urban Water Management Plan

Adopted June 2, 2016

PCWA

water • energy • stewardship

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PCWA

water • energy • stewardship

2015 Urban Water Management Plan

Adopted
June 2, 2016

Prepared by:

Tully & Young
Comprehensive Water Planning

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This Placer County Water Agency 2015 Urban Water Management Plan was prepared under the direction of a California licensed civil engineer.

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CHAPTER 1. INTRODUCTION

Placer County Water Agency (PCWA) was created in 1957 by a special act of the California Legislature known as the Placer County Water Agency Act. PCWA has a five-member board of directors elected by district voters for four-year terms. The boundaries of PCWA are coterminous with the boundaries of Placer County.

PCWA carries out a broad range of responsibilities including water resource planning and management, wholesale and retail supply of water, and hydroelectric energy production. PCWA has existing surface water appropriative rights as well as contract entitlements exceeding 300,000 acre-feet per year. PCWA also has access to sustainably managed regional groundwater resources to manage emergency conditions.

PCWA currently delivers approximately 116,500 acre-feet per year within its Western Water System, and provides approximately 23,600 acre-feet per year of untreated water to neighboring purveyors for treatment and resale, serving a total population of over 200,000 people in Placer County directly or indirectly with treated and irrigation water. In addition, PCWA regularly makes surface water available for transfer to other purveyors in the state and to assist fishery protection goals in the lower American River during periods of drought.

Note to DWR

Placer County Water Agency 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 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**.

PCWA has prepared this Urban Water Management Plan (UWMP) to comply with the Urban Water Management Planning Act (UWMPA) requirements for urban water suppliers. This UWMP addresses PCWA's water management planning efforts to ensure adequate water supply to meet demands over the next 30 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. This UWMP provides verification that future demands, represented by existing

General Plans within the land use jurisdictions served by PCWA, will not exceed PCWA's available water supplies.

The 2015 UWMP is an update to PWCA'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 that describes PCWA's water supplies, assesses 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 future 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 PCWA's water supply and operations.

1.1 Urban Water Management Planning Act

The Urban Water Management Planning Act requires every urban water supplier to prepare an urban water management plan pursuant to California Water Code § 10610 et seq.[1] Because PCWA 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 PCWA and its water management programs.

Specifically, the 2015 UWMP describes and evaluates the reliability of PCWA's existing and planned water supplies to meet forecast near-term and long-term customer water demands. The plan assesses the availability and sufficiency of surface, groundwater, and recycled water assets and the vulnerability of these supplies to seasonal, climactic, and regulatory conditions.

The 2015 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 2015 UMWP also includes narratives describing water demand management measures (DMMs),[2] PCWA's long-term plan for efficient water use, and estimated future water savings based on water use projections, where available. Also included are discussions regarding distribution system water loss, information on potential use of recycled water as a water source for PCWA, and PCWA's

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

comprehensive water shortage contingency analysis, which details stages of action to be undertaken by PCWA in response to water supply shortages.[3]

In short, this 2015 UMWP allows PCWA assess and plan for short-term and long-term effective management of its water supplies to meet its evolving water demands in the context of climate change and regulatory uncertainty.

1.1.1 Retailer and Wholesaler Requirements

The California Water Code indicates that both urban wholesale and retail water suppliers are to prepare UWMPs. Wholesale and retail suppliers are also to coordinate and provide water use and supply information to each other during preparation of their respective UWMPs. Generally, the UWMPA refers to "urban water suppliers," and the Water Conservation Bill of 2009 indicates that "all water suppliers increase efficiency." These provisions denote consistent application of some components of the UWMPA to both wholesale and retail water providers. There are several instances within the UWMPA, however, where the requirements for wholesale and retail urban water suppliers differ. These include:

- DMMs: Wholesale suppliers provide documentation for DMMs as required under CWC 10631(f)(1)(B). Retail suppliers provide documentation for each DMM as required under CWC 10631(f)(B).
- Baselines and Targets: Only retail urban water suppliers are required to develop base daily per capita use, interim urban water use target, and urban water use target values.
- Water use reduction: Wholesale suppliers are to provide "an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions." Retail suppliers are to "conduct at least one public hearing" that includes general discussion of "the urban retail water supplier's implementation plan for complying with" the Water Conservation Bill of 2009.
- Lower income housing: Only retail urban water suppliers are required to address the lower income water supply projections required by CWC 10634(a).

PCWA meets the CWC definition of a retail urban water supplier as discussed above in **Section 1.1**. Additionally, PCWA also meets the definition of a wholesale urban water supplier as more than 3,000 acre-feet annually are provided by PCWA to other municipalities.[4] Therefore this 2015 UWMP addresses both the retail and wholesale requirements of the UWMPA.

[3] A recent amendment to CWC § 10632 includes defining water features that are artificially supplied with water as part of this contingency analysis.
[4] CWC 10608.12(r): "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

1.2 Public Participation and Agency Coordination

The UWMPA requires a water purveyor to coordinate the preparation of its UWMP with other appropriate agencies in and around its service area. This includes other water suppliers that share a common source, water management agencies, and relevant public agencies. PCWA has prepared this UWMP in coordination with water utilities that receive wholesale water from PCWA, as well as other appropriate local government agencies, as listed in **Table 1-1**. Copies of correspondence are included in **Appendix B-3**.

1.2.1 Water Forum

Community leaders, along with water managers from Sacramento, Placer and El Dorado counties negotiated the Water Forum Agreement (WFA). The WFA 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. PCWA is a signatory to the Water Forum Agreement. As one of the signatories, PCWA has agreed to specific water management actions under a range of hydrologic events that are linked primarily to the American River Basin and Folsom Reservoir. The water management actions impact the operation of PCWA's Middle Fork Project reservoirs as replacement water to benefit the Lower American River. Pursuant to the Water Forum provisions, PCWA has also developed best management practices that are consistent with the Demand Management Measures in the 2015 UWMPA.

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. 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. PCWA is an active member of RWA and holds executive positions on the RWA Board.

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
Wholesale Customers from Folsom Lake				
City of Roseville	√	√	√	√
San Juan Water District	√	√	√	√
Sacramento Suburban Water District	√	√	√	√
Wholesale Customers who are Urban Water Suppliers				
City of Lincoln	√	√	√	√
California American Water Company	√	√	√	√
Wholesale Customers who are not Urban Water Suppliers				
Dutch Flat Mutual Water Company			√	√
Heather Glen CSD			√	√
Meadow Vista County Water District			√	√
Willow-Glen Water Co.			√	√
Weimar Water Co.			√	√
Midway Heights County Water District			√	√
Christian Valley Park CSD			√	√
Folsom Lake Mutual Water Co.			√	√
Golden Hills Mutual Water Co.			√	√
Hidden Valley Community Assoc.			√	√
Lakeview Hills Community Assoc.			√	√
Land Use Entities and Interested Parties (unless listed above)				
General Public				√
Placer County	√	√	√	√
Sacramento County		√	√	√
Nevada Irrigation District		√	√	√
City of Rocklin	√	√	√	√
Town of Loomis	√	√	√	√
City of Auburn	√	√	√	√
City of Colfax	√	√	√	√

1.2.3 Additional Entities

Placer County Water Agency has shared water interests with numerous local and regional water purveyors. The list of these purveyors is incorporated in **Table 1-1**. Specifically, PCWA provides surface water to San Juan Water District, the City of Roseville, the City of Lincoln, the Sacramento Suburban Water District and other local purveyors within Placer County. Moreover, PCWA accesses groundwater from the Sacramento North Area Groundwater Basin (described in more detail in **Chapter 3**) that also overlaps with numerous water agency boundaries. All relevant entities, including the general public and adjacent

water suppliers, 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, PCWA held a public hearing regarding its 2015 UWMP on June 2, 2016. Before the hearing, PCWA made a draft of the 2015 UWMP available for public inspection at PCWA's office and on the PCWA website. Pursuant to CWC Section 10642, general notice of the public hearing was provided through publication of the hearing date and time,[5] and posting of the hearing at PCWA's office. PCWA's Board of Directors received comments at the public hearing.

As part of its public hearing, PCWA 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.[6] Also, at the public hearing, PCWA presented the method for determining its urban water use target pursuant to CWC § 10608.20(b).

PCWA adopted this 2015 UWMP on June 2, 2016.[7] A copy of the adopted 2015 UWMP will be provided to the County and the California State Library, and posted onto PCWA's website.

1.3.1 Additional Compliance

PCWA 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;
- 2006 Integrated Water Resources Plan;
- 2015 Water Shortage Contingency Plan;
- 2014 Placer County Economic and Demographic Profile;

[5] See **Appendix B-2** for copies of the published notices.
[6] CWC § 10608.26
[7] The resolution adopting the 2015 UWMP is in **Appendix B-1**.

- 2007 Western Placer County Groundwater Management Plan.

1.5 Plan Organization

This UWMP is organized as follows:

- Chapter 2 provides a description of PCWA's (a) service area, including climate; demographic and population characteristics; and current and projected land-use changes integral to the demand forecasts, and (b) water system, including the potable and non-potable delivery systems;
- Chapter 3 describes PCWA's current and future water supplies and the reliability of the supplies;
- Chapter 4 details the demands on PCWA's system, including the past and future estimated demands;
- Chapter 5 provides information regarding PCWA's demand management measures;
- Chapter 6 discusses PCWA's water shortage contingency plan;
- Chapter 7 compares PCWA's supplies and demands in normal and dry years.

This 2015 UWMP also includes several appendices providing referenced documents and supporting information.

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CHAPTER 2. WATER SYSTEM INFORMATION

2.1 PCWA Service Area General Description

PCWA is a public water agency that provides untreated, treated and irrigation water directly and indirectly to wholesale and retail customers throughout Placer County. Water in Placer County was primarily used for mining, agricultural and residential purposes beginning in the 1850's. This disaggregated usage lasted through the 1950's. In 1957, the Placer County Water Agency Act was signed by Governor Goodwin Knight, creating the Placer County Water Agency. Shortly after being established, PCWA constructed the Middle Fork American River Hydroelectric Project on the Middle Fork American River and selected tributaries.

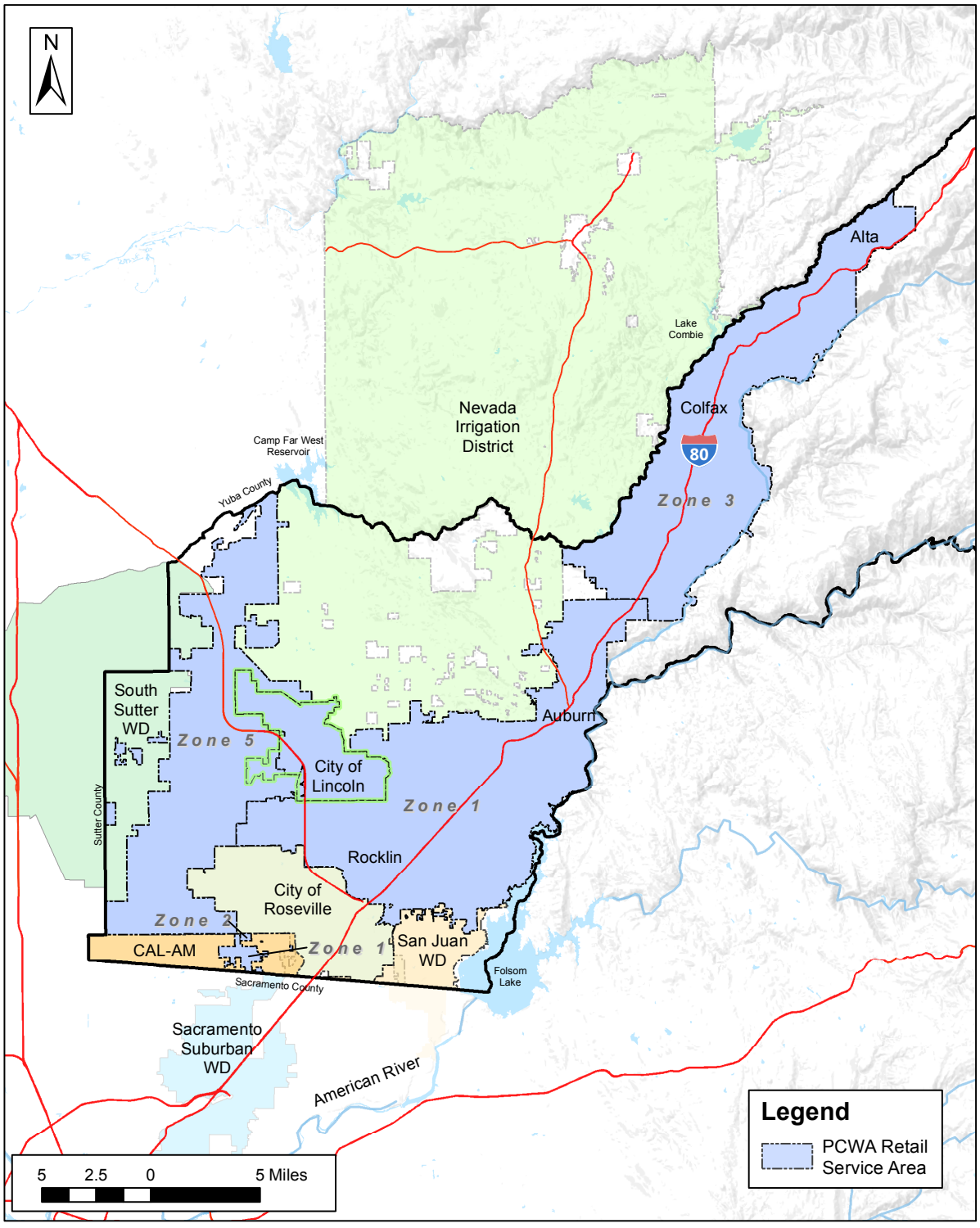
The area served by the Western Water System extends from the community of Alta on the east, westward down the Interstate 80 corridor, and bounded by the Sutter and Sacramento county lines on the west and south and Nevada County on the north. The service area includes retail treated water deliveries to the communities of Alta, Monte Vista, Applegate, Colfax, Auburn, Loomis and Rocklin and much of the surrounding unincorporated areas. PCWA also provides wholesale treated water to the City of Lincoln, California American Water Company for use in their franchise area west of Roseville and south of Baseline Road, and to other relatively small mutual water companies and towns throughout PCWA's western service area.

In addition to treated water service, PCWA provides irrigation water through its extensive canal system to individual customers, and untreated water for treatment and resale by other retail water purveyors. Irrigation water comprises about two-thirds of PCWA's Western Water System deliveries.

The Western Water System is a financial and operational amalgamation of four separate systems acquired or developed over time. Each of these underlying systems is designated as a PCWA Zone; numbered 1, 2, 3 and 5. In **Section 2.1.5**, the five PCWA Zones are described. It should be noted as a difference from PCWA's 2010 UWMP the area called "Zone 4" located in Martis Valley near Truckee, California is no longer served by Placer County Water Agency. This area is now served by Northstar Community Services District.

PCWA also provides untreated water under its North Fork American River water rights into Folsom Lake for delivery to the San Juan Water District, the City of Roseville, and Sacramento Suburban Water District, each of which are required to prepare their own UWMPs. Deliveries to these customers are grouped under the general term of "Untreated Sales to Other Agencies." Thus, PCWA's place of use for its water rights extends outside of the PCWA's district boundaries. **Figure 2-1**, **Figure 2-2** and **Figure 2-3** illustrate the location of PCWA's various service areas.

Figure 2-1 – PCWA Service Area and Adjacent Agencies



2.1.1 Classes of Water Usage

PCWA is both a retail water purveyor and a wholesale water purveyor that serves both treated and raw water supplies to its diverse customers. Because of the diverse service groups, PCWA classifies its customers into four categories for purposes of assessing existing and future demands: retail treated customers, irrigation customers, wholesale treated customers, and untreated water customers. "Retail treated" is water provided directly to PCWA's municipal and industrial customers and meets all requirements for potable water use. "Irrigation" is non-potable surface water provided directly to PCWA retail customers and is generally used by commercial agriculture and by rural residential customers for outdoor water needs. "Wholesale treated" is potable water treated at PCWA-owned water treatment facilities and sold to other water suppliers who then deliver to customers (PCWA does not directly serve the end-user). And, "Untreated" is untreated water sold under contract to other water purveyors for subsequent treatment and delivery to the contractor's urban customers. The latter three categories are discussed in more depth in **Section 4.4** and **Section 4.5**.

Zone 1 and Zone 3 comprise the primary areas of water use that require different types of treated and untreated water. The classes of water use in Zone 1 are shown in **Figure 2-2** by each subarea. Similarly **Figure 2-3** provides an illustration of Zone 3's class of usage by location for retail treated and wholesale untreated.

2.1.2 Climate

The Placer County Water Agency's service area has a large variation in climate due to significant differences in topography, elevation, and related climatological characteristics. This unique variation includes dramatic elevation changes from about 150ft in the western service area up to about 6,000 feet at the eastern end of PCWA's existing service. There are significant climate variations even within the 4 designated PWCA service zones, so this UWMP details multiple distinct locations to describe the PWCA service area climate.

PWCA Zone 1 and Zone 5 are in the western portion of Placer County. Lower Zone 1 is an area with urban development. Zone 5 includes a large swath of agricultural lands. Both zones have weather typical to California's Central Valley with hot dry summers and cool wet winters. Upper Zone 1 consists of rolling foothills and associated large landscape development as well as climate variations associated with elevations up to about 1,600 feet. The climate generally includes hot dry summers and cold wet winters – with evening temperatures cooling below areas further west as well as increased precipitation amounts caused by orographic uplift. Zone 3 extends from Zone 1 up to nearly 4,000 feet and is characterized by Sierra forest climate with warm summers, cold wet winters, and occasional snow. Precipitation at these elevations is significant. Spring runoff from the higher elevations, above 4,000 feet, is the backbone of PCWA's water supply system.

Figure 2-2 – Zone 1 Planning Subareas and Classes of Water Service

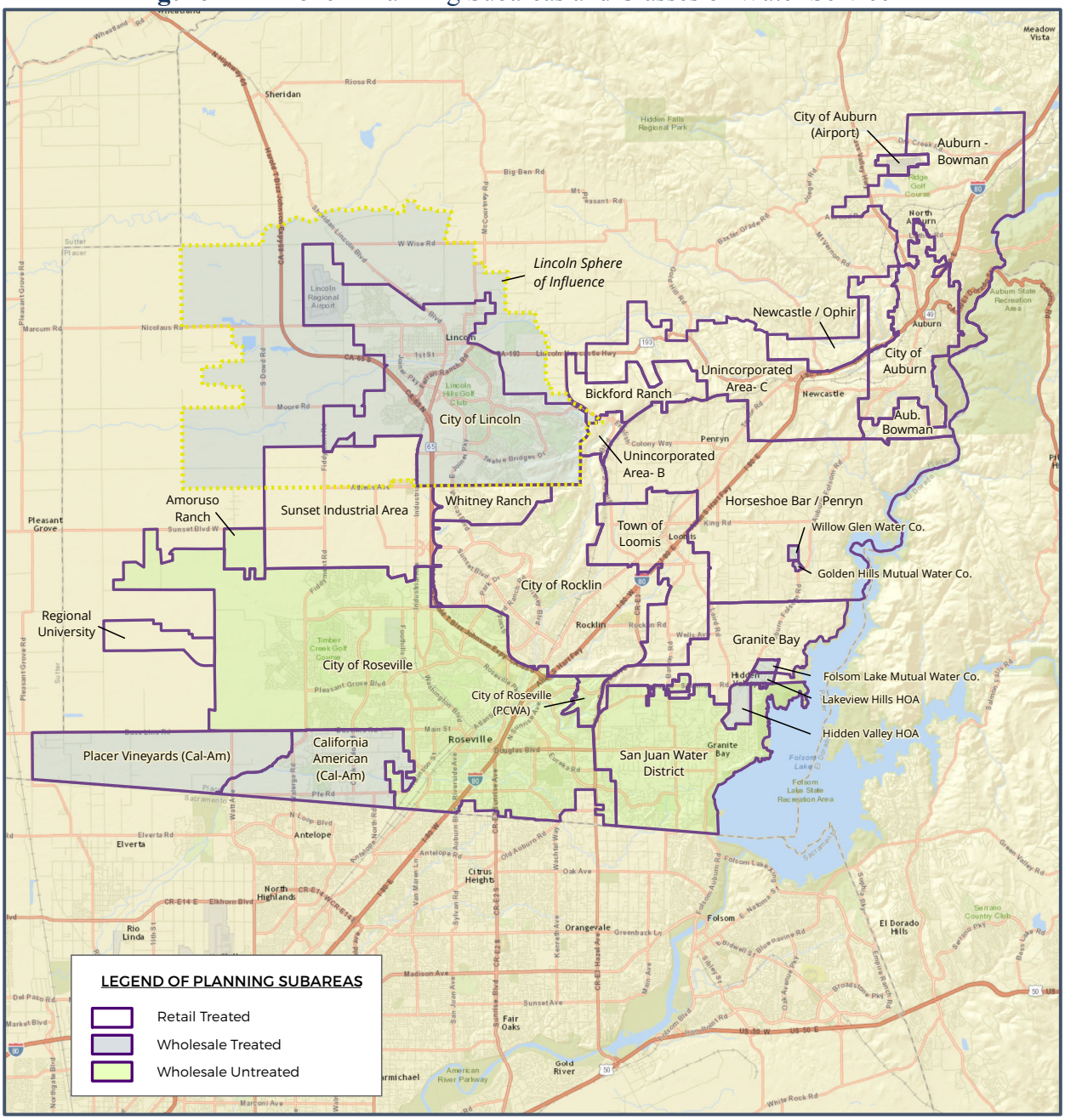
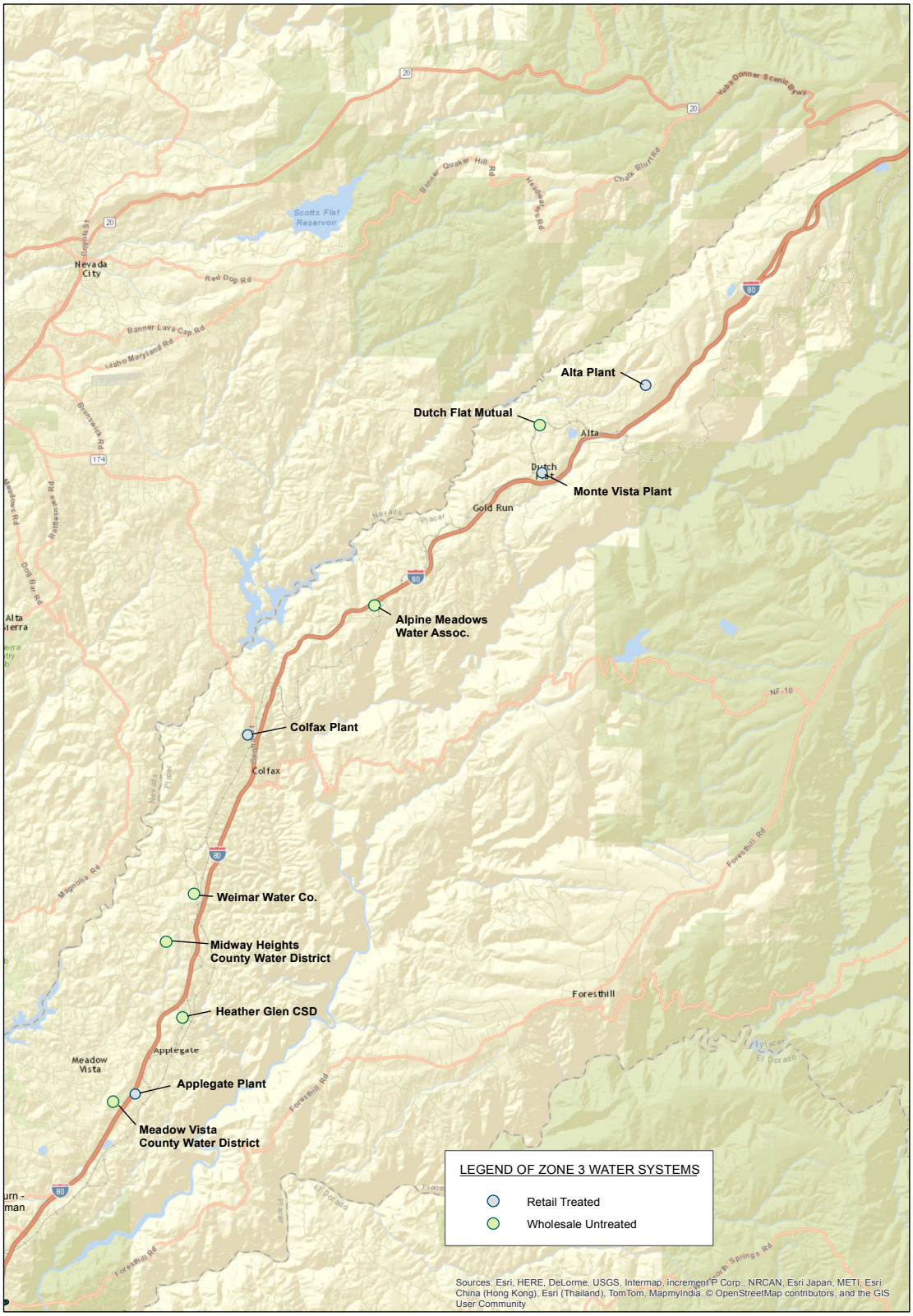


Figure 2-3 – Zone 3 Water Service Locations by Classification



Tables 2-1, 2-2, and **2-3** include the average reference evapotranspiration (ETo), precipitation, and temperature at selected locations in the PCWA service area. Roseville and Auburn represent climate in two distinct areas of the PCWA Zone 1 service area: Upper Zone 1 and Lower Zone 1. Colfax is representative of the climate in PCWA's Zone 3 service area.

For purposes of documenting ETo, PCWA will be using Appendix A of the 2015 update to the California Model Water Efficient Landscape Ordinance (MWELO). The MWELO contains the reference ETo by month as shown in **Tables 2-1, 2-2,** and **2-3**. These tables include ETo estimates for Roseville, Auburn, and Colfax to reflect variations between lower and upper Zone 1, and Zone 3. ETo values for Roseville and Auburn have an additional column for data from local California Irrigation Management Information System (CIMIS) stations. 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 – Average ETo, Precipitation, and Temperature for Roseville

Month	MWELO App A ETo (inches)	CIMIS Average ETo (inches)	Average Precip. (inches)	Average Temp. (ºF)	Average Max. Temp. (ºF)	Average Min. Temp. (ºF)
January	1.1	1.12	3.65	43.7	53.8	33.6
February	1.7	1.70	3.09	47.8	59.1	36.5
March	3.1	3.29	2.89	53.4	66.8	39.9
April	4.7	4.49	1.56	55.9	69.6	42.1
May	6.2	6.36	0.29	65.7	82.0	49.3
June	7.7	7.40	0.26	73.1	90.7	55.4
July	8.5	7.95	0.31	77.6	96.0	59.2
August	7.3	7.05	0.05	76.7	95.5	57.8
September	5.6	5.17	0.37	71.2	89.7	52.7
October	3.7	3.37	1.83	60.8	76.5	45.1
November	1.7	1.63	3.84	48.4	59.5	37.2
December	1.0	1.05	3.21	43.0	52.7	33.3
Annual :	52.3	50.56	21.35	59.8	74.3	45.2

MWELO Appendix A data from Roseville, CA

ETo data from DWR CIMIS Data, Fair Oaks Station 131, 1998-2015

Precipitation and Temperature data from WRCC - Rocklin, CA (047516) 1971-2000

Table 2-2 – Average ETo, Precipitation, and Temperature for Auburn

Month	MWELO App A ETo (inches)	CIMIS Average ETo (inches)	Average Precip. (inches)	Average Temp. (ºF)	Average Max. Temp. (ºF)	Average Min. Temp. (ºF)
January	1.2	1.41	6.71	45.1	54.0	36.6
February	1.7	1.82	6.71	48.5	58.3	39.3
March	2.8	3.26	5.35	51.9	62.0	41.4
April	4.4	4.66	2.7	56.3	68.3	44.8
May	6.1	6.26	1.26	63.3	76.2	50.3
June	7.4	7.36	1.26	70.8	85.3	56.5
July	8.3	8.13	0.05	77.4	92.5	61.8
August	7.3	7.54	0.07	76.4	91.5	61.0
September	5.4	5.64	0.42	71.3	86.2	57.3
October	3.4	3.62	1.78	63.3	76.6	50.7
November	1.6	1.76	4.01	53.2	63.2	42.9
December	1.0	1.05	5.71	46.1	54.9	36.8
Annual :	50.6	52.52	36.03	60.3	72.4	48.3

MWELO Appendix A data from Auburn, CA

ETo data from DWR CIMIS Data, Auburn Station 195, 2005-2015

Precipitation and Temperature data from WRCC - AUBURN, CALIFORNIA (040383) 1905-2015

Table 2-3 – Average ETo, Precipitation, and Temperature for Colfax

Month	MWELO App A ETo (inches)	CIMIS Average ETo (inches)	Average Precip. (rain/snow) (inches)	Average Temp. (ºF)	Average Max. Temp. (ºF)	Average Min. Temp. (ºF)
January	1.1	8.16	6.9	44.6	53.8	34.6
February	1.5	7.6	3.8	46.5	56.2	36.4
March	2.6	6.77	4	49.2	59.8	38.3
April	4.0	3.58	0.9	54.1	65.9	42.1
May	5.8	1.85	0.1	60.8	73.6	48
June	7.1	0.59	0	69.0	82.8	55
July	7.9	0.09	0	76.5	91.1	61.9
August	7.0	0.13	0	75.1	89.9	60.1
September	5.3	0.65	0	69.9	84.3	55.3
October	3.2	2.45	0	61.1	74.2	47.6
November	1.4	5.5	0.5	51.2	62.2	40
December	0.9	7.81	2.8	45.1	54.7	35.2
Annual :	47.8	45.18	19.0	58.6	70.7	46.2

MWELO Appendix A data from Colfax CA

Precipitation and Temperature data from WRCC - COLFAX, CA (041912) 1905-2015

Temperature and precipitation numbers are from Western Regional Climate Center (WRCC) data stations. Both the Colfax and Auburn stations have been active since 1905 whereas the nearest WRCC station to Roseville was active in Rocklin from 1971 to 2000. Average snowfall values are included for Colfax in addition to precipitation data, since they receive significant annual snowfall. Temperature values are provided as monthly averages, and average maximum and minimum temperatures.

2.1.3 Service Area Demographics and Population

The population served by PCWA represents a highly varied mix of users and user classes. This is due to the size of the retail treated service, which includes a broad mix of residential population densities, as well as commercial, public, and industrial water use customers.

A population estimate for PCWA was performed using DWR methods presented in the DWR Guidebook.[8] Future population for PCWA is estimated from predicted housing unit growth. Population estimates include the Placer County population and those only directly served retail treated water. The population is estimated for PCWA retail treated customers as shown in **Table 2-4.**

Table 2-4 – Historic and Projected Retail Treated Population

Year	Population	Year	Population
1995	54,744	2009	91,832
1996	56,504	2010	91,648
1997	58,458	2011	92,230
1998	59,544	2012	92,994
1999	62,851	2013	93,777
2000	67,321	2014	96,004
2001	72,056	2015	98,128
2002	76,923	2020 (est.)	103,885
2003	81,149	2025 (est.)	110,387
2004	84,273	2030 (est.)	117,368
2005	85,942	2035 (est.)	125,384
2006	88,676	2040 (est.)	133,706
2007	90,312	2045 (est.)	141,365
2008	90,977		

2.1.4 Land Use

The population served by PCWA includes a mix of users, user classes and water types. This includes residential, as well as commercial and public customers. The population estimates discussed above are reflected in the expected growth projections within PCWA's Zone 1 service area as presented in **Table 2-5**. This table includes all the subareas in Zone 1 as seen in **Figure 2-2**. Negligible growth is expected in Zone 3, and is therefore not detailed in the

[8] DWR's *2015 UWMP Guidebook for Urban Water Suppliers* FINAL DRAFT, Section 3.4

table. The current number of dwelling units by classification for each subarea in Zone 1 is presented on the left, with anticipated build out on the right. Overall the number of single family and multi-family units is anticipated to almost triple by build out, which is expected sometime soon after the 2045 planning horizon. Additionally, non-residential acreage is also anticipated to increase by almost 1,200 acres.

The City of Rocklin is anticipated to have the largest expansion, with an increase of about 15,000 single family units reflecting an array of lot sizes. This growth representation serves as the foundation of growth forecasts presented in **Section 4.4**.

Table 2-5 – Zone 1 Retail Land Use Projections

	Existing			Build-out		
Zone 1 Subarea	Single Family (units)	Multi-Family (units)	Non-Residential (acres)	Single Family (units)	Multi-Family (units)	Non-Residential (acres)
Upper Zone 1						
Auburn/Bowman	2,260	91	499	6,488	91	936
City of Auburn	4,442	2,341	467	8,116	2,341	458
City of Auburn (Airport)	0	--	173	2	--	479
Newcastle/Ophir	3	--	0	189	--	320
Unincorp. Area C (Newcastle)	314	26	180	2,345	26	679
Lower Zone 1						
Bickford Ranch	0	--	0	2,019	--	230
Horseshoe Bar/Penryn	666	8	58	4,174	8	84
Unincorp. Area B (Loomis Basin)	2	--	0	127	--	0
Town of Loomis	1,897	254	358	3,187	254	664
Granite Bay	605	5	0	709	5	0
City of Rocklin	15,260	5,344	2,793	23,707	6,919	3,499
Whitney Ranch	1,195	591	80	4,002	1,741	125
City of Roseville (PCWA)	670	230	19	877	452	21
Sunset Industrial Area	0	0	1,024	2,476	2,886	7,095
Total Zone 1 (units or acres)	**27,315**	**8,890**	**5,650**	**58,418**	**14,723**	**14,590**
Regional University	0	0	0	2,557	934	761

2.1.5 Service Zone Descriptions

This section describes PCWA's service areas. The PCWA service area includes four zones, each of which have unique water supply characteristics, and areas served by other water purveyors within Zone 1 and Zone 5, but including areas outside of these boundaries.

2.1.5.1 Zone 1

Zone 1 is the largest of the four zones, extending from the City of Auburn to the City of Lincoln and south to the Sacramento County line. PCWA provides retail service to most of Zone 1 and provides wholesale service to the City of Lincoln, California American Water Company, the towns of Rocklin and Loomis, as well as small water purveyors. PCWA also provides untreated water service to Christian Valley Park Community Service District which operates its own water treatment plant.

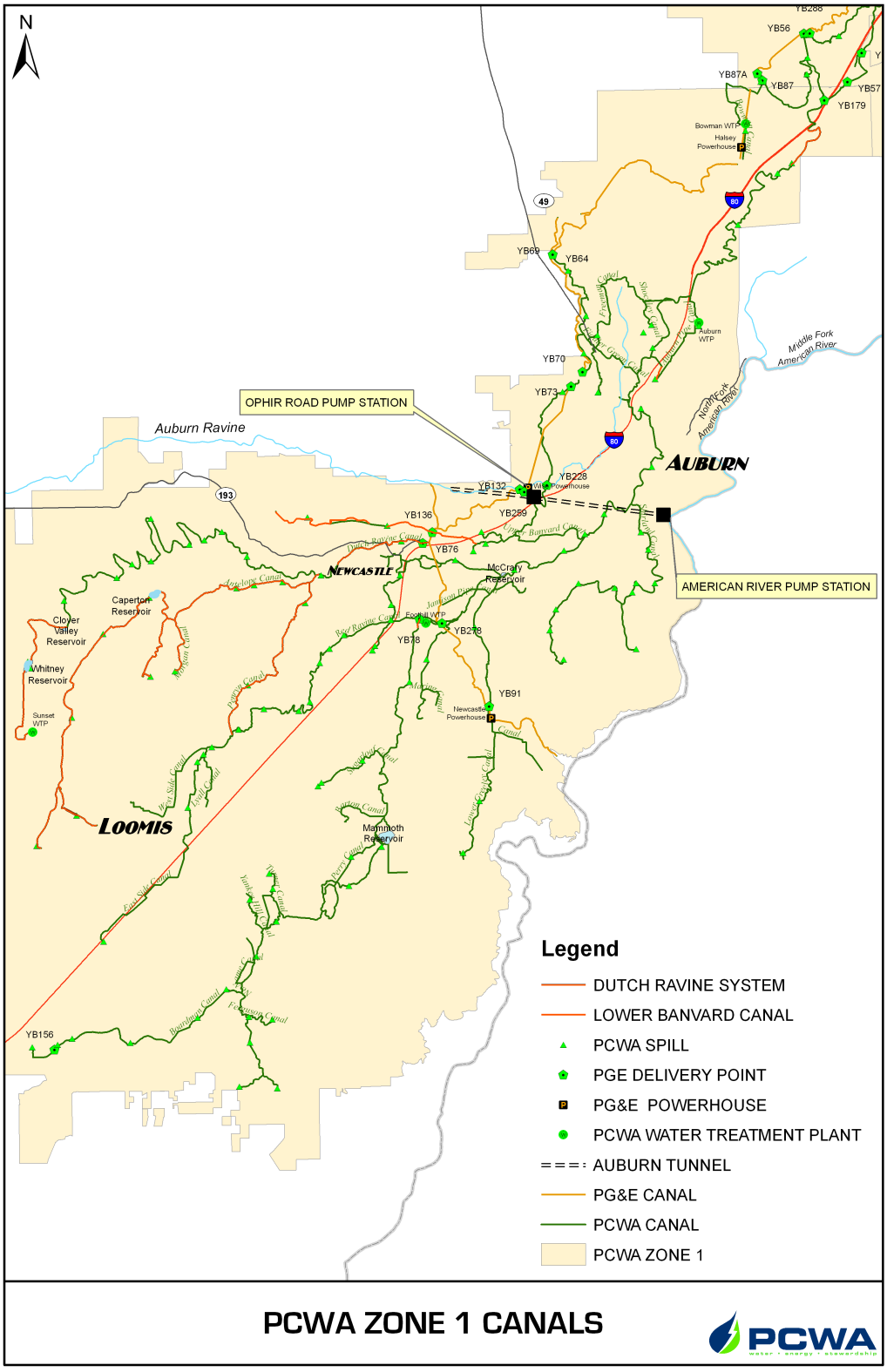
Water for Zone 1 is delivered by contract through PG&E's Drum-Spaulding hydroelectric system and also comes from PCWA's Middle Fork American River project. PCWA operates four water treatment plants (WTPs) in Zone 1. The Zone 1 service area has 16 storage tanks with about 49 million gallons (MG) of storage capacity and 496 miles of treated water pipe. A graphical depiction of Zone 1 canals and supply infrastructure can be found in **Figure 2-4**.

Upper Zone 1 consists of the City of Auburn and surrounding communities. Due to its location, upper Zone 1 can only be supplied PG&E water. PG&E diverts water from the Bear and Yuba Rivers and delivers that water to PCWA through the Bear River, Wise Canal, and South Canal. PCWA then treats this supply at the Auburn and Bowman WTPs prior to direct deliveries to its customers. It also delivers untreated water to treatment plants in lower Zone 1. The Auburn and Bowman WTPs have capacities of 8 million gallons per day (MGD) and 7 MGD respectively. The Upper Zone 1 is comprised of five subareas including Auburn/Bowman, City of Auburn, City of Auburn (Airport), Newcastle/Ophir, and unincorporated area in New Castle.

Lower Zone 1 includes the lower portion of the watershed below Auburn, including the communities of Newcastle, Penryn, and a portion of Granite Bay, as well as the Cities of Rocklin, Lincoln, and Loomis. The primary water supply for lower Zone 1 is PG&E water from the Drum-Spaulding hydroelectric system. PCWA also uses water from the North Fork American River pursuant to its own water rights. PCWA pumps North Fork American River water near Auburn into the Auburn Tunnel, which connects to the Auburn Ravine where it can be distributed to Zone 5 irrigation water customers. PCWA can also pump water from the Auburn Tunnel up to its WTP site at Ophir. The Ophir WTP is still being negotiated by interested parties and its build out timeline and capacity have not yet been determined.[9] From the Ophir site American River water can be diverted into PG&E's South Canal in emergency situations where it flows to PCWA's Foothill WTP. The Lower Zone 1 WTPs are the Foothill and Sunset plants which have capacities of 58 MGD and 8 MGD respectively. The Lower Zone 1 is also comprised of subareas like Upper Zone 1, these subareas include: Bickford Ranch, Horseshoe Bar/Penryn, Unincorporated area in Loomis Basin, Town of Loomis, Granite Bay, City of Rocklin, Whitney Ranch, City of Lincoln, City of Roseville, and Sunset Industrial Area.

[9] PCWA's Water Connection Charges Capital Improvement Program Update, December 2015, p. 15

Figure 2-4 – Zone 1 Canal System



2.1.5.2 Zone 2

Zone 2 consists of 46 residential accounts south of the City of Roseville, in a community known as Bianchi Estates. PCWA supplied water to Bianchi Estates from two wells until 2003, at which time it was converted to surface water. This development receives treated water wheeled through the City of Roseville's system pursuant to an agreement between PCWA and Roseville. As Zone 2 is no longer fed by its wells, PCWA considers it part of Zone 1 for this UWMP, just as it was for the 2010 UWMP.

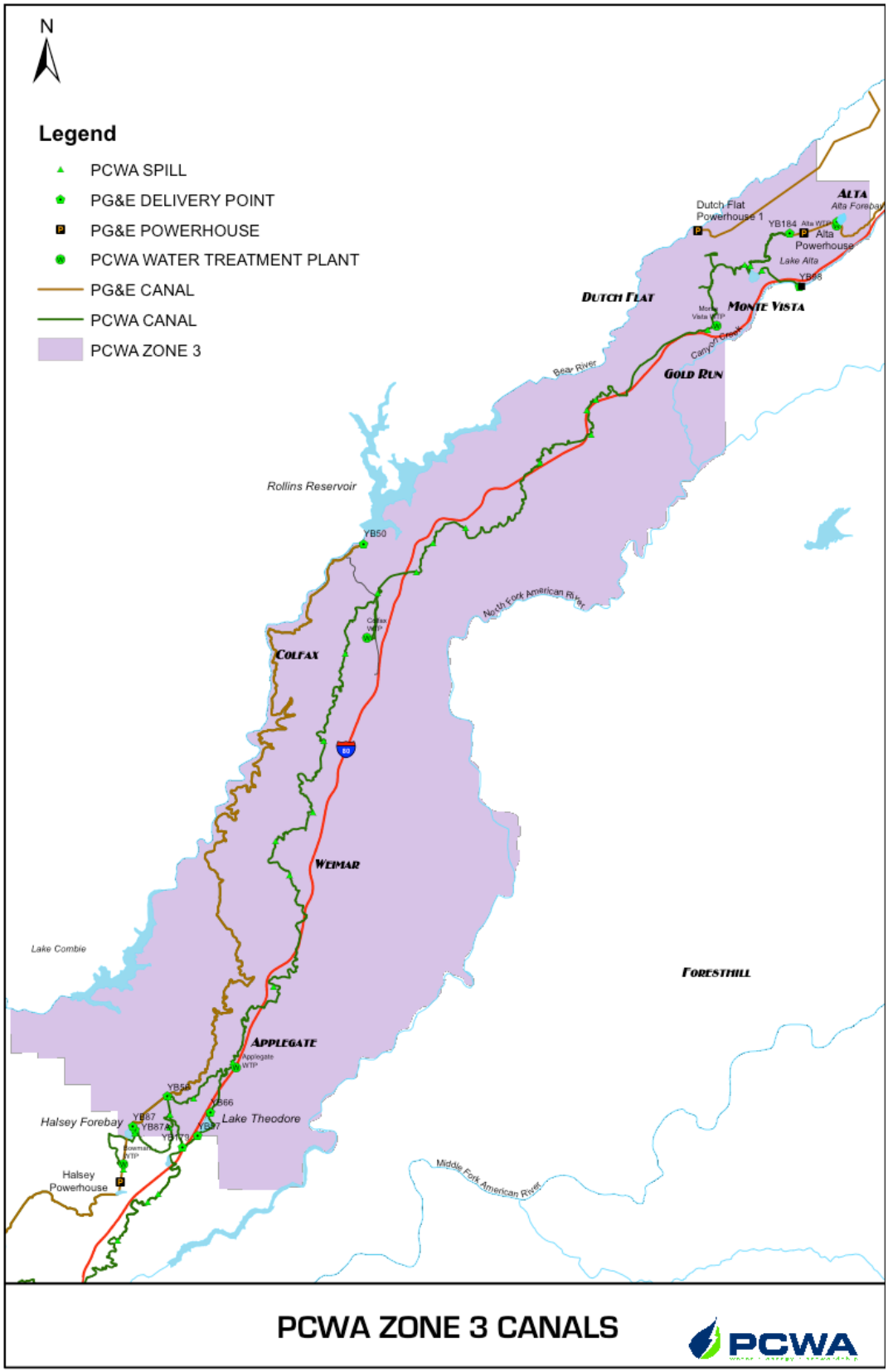
2.1.5.3 Zone 3

Zone 3 includes the communities of Applegate, Weimar, Meadow Vista, Colfax, Gold Run, Monte Vista, Dutch Flat, and Alta and in surrounding areas. Water purchased from PG&E under a 1982 contract enters PCWA's Boardman Canal from the Drum-Spaulding system. The Boardman Canal begins near Alta and runs along I-80 to Zone 1. The Boardman Canal serves as the main delivery method for water to users and treatment plants in Zone 3. PCWA's Zone 3 treatment plants include Alta (0.31 MGD), Monte Vista (0.142MGD), Colfax (1.24 MGD), and Applegate (0.12 MGD). There are about 27 miles of treated water piping and 2.16 MG of treated storage in Zone 3. A graphical depiction of Zone 3 canals and supply infrastructure can be found in **Figure 2-5.**

2.1.5.4 Zone 5

Zone 5 was established in 2000 to provide irrigation water in a previously un-served area of Placer County generally west of the City of Lincoln. This zone is limited to commercial agriculture customers. The water supply in Zone 5 is delivered through Zone 1 infrastructure and derived from multiple water sources including PG&E Drum-Spaulding and Middle Fork Project. PCWA currently serves water to 5,400 acres in Zone 5. Zone 5 receives no treated water service and is considered part of Zone 1 for the purposes of this UWMP.

Figure 2-5 – Zone 3 Canal System



2.1.5.5 Other Agencies

As discussed previously, PCWA provides untreated water to three water purveyors who treat and serve the water to their own customers including: San Juan Water District, Sacramento Suburban Water District and the City of Roseville.

2.1.5.6 Western Area

Because of the geographic overlap and the integration of supplies, and for ease of presenting demand information, the PCWA customers, both wholesale and retail, within Zone 1, Zone 5, and as otherwise within the boundaries of San Juan Water District, Sacramento Suburban Water District and the City of Roseville are collectively grouped under the term "Western Area Water Demands."

2.2 Water Delivery System

PCWA has potable and non-potable water systems allowing it to provide deliveries throughout its service area. These different types of delivery systems allow a variety of classes of water users to be served different types of water to meet their needs.

2.2.1 Potable Water Delivery System

PCWA has an expansive and complex potable water system with 8 treatment plants and over 30 storage tanks. As discussed above in **Section 2.1.5**, PCWA's service areas are broken into a variety of zones. Zone 1, Zone 2, and Zone 3 all include potable water delivery systems as discussed above. **Figures 2-1, 2-2, and 2-3** provide illustrations of each zone's water service and delivery areas.

2.2.2 Non-Potable Water Delivery System

Historically PCWA's groundwater pumping was limited to Zone 2, however pumping for Bianchi Estates ceased in 2004. PCWA has invested in two backup and emergency wells called the Sunset Well and Tinker Wells. As described in **Chapter 3**, these two wells have a capacity to pump approximately 1,000 acre-feet per year as needed for various uses. These supplies could be made available to meet non-potable water demands.

Untreated water is conveyed to San Juan Water District, Sacramento Suburban Water District and the City of Roseville through various diversion facilities in the American River. These entities then treat and serve the water to their own customers through systems wholly owned and operated by these purveyors.

Presently PCWA does not utilize any recycled water systems. The development of any such supplies in the future is anticipated to only be available in Zone 1 and Zone 5. These supplies are further described in **Chapter 3**.

2.3 Retail Service Area Expansion

PCWA is authorized to provide water to all of Placer County. Expansion of PCWA's service area is not required for new development considered in this UWMP. However, PCWA does implement zones for handling of financial matters such as rates and special assessments. Some portions of new developments considered in this 2015 UWMP may require annexation into a zone, which is a process not subject to LAFCO.

The City of Lincoln growth since 2000 required no expansion of PCWA service as Lincoln buys the water wholesale and owns the retail distribution system that exists in the existing Zone 1 area. Other development has required PCWA to expand service but all of that occurs within its existing service area.

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CHAPTER 3. WATER SUPPLY CHARACTERISTICS

This chapter describes Placer County Water Agency's existing and planned water supplies, analyzes the reliability of these supplies, and identifies the extent of any water shortages. PCWA uses surface water as its primary supply. PCWA delivers this supply to both its wholesale and retail customers. PCWA plans to produce groundwater in dry hydrologic conditions to meet demands in the Zone 1 service area. And PCWA may also use recycled water – produced by the cities of Roseville and Lincoln – to meet some demands in the future. The surface water, groundwater and recycled water supplies comprise PCWA's water supply portfolio.

3.1 Existing Surface Water Supplies

PCWA's surface water supplies consist of water from the North Fork American River and its tributaries (including water stored in its Middle Fork Project (MFP)) under water right Permits 13856 and 13858, Central Valley Project water under Interim CVP Contract 14-06-200-5082A-IR3 from the American River, and water purchased from Pacific Gas & Electric Company (PG&E) from the Yuba and Bear Rivers under the 1982 Zone 3 Contract Purchase Agreement and the February 27, 2015 Water Supply Agreement. PCWA also uses a limited amount of surface water from small creeks under pre-1914 water rights. Lastly, PCWA has occasionally purchased water from the South Sutter Water District for service to PCWA Zone 5 customers under Nevada Irrigation District's (NID) water rights.

A summary of PCWA's existing surface water supplies are provided in **Table 3-1** based upon the existing water rights currently held and the contracts to which PCWA is a party. The table identifies the source, maximum available quantity, purpose of use, and place of use for each water asset. Note that to the extent a supply may be used in more than one zone, the total use cannot exceed the maximum quantity available under the water right or contract, and that the use of a given quantity of a supply in one zone precludes the use of the same water in another zone.

3.1.1 Pacific Gas & Electric Contracts

PCWA has two water supply contracts with PG&E that provide opportunity to purchase up to 125,400 af/yr for irrigation and domestic purposes. PCWA typically purchases approximately 110,400 af/yr, with 100,400 af/yr under one agreement and 10,000 af/yr under another (see explanation below). The underlying rights for the PG&E supply are PG&E's pre-1914 appropriative rights to water in the Yuba and Bear Rivers, which were established prior to the time that PG&E developed hydroelectric facilities throughout the Yuba and Bear River watersheds.

Table 3-1 – Water Rights and Contract Entitlements

Supply	Source	Purpose of Use	Max Use af/yr	Place of Use Description	Place of Use		
					Zone 1	Zone 3	Zone 5
Permits 13856-13858	American River	Irrigation, Domestic, Municipal and Industrial, Recreation	120,000	"Western Placer County"; Portions of Sacramento County, including San Juan Water District, Sacramento Suburban Water District, and Rio Linda WD service areas	√		√
Central Valley Project Contract	American River	Municipal and Industrial	35,000	Zone 1	√		
PG&E Water Supply Agreement (2015)	Yuba and Bear Rivers	Irrigation and Domestic	100,400	Western Water System	√		√
PG&E (Zone 3) Purchase Agreement (1982)	Yuba and Bear Rivers	Irrigation and Domestic	25,000	Zone 3		√	
South Sutter WD Contract	Yuba River	Irrigation	12,000	Zone 5			√
Pre-1914 Appropriative Right (S000959)	Canyon Creek	Irrigation and Domestic	40 cfs (Max.)	Alta, Colfax, Monte Vista and rural areas (Not limited to Zone 3)	√	√	√
Pre-1914 Appropriative Right (S000967)	Tributary To Auburn Ravine	Irrigation and Stock watering	Not Stated	"Boardman Canal" Area	√	√	Maybe
Pre-1914 Appropriative Right (S010397)	South Fork Dry Creek Tributary to Coon Creek	Irrigation	Not Stated	Localized Irrigation Just East of Auburn	√	√	Maybe
Pre-1914 Appropriative Right (S010398)	North Fork Dry Creek Tributary to Coon Creek	Irrigation	Not Stated	Localized Irrigation Just East of Auburn	√	√	Maybe

The water supply that PCWA purchases from PG&E is used to meet both treated and raw water demands within PCWA's Western Water System. In 1968, PCWA purchased PG&E's lower Placer Water System, including its distribution canals and treated water systems as well as rights to delivery of 100,400 af/yr of water from PG&E's Drum-Spaulding Project to serve PCWA customers in the Western Water System area. This supply generally serves PCWA customers in Western Placer County.[10]

The Drum-Spaulding Project consists of 29 reservoirs, 6 major water conduits, 12 powerhouses as well as other infrastructure water, power, and recreation related facilities. In 2014, the Drum-Spaulding Project was divided into three distinct projects for purposes of Federal Energy Regulatory Commission (FERC): Upper Drum-Spaulding, Lower Drum, and

[10] The demarcation for Western Placer County is the service area line separating PCWA's Zone 3 from Zone 1 customers. For further information about this agreement please contact PCWA.

Deer Creek hydroelectric projects.[11] Although the systems are currently operating on annual FERC license renewals, when the final FERC licenses are issued they will have a term between 30 and 50 years.

PCWA and PG&E entered a new Water Supply Agreement on February 29, 2015. In Article II of the Agreement, PG&E will continue to deliver 100,400 acre-feet of water to PCWA from the Drum-Spaulding Project. PCWA will purchase this water during a water contract year from (Oct 1 to Sept 30 of the following year). PCWA is also entitled to purchase additional water if made available by PG&E.

The 2015 Water Supply Agreement terminates upon "the expiration date of the New FERC License…."[12]

In 1982, PCWA purchased the remainder of PG&E's Upper Placer Water System.[13] In the PG&E and PCWA Purchase Agreement, PG&E agreed to deliver as much as 25,000 acre-feet per year from PG&E's Drum Spaulding Project as part of the Upper Placer Water System conveyance.[14] PCWA typically acquires 10,000 acre-feet during average years. PCWA purchases water from PG&E at various buy points, and raw water is placed into PCWA's Boardman Canal, which begins near Alta and extends southwest along the Interstate 80 corridor to near Lake Theodore. From the Boardman Canal, PCWA delivers water to its four water treatment plant facilities located within Zone 3, other community water districts, and its raw water customers.

The Agreement has no termination date but does limit availability of water under certain conditions and maintenance needs. For instance, in Article 9, PG&E agrees – among other things – to use "due diligence in delivering water… but shall not be liable for curtailments of delivery caused by…actions or decisions by any governmental agency, officer or court, or other conditions beyond PG&E's reasonable control." Accordingly, PG&E will deliver water as it is available but has limited obligations under certain conditions.

The Upper Drum-Spaulding, Lower Drum, and Deer Creek hydroelectric projects are FERC licensed facilities and are thereby subject to the terms and conditions of the three FERC Licenses affecting their operations. In concert with the terms of these licenses, PG&E provides wholesale water to PCWA for consumptive uses in PCWA's service area. While federal law allows for FERC to adopt permit conditions that mandate minimum flows, reservoir levels or set temperature limitations related to operation of a hydroelectric facility, these provisions should not affect the appropriation and distribution of water for consumptive

[11] NID's Yuba-Bear hydroelectric project is also incorporated into the Final FERC EIS.
[12] 2015 Water Supply Agreement, Article I, paragraph 1.2
[13] Purchase Agreement between Pacific Gas and Electric Company and Placer County Water Agency dated November 17, 1982 (hereafter "PG&E and PCWA Purchase Agreement").
[14] PG&E and PCWA Purchase Agreement at Exhibit A.

purposes at this time.[15] Future conditions in the FERC License renewal process could impact deliveries for consumptive purposes.

PG&E's pre-1914 water rights and supplies delivered through its system under these water rights are highly reliable during normal, single-dry and multiple-dry year periods. Between 1987 and 1992, when the State of California generally experienced a drought, PCWA had a full Yuba/Bear river supply each year. In the 2015 water year, one of the driest years in California's history, PG&E delivered 76,119 acre-feet of water to PCWA – 68.9 percent of the 110,400 acre-feet that PCWA anticipates each year. This reduction represents significant supply reliability as compared to other sources of water in California in 2015 where supplies were reduced to a much greater extent (even zero in some instances).

Nevertheless, for conservative planning purposes, PCWA anticipates that it will experience a 50 percent reduction in its PG&E supply in single dry years and a 25 percent reduction in multiple dry years. PCWA has developed a raw water allocation strategy in the Western Placer System for dry-year shortage conditions. The dry-year shortage strategy also relies on the fact that commercial agricultural customers can more easily switch their source of supply in a dry year to groundwater. **Tables 3-3** through **Table 3-5** below show the reliability of the PG&E supplies under normal, single dry, and multiple dry conditions.

3.1.2 Permits 13856 and 13858

PCWA's North Fork American River water rights include direct diversion rights from the North Fork American River, Folsom Dam, and other locations within PCWA's Middle Fork American River Project (MFP) and storage rights in MFP reservoirs and subsequent rediverison rights of the stored water for irrigation, domestic, municipal, industrial, and recreational purposes. PCWA may divert water directly from the North Fork American River and Folsom Dam from November through June. The remainder of the year PCWA must redivert water released from its MFP reservoirs.

In 2014 and 2015, two of the driest years on record, PCWA's water rights were additionally curtailed from direct diversion or diversion to storage. The curtailments were from May 27 to November 19 in 2014 and from May 1 to November 6 in 2015, reducing the permitted diversion to storage season by 54 days in 2014 and 67 days in 2015.

The two water right permits provide water supplies to PCWA's treated and irrigation water customers from the American River Pump Station (ARPS) and to PCWA's wholesale customers from Folsom Dam. PCWA may use water under its permitted water rights in western Placer County, as well as portions of northern Sacramento County, including San Juan Water District, Sacramento Suburban Water District, and Rio Linda/Elverta Community

[15] 16 U.S.C. § 821.

Water District service areas. PCWA's wholesale customers include the City of Roseville, San Juan Water District, and the Sacramento Suburban Water District.

PCWA has signed an interim agreement with the United States Bureau of Reclamation (Reclamation) limiting its diversions under PCWA's permitted rights to 120,000 af/yr off the North Fork American River for use within the existing PCWA place of use.[16]

Extension of Time: California's SWRCB-governed water rights system consists of a three stage water right staged process – application, permit and then licensing of the water put to beneficial use at the end of the permit term. PCWA's water rights are in the permit stage, meaning that PCWA has not yet put the water supplies under its permit to full beneficial use. The water rights system allows for an extension of time to the permit term.

PCWA's North Fork American River Water Right Permit Nos. 13856 and 13858 state that the complete application of the water to the proposed use was to be made on or before December 1, 2007. PCWA did not fully utilize the water supply entitlements described in Water Right Permits 13856 and 13858 prior to the specified date. PCWA timely filed petitions for a 36-year extension of time in which to put water allocated under these permits to full beneficial use. The petitions were accepted by the State Water Board in January 2008 and are undergoing formal administrative review. To support State Water Board's decision on the petitions for extension of time, PCWA is preparing an Environmental Impact Report (EIR) to assess potential environmental impacts of diverting the full 120,000 af/yr[17] under interim Reclamation agreement as compared to the baseline diversion quantity it put to beneficial use prior to December 1, 2007 (41,991 af/yr). Although, PCWA anticipates approval of its petition by the State Water Board, the ultimate outcome of the process is yet to be determined.

ARPS Capacity: The recently completed (2008) American River Pump Station (ARPS) on the North Fork American River was designed to be expanded from its existing capacity of 100 cfs to 200 cfs to accommodate future demand, if needed. PCWA has used the ARPS (and its predecessor pumping stations) to meet agriculture and treated water demands within its Zone 1 and Zone 5 service areas. In 2015, PCWA diverted 24,000 af of water from the ARPS. The ARPS EIR analyzed diversion of 35,500 af/yr of North Fork American River water right water. Future diversion amounts of greater than 35,500 af/yr, if needed, would require additional environmental review. However, the EIR anticipated that PCWA may need to divert up to a total of 70,500 af/yr at ARPS to meet future demand. PCWA

[16] Permits 13856 and 13858 can be reviewed at https://ciwqs.waterboards.ca.gov/ciwqs/ewrims/EWServlet?Redirect_Page=EWWaterRightPublicSearch.jsp&Purpose=getEWAppSearchPage

[17] PCWA's diversions from the American River under its water rights permits are limited by agreement with the US Bureau of Reclamation; the actual total volume of PCWA's water rights permits is greater than 300,000 af/yr.

anticipates it will need to expand the use of the ARPS in the future to meet demands in Zone 1.

Water Forum Agreement: PCWA approved the Memorandum of Understanding for the Water Forum Agreement (WFA) in the year 2000. The WFA has two stated objectives: (1) to provide a reliable and safe water supply for the region's economic health and planned development to the year 2030, and (2) to preserve the fish, wildlife, recreational and aesthetic values of the lower American River.

Subject to certain conditions, terms in the WFA require PCWA to release up to 47,000 acre-feet of additional water in drier years through reoperation of MFP reservoirs (27,000 acre-feet for PCWA and 20,000 acre-feet for the City of Roseville) to replace water diverted above the WFA 1995 baseline volumes.[18] When projected March through November Unimpaired Inflow to Folsom Reservoir (UIFR) is between 950,000 acre-feet and 400,000 ac-feet, the amount of these additional water releases is linearly interpolated between 0 acre-feet and 47,000 acre-feet. When projected March through November UIFR is less than 400,000 acre-feet, it is considered a "conference year" where Water Forum participants meet to determine how best to manage the available water, recognizing that there may not be sufficient water to meet both deliveries and environmental release requirements specified in the agreement.

In the WFA, PCWA would make the releases contingent upon the following conditions:

- Its ability to transfer the released water for use below the Lower American River on terms acceptable to PCWA; and
- PCWA's determination that it has sufficient water in its reservoirs to make the additional releases in dry years without jeopardizing the supply for PCWA's customers.

The water that PCWA releases pursuant to the WFA is PCWA water rights water intended to be transferred to another party downstream of the lower American River and is not relinquished or abandoned water.

The North Fork American River water supplies are highly reliable in normal years. In some extreme years, climatic variability has affected the water supplies as well as the ability to store these water supplies in the Middle Fork Project reservoirs. Modeling indicates that at the end of a multi-year period a reduction of approximately 33 percent could occur. **Tables 3-3** through **Table 3-5** below indicate the supply reliability of these water assets under normal, single dry and multiple dry years.

[18] PCWA's baseline volume is 8,500 af/yr. The City of Roseville's baseline volume is 19,800 af/yr.

3.1.3 Central Valley Project Contract

PCWA has a Central Valley Project (CVP) water contract with the United States Bureau of Reclamation (Reclamation) for delivery of up to 35,000 af/yr for Municipal and Industrial purposes, including groundwater recharge programs that are consistent with applicable State law.[19] The term of the CVP contract, Amendatory Contract 14-060200-5082A, was through 2011, but included a long-term renewal provision. The contract has been extended through two-year interim renewal contracts since 2011 until a long-term renewal contract can be implemented by Reclamation. The long-term renewal is pending resolution of issues regarding environmental documentation associated with the CVP. The current interim contract is good through February 28, 2018.

PCWA's point of diversion for CVP water under the August 27, 2002 amendment is Folsom Dam, but the contract also includes potential for other diversions, including the Sacramento River, if the points of diversion are agreed to by the Contracting Officer. PCWA does not currently own or control facilities that are capable of conveying CVP water from Folsom Dam to the PCWA service area. As such, the availability of the water supply is currently affected by physical limitation. PCWA is engaged in negotiations with the City of Roseville and other regional entities to potentially utilize existing facilities to divert and deliver PCWA's CVP project water supplies.

The CVP contract identifies only a portion of PCWA's Zone 1 service area as the area available for water deliveries from CVP Project supplies. Some portions of PCWA's Zone 1 service area, including portions in Sacramento County, are not identified as delivery areas in the CVP contract map. The contract, however, specifies a procedure for administratively modifying the service area with Reclamation approval.

Article 3(b) of the CVP contract indicates that of the 35,000 af/yr identified in the contract, the amount of water that would likely be delivered in normal years is 32,000 acre-feet.[20] Reclamation reserves the right to apportion the available CVP water supply among PCWA and other CVP water contractors under Reclamation's Municipal and Industrial Water Shortage Policy (M&I WSP). The M&I WSP generally defines water service terms and conditions under drought conditions. The M&I WSP is valid through 2030. Generally, reductions in M&I deliveries should not exceed 25 percent, unless conditions are severe. In 2015, M&I WSP allocations on the American River watershed were 25 percent of the historical use – meaning 25 percent of the last three normal years' average use adjusted for identified variables. At present, PCWA has used only a very small amount of CVP water. In the future, PCWA will need to demonstrate a record of use of CVP water in normal years to have access to water in drought years.

[19] Contract No. 14-06-200-5082A-IR3 dated March 1, 2016.
[20] Contract No. 14-06-200-5082A-IR2

Several issues related to CVP water, including diversion facilities, the service area identified in the CVP contract, and M&I WSP drought year allocations will need to be addressed if the CVP contract water is to be utilized in PCWA's service area effectively.[21]

3.1.4 Pre-1914 Appropriative Rights

PCWA holds four pre-1914 appropriative water rights for diversion of water from various small creeks and their tributaries in western Placer County. PCWA has filed Statements of Diversion and Use (SOD) with the SWRCB for each water right: S000959, S000967, S010397 and S010398.[22] These rights are generally for agricultural purposes, including irrigation and stockwatering. In 2014, a relatively dry year, the combined diversion from pre-1914 water rights was 2,687 acre-feet.

3.1.5 South Sutter Water District

Historically PCWA has been party to a surplus water supply contract with South Sutter Water District (SSWD). Surplus SSWD water (purchased from Nevada Irrigation District [NID] in excess of its needs) was made available for irrigation purposes in PCWA Zone 5. PCWA is not currently receiving water from SSWD and does not anticipate receiving water during the time horizon of this UWMP.

3.2 Groundwater Supplies

PCWA has historically produced a limited quantity of groundwater. Historical pumping by PCWA in western Placer County was limited to pumping for Bianchi Estates (Zone 2) and for the Sunset Industrial area. Pumping for Bianchi estates ceased in 2004, with PCWA serving the area with surface water ever since. PCWA maintains the Sunset Industrial area wells, though these wells are in place for dry year supplies.

Pumping in western Placer County occurs from the North American subbasin of the Sacramento Valley groundwater basin (DWR Sub-basin 5-21.64). While PCWA does not currently produce groundwater from the subbasin, its water supply plans, as discussed later in this section, project the use of groundwater in dry hydrologic conditions if surface water supplies are limited.

3.2.1 Western Placer County GMP

On September 6, 2007, the Placer County Water Agency adopted the Western Placer County Groundwater Management Plan (WPCGMP).[23] The WPCGMP is designed to assist the City of Roseville, the City of Lincoln, PCWA, and the California American Water Company (Cal-

[21] In 2014 and 2015, the extreme drought was accompanied by state mandated demand restrictions.
[22] The latest SODUs on file with the SWRCB are for water year 2014.
[23] A copy of the Western Placer County Groundwater Management Plan is available on PCWA's website.

Am) in an effort to maintain a safe, sustainable and high-quality groundwater resource within a zone of the North American River Groundwater Sub-basin.[24] The objective of the WPCGMP is to maintain groundwater resources to meet backup, emergency, and peak demands without adversely affecting other groundwater uses within the WPCGMP area. Moreover, the purpose of the WPCGMP is to provide a framework to coordinate groundwater management activities through a set of basin management objectives and specific implementation actions.[25] The "WPCGMP Area," which is located in southwestern Placer County, is shown in **Figure 3-1**.[26]

3.2.2 PCWA Groundwater Use

PCWA does not anticipate utilizing groundwater to support its normal year water deliveries. Specifically, PCWA has two wells – the Sunset Well and the Tinker Well – each with a production capacity of 1,000 acre-feet per year. These wells are to be used for backup and dry-year supplies and therefore are accounted for as a single dry-year supply only, and not included in the water supply under average or multiple dry years.

3.3 Desalination

There are currently no plans to develop desalinated supplies within the PCWA service area.

3.4 Recycled Water Supplies

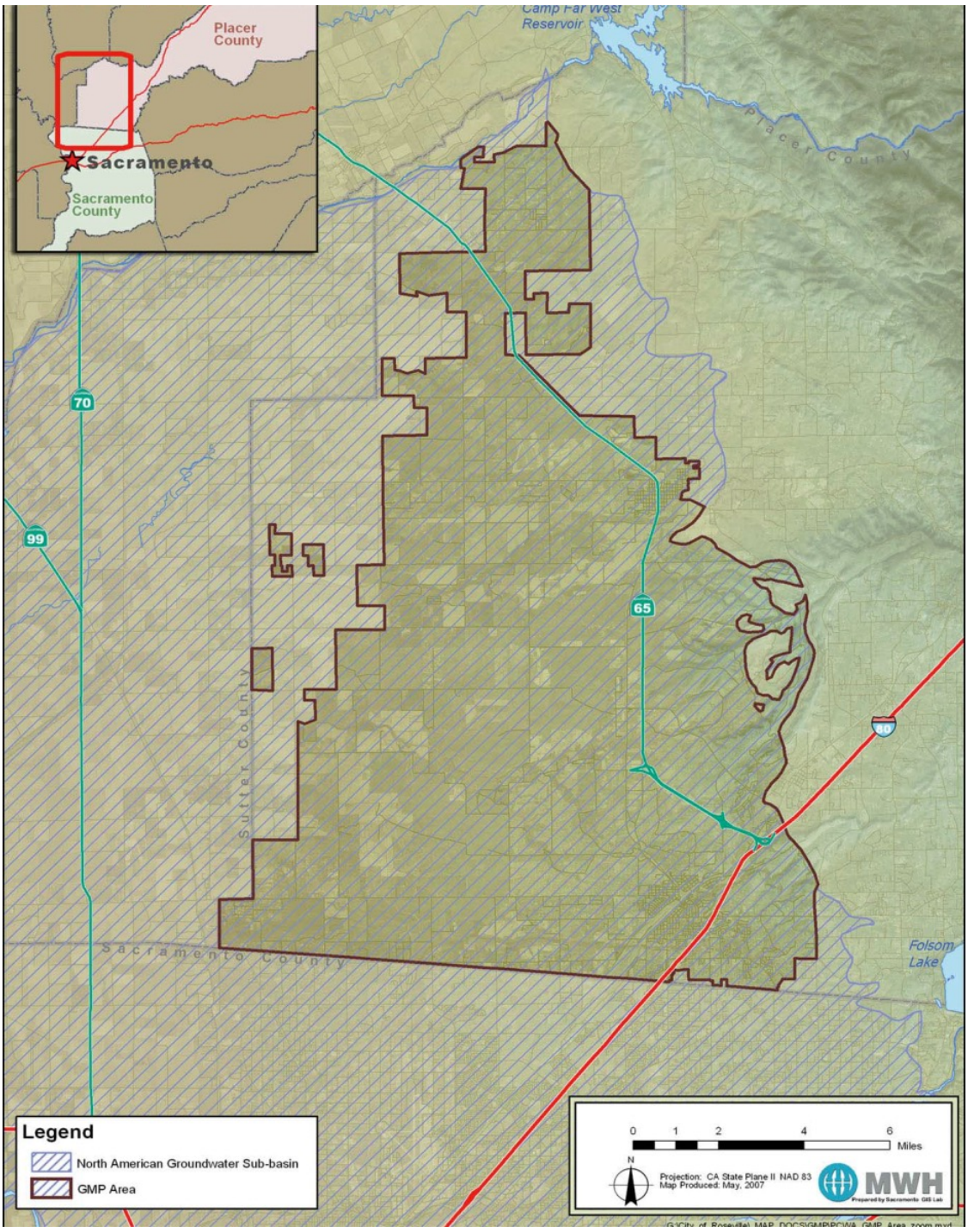
This subsection presents the recycled water supplies that PCWA anticipates will be developed and potentially available as a supply in its retail service area (see **Table 3-2**). However, these supplies would be provided through agreements with the City of Lincoln and the City of Roseville as potential users of recycled water produced at each cities respective wastewater treatment facility. PCWA anticipates the quantities shown in the table to be made available to meet part of the broad array of PCWA customer demands presented in Chapter 4, which include retail and wholesale customers adjacent to each City. The details of recycled water supply plans are being developed as part of on-going regional discussions.

Table 3-2 – Recycled Water Supplies

(values in af/yr)	Current	2020	2025	2030	2035	2040	BO
Potential Regional Recycled Water Supply	0	0	2,500	5,000	7,000	8,000	9,000

[24] WPCGMP, p. ES-1.
[25] WPCGMP, p. 1-3.
[26] Figure 3-1 appears as Figure 1-1 in the WPCGMP.

Figure 3-1 – Western Placer County GMP Planning Area



Tully & Young
Comprehensive Water Planning

Image Sources:
Western Placer County Urban Water Management Plan

3.5 Transfer and Exchange Opportunities

PCWA holds water rights and is party to contracts entitling it to water supplies that are adequate to meet its current and future projected needs. PCWA has historically transferred water outside of its service area in Placer and Sacramento Counties.

PCWA has transferred water pursuant to its commitments under the WFA as well as water made available through reservoir reoperations. PCWA's water transfers have made water available to areas in water deficit and have benefitted the lower American River.

PCWA may engage in future water transfers of its water to benefit areas with water supply deficits and to meet its commitments under the WFA. These transfer opportunities may include reservoir reoperation transfers, groundwater substitution transfers, conservation-based transfers, or any other transfer or exchange opportunity allowed by law.

3.6 Current and Projected Water Supplies

In normal years, PCWA anticipates its Zone 1 PG&E contract will provide a supply of 100,400 af/yr and its North Fork American River water rights will yield 120,000 af/yr. In addition, PCWA anticipates an additional 10,000 af/yr of water to be made available in Zone 3 through the 1982 PG&E contract. Beginning in the year 2025, PCWA anticipates its Central Valley Project contract will yield at least 32,000 af/yr. Also, PCWA's pre-1914 appropriative rights are available for deliveries in portions of Zone 3 and in Zone 1[27] and the estimated yield is 3,400 af/yr. PCWA anticipates that the SSWD supply will not be available in the future. Based on the recycled water analysis in **Section 3.4**, recycled water is projected to be available in the PCWA retail service area starting in 2025. These recycled water supplies would be derived from the City of Lincoln and City of Roseville to meet PCWA service area demands. **Table 3-3** summarizes PCWA's projected water supplies through 2045 or build-out.

3.7 Supply Reliability

This section presents the projected supplies available during normal, single and multiple dry year periods. The factors affecting the reliability of PCWA's water supplies are discussed in **Sections 3.1** and **3.2**. The single dry year supply values for the western and central areas of Placer County (i.e., Zones 1, 3, and 5) approximate the supplies that were available during the single driest year period in PCWA's recent history (1977). The multiple dry-year supply values approximate supply reductions during the recent 1990 to 1992 multi-year dry period.

[27] Operationally, PCWA typically uses its Pre-1914 water rights supply in Zone 1. Yet, because the supply may also be used in Zone 3, to the extent it is used in Zone 3, then the quantity of water used in Zone 3 is unavailable for use in Zone 1.

Table 3-3 – Projected Average Year Water Supplies[28]

Supply Source (values in acre-feet/yr)	2020	2025	2030	2035	2040	2045
MFP	120,000	120,000	120,000	120,000	120,000	120,000
CVP Contract	0	32,000	32,000	32,000	32,000	32,000
PG&E Agreements	110,400	110,400	110,400	110,400	110,400	110,400
Pre 1914 Appropriations	3,400	3,400	3,400	3,400	3,400	3,400
Recycled Water	0	2,500	5,000	7,000	8,000	9,000
Groundwater	0	0	0	0	0	0
Total Supply	233,800	268,300	270,800	272,800	273,800	274,800

3.7.1 Average Year Supply Reliability

Under average conditions, PCWA estimates it has a baseline quantity of 110,400 af/yr of PG&E water for uses in its service area. PCWA's modeling over an 82-year hydrologic record indicates that 120,000 af/yr will be available from the North Fork American River supply in average years. Based on Reclamation estimates of availability as written in PCWA's CVP contract and CalSim II modeling conducted by PCWA, PCWA estimates that 32,000 af/yr of CVP water will be available in average years. PCWA's pre-1914 appropriative rights will provide approximately 3,400 af/yr during average years. PCWA does not anticipate receiving water from SSWD. As buildout of the City of Lincoln and the planning areas west of the City of Roseville occurs, recycled water should be available in both average and dry years. **Table 3-3** above depicts PCWA's average year supply reliability in accordance with the technical estimates described in this section.

3.7.2 Single Dry Year Supply Reliability

In the worst case scenario, if hydrologic conditions were similar to those experienced during the 1977 drought year, PCWA estimates for planning purposes that only 50 percent of its recent PG&E use quantities will be available. Importantly, this level of cutback has never been realized as even in the extreme droughts of 2014 and 2015, PG&E was able to deliver 68.9 percent of the anticipated supplies. The full North Fork American River water supply would remain available (120,000 ac-ft) due to the ability to store and deliver supplies under this water permit. PCWA's CVP supply would likely be reduced by 50 percent of full contract allocations based on the Bureau of Reclamation's current municipal and industrial shortage policy. In a single dry year, the pre-1914 appropriative right supply quantity is assumed for purposes of this analysis to be reduced by 75 percent, given that the creeks from which PCWA diverts are runoff dependent. **Table 3-4** represents these assumptions.

[28] Article 9 of the PG&E 1982 Agreement provides 25,000 acre-feet is available to PCWA. PCWA takes 10,000 acre-feet to meet its current needs in normal years.

Table 3-4 – Single Dry Year Supply Reliability

Supply Source (values in acre-feet/yr)	2020	2025	2030	2035	2040	2045
MFP	80,400	80,400	80,400	80,400	80,400	80,400
CVP Contract	16,000	16,000	16,000	16,000	16,000	16,000
PG&E Agreements	55,200	55,200	55,200	55,200	55,200	55,200
Pre 1914 Appropriations	850	850	850	850	850	850
Recycled Water	0	2,500	5,000	7,000	8,000	9,000
Groundwater	2,000	2,000	4,000	4,000	5,000	5,000
Total Supply	154,450	156,950	161,450	163,450	165,450	166,450

Any potential shortfall in supply that may occur in Zone 1 under build-out conditions in a dry year may be addressed through groundwater production. Groundwater may be produced by overlying users and/or appropriators to meet demands, consistent with the GMP discussed in **Section 3.2**. In addition to groundwater, PCWA has various demand management mechanisms at its disposal to address supply shortages.

3.7.3 Multiple Dry Year Supply Reliability

During multiple dry year periods, PCWA anticipates that its PG&E supplies will be reduced by 25 percent each year. North Fork American River supply in the MFP would not be reduced. CVP supplies are assumed to be reduced by 25 percent. Pre-1914 water supply is assumed for purposes of this analysis to be reduced by 50 percent. **Table 3-5** represents these assumptions.

3.7.4 Supplementing Water Supplies

PCWA is investigating the potential of developing, jointly with other agencies, a diversion on the Sacramento River. This would potentially allow a mechanism for PCWA to divert its CVP water supply (or a portion of its supply) for use in Zone 1. The diversion would also open the potential for PCWA to exchange a portion of its North Fork American River supply, such that it would be able to divert exchanged water from a Sacramento River diversion to PCWA Zone 1. It is anticipated, however, that if a diversion and related facilities on the Sacramento River are constructed, it would not occur prior to 2025.

Table 3-5 – Multiple Dry Year Supply Reliability

Supply Source (values in acre-feet/yr)	2020	2025	2030	2035	2040	2045
MFP	120,000	120,000	120,000	120,000	120,000	120,000
CVP Contract	24,000	24,000	24,000	24,000	24,000	24,000
PG&E Agreements	82,800	82,800	82,800	82,800	82,800	82,800
Pre 1914 Appropriations	1,700	1,700	1,700	1,700	1,700	1,700
Recycled Water	0	2,500	5,000	7,000	8,000	9,000
Groundwater	0	0	0	0	0	0
Total Supply	228,500	231,000	233,500	235,500	236,500	237,500

3.7.5 Wholesale Water Supply Projections

The normal year surface water supplies that are available to PCWA's wholesale customers throughout western Placer County (Zone 1 and 5) and central Placer County (Zone 3) are the same as those depicted in **Table 3-3** above. Moreover, the dry year supply availability under PCWA's rights and entitlements available to its wholesale customers is also the same for its wholesale customers as depicted in **Tables 3-4** and **3-5** above.

CHAPTER 4. WATER DEMAND CONDITIONS

Understanding water demand characteristics enables PCWA to reliably and cost-effectively manage its water supplies to meet customer needs. This section characterizes the PCWA's retail and wholesale customer demands 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 changeable conditions. As such, 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).[29]
- 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.
- Derivation of PCWA retail unit demand factors – This subsection presents the methodology and basis for various unit demand factors for unique land use classification that are used to derive future demand forecasts.
- Western Area demand summary – This subsection presents historic and forecast retail and wholesale demands within four subcategories (see discussion later) for the predominant service areas in Zone 1,[30] Zone 5 and the areas served by the City of Lincoln, San Juan Water District, Sacramento Suburban Water District, the City of Roseville, and several smaller wholesale customers.
- Zone 3 demand summary – This subsection describes the historic and future water demands for this foothill to intermountain zone of PCWA's service, including derivation of demand factors and future growth for retail and wholesale customers.
- Summary of current and forecast demands – This subsection presents the sum of forecast water demands for all PCWA service areas.

Because PCWA is both a retailer and wholesaler, serving both treated and raw water supplies to its customers in the Western Area and Zone 3, this UWMP classifies existing and forecast demands within four categories:

- "Retail treated" is water provided directly to PCWA's municipal and industrial customers and meets all requirements for potable water use,

[29] 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).*
[30] Zone 1 includes the previous Zone 2 as it was connected to the Zone 1 system in 2003.

- "Irrigation" is water provided directly to PCWA retail customers that has not undergone any treatment, and is generally used by commercial agriculture and by rural residential customers for outdoor water needs,
- "Wholesale treated" is potable water treated at PCWA-owned water treatment facilities and sold to other water suppliers who then deliver to customers (PCWA does not directly serve the end-user), and
- "Untreated" is untreated water sold under contract to other water purveyors for subsequent treatment and delivery to the contractor's urban customers.

As described under each zones' section below, the methodology for determining future demand varies due to (1) the unique characteristics of each zone and (2) the availability of pertinent data associated with existing demands and anticipated growth. Furthermore, as discussed in relation to wholesale treated water demand and untreated water demand, contracts with retail water suppliers drive the ultimate demand from PCWA's perspective. As such, PCWA's near-term demand assessments require integrating the calculated customer demands of each retailer that may vary in both scope and methodology.

4.1 Review and Refinement of GPCD Targets

As detailed in PCWA's 2010 UWMP, retail population, residential connections, and water production data were used to generate a gallon per capita day (GPCD) baseline of 298 gpcd. From this GPCD baseline, PCWA assessed and determined a *2020 Urban Water Use Target* and an *Interim 2015 Urban Water Use Target*. These values were determined to be 241 and 270, respectively, as presented in the 2010 UWMP.[31]

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.[32] For PCWA's 2010 UWMP, the 2010 Census data was not fully available, causing PCWA to use other methods to estimate populations for baseline GPCD analysis.[33] When the 2010 Census data was available, PCWA reevaluated population estimates and recalculated its GPCD targets. That information has been used internally by PCWA in the intervening years between this 2015 UWMP and the 2010 UWMP to track annual GPCD values and progress toward 2015 and 2020 targets.

[31] Placer County Water Agency 2010 UWMP, p. 4-38 (available at: http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Placer%20County%20Water%20Agency/Placer%20Co%20WA%20Final%202010%20UWMP%20-%20Main%20document.pdf)

[32] "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)

[33] PCWA's 2010 UWMP used 2000 U.S. Census data and only calculated populations through 2009 using connection data and occupancy rates.

For this 2015 UWMP, PCWA has officially recalculated its baseline GPCD and re-established its target and interim-target values with the available 2010 Census data.[34] The UWMP Guidebook added detail to the population analysis procedures and DWR created an online population analysis tool. For many agencies, the addition of the population analysis tool becomes the clear choice for derivation of population as it is a simple method that is much more efficient than hand analysis of census tracts. For PCWA, the expansion of GIS capabilities since the 2010 UWMP means that population is now tracked annually by PCWA.

PCWA actually began a recalculation of the population numbers to include the 2010 census data in late 2011 after the complete data was available. Additionally, PCWA improved the quality of the analysis completed for the 2010 UWMP by using GIS software to examine census tracts rather than relying on hand marking on maps.[35] This GIS effort analyzed both the 2000 and 2010 census results to improve accuracy of boundary analysis. The result of the analysis provided a new population value for 2010 and, based upon the prior connection data, new population estimates for the period 1995 through 2010. In addition to improvements in population analysis, discrepancies in the gross water use numbers were identified. New population values divided into the revised gross water values provided revised GPCD values for this period. **Table 4-1** provides a comparison of the population and GPCD estimates from the 2010 UMWP and as revised using 2010 Census data.

Notably, the population was recalculated lower than the original values presented in the 2010 UWMP and the demand was revised slightly higher. This resulted in higher annual GPCD values than previously determined.

Using the revised annual GPCDs, new values were calculated for the six 10-year time periods ending no earlier than December 31, 2004 and no later than December 31, 2009. The comparative results are shown in **Table 4-2**. ***As expected, the use of 2010 Census data and revised gross water use data did have a significant effect on the estimated baseline values, increasing the highest average baseline value from 298 gpcd to a new value of 322 gpcd***. Using the Method 4 target approach, discussed further below, the modified baseline GPCD generates a modified 2015 Interim GPCD Target and 2020 GPCD Target.

Pursuant to CWC 10608.20(g) PCWA may choose to select a different method for calculating its 2020 GPCD target. Upon review of the analysis in the 2010 UMWP that resulted in the choice of Method 4, and a reassessment of the Method 4 results using the updated baseline and population data, PCWA finds no reason to vary from the prior method choice. Thus, PCWA is officially using Method 4 to establish its 2020 GPCD target.

[34] According to CWC Section 10608.20(g), PCWA 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.
[35] Hand analysis was the only method in 2010 that PCWA could do to comply with the Appendix A Alternative Methodology for Service Area Population of the 2010 UWMP Guidebook. The GIS based effort was able to complete a more accurate analysis in a similar method without the human error transposing between maps.

However, to accurately reflect the use of the 2010 Census data, PCWA will modify its 2020 GPCD Target to be 261 gpcd and its 2015 Interim GPCD Target to be 292 gpcd.

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

	From 2010 UWMP			For 2015 UWMP		
Year	Gross Water Use	Population	GPCD	Revised Gross Water Use	Revised Population	Revised GPCD
1995	19,004	60,000	283	19,004	54,744	310
1996	19,758	61,800	285	19,760	56,504	312
1997	22,976	63,800	321	22,976	58,458	351
1998	19,780	65,500	270	19,792	59,544	297
1999	24,022	69,000	311	24,061	62,851	342
2000	26,023	73,650	315	23,497	67,321	312
2001	26,815	78,294	306	26,918	72,056	334
2002	28,018	83,632	299	28,471	76,923	330
2003	27,846	87,941	283	27,911	81,149	307
2004	30,931	91,116	303	30,957	84,273	328
2005	27,657	92,770	266	27,632	85,942	287
2006	27,968	95,442	262	27,976	88,676	282
2007	29,313	96,909	270	29,338	90,312	290
2008	31,336	97,444	287	31,371	90,977	308
2009	28,671	97,887	261	28,671	91,832	279

Table 4-2 – Comparison of baseline and target values

Baseline Period	Baseline Values	
	Original	Revised
1995-2004	298	322
1996-2005	296	320
1997-2006	294	317
1998-2007	288	311
1999-2008	290	312
2000-2009	285	306

4.2 Compliance with 2015 Interim Target

Pursuant to CWC Section 10608.40, PCWA is to report to DWR on its progress in meeting its urban water use targets as part of its 2015 UWMP. As part of the progress reports, PCWA should include its "compliance daily per capita water use" (Compliance Value), which is the gross water use during the final year of the reporting period, reported in gallons per capita

per day (gpcd).[36] Documentation of the Compliance Value must include the basis for determining the estimates, including references to supporting data. Furthermore, pursuant to CWC Section 10608.24(a), PCWA 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, PCWA is able to calculate its 2015 Compliance Value. **Table 4-3** presents the extended population calculation for 2011 through 2015, the associated gross water use in each year, and the resulting annual GPCD.[37] As demonstrated, PCWA's 2015 Compliance Value is 203 gpcd, which is significantly below the 2015 Interim GPCD value of 292.

Table 4-3 – Annual GPCD for 2010 through 2015

Year	Population	Gross Water Use (af/yr)	GPCD
2010	91,648	26,518	258
2011	92,230	25,472	247
2012	92,994	28,135	270
2013	93,777	30,397	289
2014	96,004	24,773	230
2015	98,128	22,366	203

Though the 2015 Compliance Value seems impressive, PCWA recognizes this does not represent the actual progress toward its 2020 GPCD Target conditions due to 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,[38] with a tool available from DWR to perform the calculation, the State mandated conservation likely had a greater downward effect on the 2015 Compliance Value.

Although adjustments for weather are allowed, they are not required.[39] Because PCWA's 2015 Compliance Value demonstrates that PCWA is in compliance with the statutes, it has elected to not adjust the 2015 Compliance Value for weather. However, it has chosen to adjust 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 PCWA to understand 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

[36] CWC § 10608.12(e).
[37] PCWA's gross water use value is calculated as the total water entering PCWA's treatment plants minus the sales to wholesale treated water customers.
[38] CWC Section 10608.24(d)(1)(A)
[39] CWC Section 10608.24(d)(2)

were no mandatory conservation measures, weather was not significantly different than average conditions (though 2013 was the beginning of the current drought cycled), and the region was recovering from the recent recession. The GPCD values for 2012 and 2013 were 270 and 289 gpcd respectively, already below the revised 2015 Interim Target GPCD value of 292 gpcd and moving toward the revised 2020 GPCD Target of 261 gpcd (see **Table 4-3**).

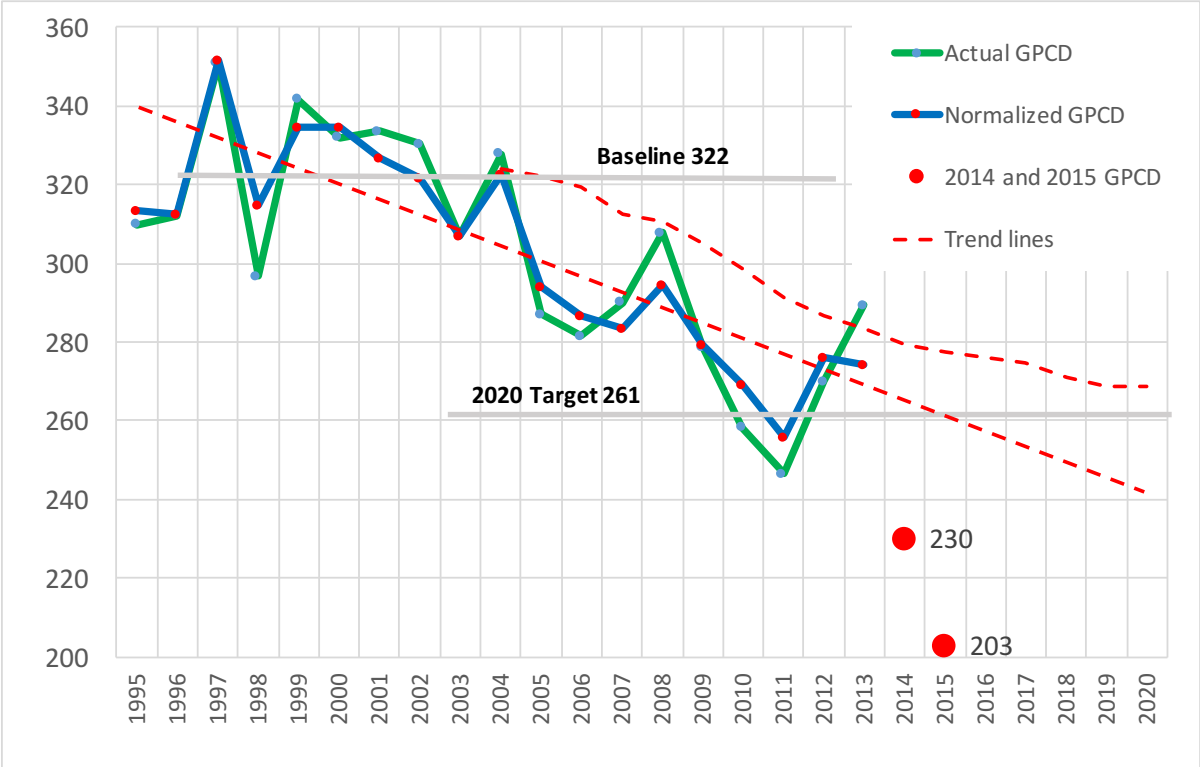
Another option is to adjust the 2015 GPCD value to remove the conservation achieved by PCWA during its efforts to comply with the State's mandate. The State had mandated PCWA meet a 32 percent conservation goal between June 2015 and February 2016. Through December 2015, PCWA successfully achieved a 31.5 percent cumulative savings (compared to 2013 conditions – which was the State's baseline).[40] There are multiple methods to normalize the 2015 water use for the months of June through December. Using a few simple multiplier approaches the actual gross water production in 2015 of 22,366 acre-feet could have increased to between 28,000 and 29,500, depending on the amount of "normalized" wholesale treated water deliveries that are also subtracted. But for illustrative purposes, using both of these values, the 2015 GPCD would adjust from 203 gpcd to between 255 and 268 gpcd. This normalized value is still well below the 2015 Interim GPCD Target, but either side of the 2020 GPCD 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, PCWA performed an analysis to determine allowable adjustments to each annual GPCD from 1995 through 2013. The results are displayed in **Figure 4-1**. The figure plots the actual GPCD value, the weather normalized value, the actual 2014 and 2015 GPCD values (as single points), and trend lines. Notably, because of many variables, even the normalized GPCD results in trends that indicate the likely success of meeting the 2020 GPCD Target, but just as likely to miss the target. The two depicted trend lines use (1) a linear trend extending the 1995 through 2013 normalized GPCD values through 2020, and (2) a 10-year running average for the same data set.

From the results of these three optional evaluations of trending, PCWA concludes that 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 conservation efforts would create unnecessary risk.

[40]Based on report from the SWRCB available at: http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/2016feb/suppliercompliance_020216.pdf

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



4.3 Derivation of PCWA Retail Unit Demand Factors

A fundamental function of the 2015 UWMP is forecasting the future water demands of existing and new customers. Key to this derivation are "unit demand factors" that define the expected water use by residential dwelling unit or by non-residential acreage or account.

For PCWA's wholesale customers, these factors are less important since the demands are driven by contract or by the retail purveyor's own determinations of forecast demands (likely using its own unit demand factors). However, for PCWA's retail treated water customers, the unit demand factors are necessary for reasoned demand forecasting, and, more importantly, customer meter data is available that can help PCWA understand unit demands as they may vary throughout their service area and among differing land-use classifications.

There are several factors that affect the development of unit water demand for future new customers, which in turn affect the forecasted water demand for these customers. These factors also influence the future unit demand factors for existing customers, but to a lesser extent as explained later. Primary drivers affecting the unit demand factors for new customers – especially residential – range from state mandates such as the Cal Green Code and MWELO, to changes in the types of housing products being offered. The derivation and

resulting demand factors for existing customers and for new customers are explained under the respective subsections later in this chapter.

The following provides a brief description of the drivers that are generally recognized to result in lower per unit demand factors for future residential and non-residential customers than PCWA currently recognizes for existing customers.

4.3.1 Water Conservation Objectives:

On November 10, 2009, Governor Arnold Schwarzenegger signed SBX7-7, 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.[41] As discussed previously, the PCWA has established a 2020 Target GPCD in response to this requirement and is tracking toward compliance with that target by 2020.

Achieving PCWA's 2020 conservation target will require the PCWA to continue its on-going conservation 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 PCWA's annual GPCD since the factors described below are designed to further reduce per capita water use.

4.3.2 Indoor Infrastructure Requirements

In January 2010, the California Building Standards Commission adopted the statewide mandatory Green Building Standards Code (hereafter the "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.[42] 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 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 heaters, or other fixtures as well as Energy Star and California Energy Commission-approved appliances.

[41] California Water Code § 10608.20

[42] "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.

4.3.3 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).[43] 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.[44]

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).[45] 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).

It is difficult to predict the ultimate impact of the MWELO requirements on future water demand. While the requirement is for development of a landscape design plan that uses plants and features that are estimated to use no more than 55 percent of ETo, some provision must be made for the inherent tendency to over-water even with irrigation controllers installed, piecemeal changes in landscape design, reductions in irrigation efficiency through product use, and limited resources for enforcement in the absence of dedicated irrigation meters.

4.3.4 California Urban Water Conservation Council BMPs

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

[43] Gov. Code §§ 65591-65599

[44] 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. For purposes of this 2015 UWMP, precipitation is not assumed to satisfy a portion of the outdoor landscape requirement because the determination of an appropriate effective precipitation factor is highly uncertain given the various landscape slopes, terrain composition, concurrent watering schedules, etc.

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

4.4 Western Area Water Demands

Although considered independent water service areas by PCWA, Zone 1 and Zone 5 are presented together in anticipation of future urban growth in Zone 1, which will displace some of the land uses currently in Zone 5 – a zone that currently only includes raw water demands for commercial agricultural and rural irrigation. The geographic service areas of San Juan Water District, Sacramento Suburban Water District, and the City of Roseville are also included, since these purveyors share in the use of Middle Fork water rights (see Chapter 3). As presented in **Chapter 2** (see **Figure 2-1**), Zone 1 is the largest zone in the PCWA service area and extends from the Placer County line south of the city of Roseville north to Lincoln and east to Auburn. Zone 5 is an agricultural area west of Zone 1 that stretches north nearly to Camp Far West Reservoir.

Currently, approximately thirty percent of the water demands in Zone 1 is treated water for urban uses, while the remaining two thirds is for raw water used for commercial agricultural and rural residential irrigation, or is sold to other agencies within the Western Area. Zone 5 is supplied through Zone 1 facilities and is completely untreated agricultural water.[46] Anticipated urban development westward from Zone 1 into Zone 5 could potentially affect both the ratio of service type in Zone 1 as well as add a treated water demand into Zone 5.

The discussion that follows has been subdivided into the following sections to facilitate the presentation of data and methods used to derive the future demand projections for these service areas:

- Historical water demands – this includes information on demands and trends from the historical records.
- Retail treated water demands – this includes information on current and future land-uses and service connections, current and future unit demand factors, and projected future demands.
- Other Retail Canal Deliveries – this includes information on customer type as well as current and future demands for many of the rural customers that receive raw water delivered through PCWA's network of canals and ditches.
- Wholesale treated water demands – this includes information on the contractual obligations to water purveyors as well as current and future demands.
- Wholesale raw water demands – this includes information on the contractual obligations to San Juan Water District, Sacramento Suburban Water District and the City of Roseville, as well as current and future demands.

[46] Based on approximation from 2013 Water Sales Report

4.4.1 Historical Demands in the Western Area

Based on available records for water production, water sales and deliveries, **Table 4-4** reflects the magnitude and trends in the four types of water demands present in the Western Area of PCWA's service area.[47] Records for demands in Zone 5 only exist back to the year 2000 when Zone 5 was created to supply raw surface water to agriculture and rural areas of western Placer County.

Table 4-4 – Western Area Overall Historic Water Demands

Customer Classification	2011	2012	2013	2014	2015
Zone 1					
Retail treated	24,784	27,345	29,628	24,096	20,240
Retail untreated	50,596	55,421	60,612	43,622	44,820
Wholesale treated sales	7,914	8,712	11,115	9,389	7,921
Zone 5					
Commercial Agriculture	1,210	12,031	12,433	95	10,137
Zone 1/5 Subtotal	84,504	103,509	113,788	77,202	83,118
Wholesale untreated sales	24,591	12,133	20,327	21,089	18,638
Western Area Total	**109,095**	**115,642**	**134,115**	**98,291**	**101,756**

4.4.2 Retail Treated Water Demand in Zone 1

Retail treated water demands are a significant component of PCWA's long-term planning. Although representing less than one quarter of PCWA's current demands in the Western Area, this demand category will see the greatest percentage increase over the next several decades as a result of anticipated growth of urban areas within Placer County. Because of this anticipated increase in total water demand, understanding the characteristics of current demands and the anticipated characteristics of future demands requires detailed analysis. The primary characteristics that define retail treated demand are (1) the urban land uses and associated water service connections, and (2) the unit demand factors associated with each class of land use. **Chapter 2** presented the anticipated growth in the urban land use classifications within each of the PCWA retail service subareas in Zone 1, along with a brief description of Zone 3 land use projections.

As the largest retail service zone in PCWA's system, the importance of accuracy of retail treated analysis in Zone 1 is important. The calculated values in Zone 1 treated retail have

[47] The Western Area includes retail treated, irrigation and wholesale treated deliveries in Zone 1, irrigation deliveries in Zone 5, and untreated water sales to other agencies within or adjacent to Zone 1 and Zone 5.

the most impact on usage numbers as changes in values of other service areas result in only slight variances. Zone 1 retail treated water demands account for over 96 percent of the retail treated demands in the entire PCWA service area.[48]

4.4.2.1 Existing Retail Treated Water Customers

Table 2-5 presented the representative existing and build-out residential dwelling units and non-residential acres anticipated to occur within the PCWA Zone 1 subareas (see **Figure 2-2**).

These existing customers have certain characteristics in their existing water use, as represented by existing unit demand factors (see **Section 4.3**). Using account information and meter data, PCWA used its GIS tools to link the lot size designations with 2013 customer meter data, generating average demand factors for each lot-size for both the upper and lower portions of Zone 1. This information provides a baseline for estimating the future demands of existing customers. **Table 4-5** provides the baseline demand factors for each land use category using 2013 account and meter data. The land use categories are presented by residential lot size for upper Zone 1 customers and lower Zone 1 customers, since these areas have varied climates and demographics, as described previously. Additionally, for purposes of estimating average existing demand factors by lot size, PCWA grouped the lot-size data from each of the Zone 1 subareas to generate an average unit demand factor for each unique residential lot size as well as several non-residential land-use types. This grouping is reflected in **Table 4-5**.

PCWA believes 2013 was more representative of average conditions, and understood that the data would be skewed if 2014 or 2015 customer use data were used for baseline conditions.

Existing customers' future unit demand factors are assumed to change mostly from drivers such as general homeowner fixture replacements and upgrades, PCWA's conservation awareness and incentive programs, and other factors affecting a general increased awareness of water conservation (see **Section 4.3**). A reflection of the impact of these drivers is presented as the unit demand factors for new residences. The future unit demand factors reflect a reduction from the current value in all categories resulting from conservation rates indicated in the far right column of the table. This reduction is reasonable as it reflects expected benefits of on-going PCWA and customer conservation efforts, coupled with the use of 2013 for baseline conditions.

[48] Based on 2013 PCWA sales report.

Table 4-5 – Existing Customer Characteristics

	Land-class	Existing Customers: Current Number of Connections or Acres	Current Demand Factors (af/unit)	Future Demand Factors (af/unit)	Conservation
Upper Zone 1	Residential (dwelling units)				
	<2.9k (SF 1)	259	0.16	0.16	0%
	2.9k-4.4k (SF 2)	197	0.25	0.25	1%
	4.4k-5.5k (SF 3)	201	0.28	0.27	3%
	5.5k-7k (SF 4)	487	0.32	0.31	2%
	7k-10k (SF 5)	1,463	0.42	0.41	3%
	10k-17k (SF 6)	2,356	0.55	0.54	2%
	17k-35k (SF 7)	1,066	0.69	0.67	2%
	35k-90k (SF 8)	350	0.65	0.62	4%
	>90k (SF 9)	332	0.67	0.64	4%
Lower Zone 1	Residential (dwelling units)				
	<2.9k (SF 1)	581	0.18	0.17	5%
	2.9k-4.4k (SF 2)	693	0.30	0.29	4%
	4.4k-5.5k (SF 3)	1,000	0.39	0.38	2%
	5.5k-7k (SF 4)	4,454	0.47	0.46	2%
	7k-10k (SF 5)	6,725	0.54	0.52	3%
	10k-17k (SF 6)	4,086	0.68	0.66	3%
	17k-35k (SF 7)	1,495	0.88	0.85	4%
	35k-90k (SF 8)	1,093	1.30	1.26	3%
	>90k (SF 9)	1,044	0.99	0.96	3%
All Zone 1	Multi-family (dwelling units)				
	MF 20.1+ DU/Ac.	2,662	0.22	0.21	5%
	MF 15.1-20 DU/Ac.	6,210	0.23	0.22	4%
	Non-residential (accounts and acres)				
	Commercial	1,750	1.72	1.63	5%
	Industrial	173	2.40	2.40	0%
	Municipal	1,044	1.15	1.15	0%
	Landscape-Greenbelt	1,044	2.20	2.09	5%

4.4.2.2 Future Retail Treated Water Customers

As previously indicated, the Zone 1 retail service will experience the largest growth of all PCWA customer categories, with urban retail customer growth as represented in **Table 2-5**.

When considering the various factors discussed in **Section 4.3**, coupled with a review of current customer use characteristics discussed in the prior section, PCWA has established unit demand factors it expects represent the average needs of each new customer. These assumed unit demand factors are presented in **Table 4-6** along with the representative future

increment of new customers within each land-use classification for the upper and lower areas of Zone 1.

Table 4-6 – Anticipated New Retail Customers and Demand Factors

Land-class		New Customers (Accounts or Acres)	Future Demand Factors (af/account)
Upper Zone 1	Residential (dwelling units)		
	<2.9k (SF 1)	--	0.16
	2.9k-4.4k (SF 2)	2,369	0.22
	4.4k-5.5k (SF 3)	568	0.25
	5.5k-7k (SF 4)	1,139	0.30
	7k-10k (SF 5)	1,409	0.40
	10k-17k (SF 6)	1,015	0.50
	17k-35k (SF 7)	19	0.60
	35k-90k (SF 8)	--	0.60
	>90k (SF 9)	1,570	0.60
Lower Zone 1	Residential (dwelling units)		
	<2.9k (SF 1)	--	0.16
	2.9k-4.4k (SF 2)	16,474	0.26
	4.4k-5.5k (SF 3)	6,914	0.35
	5.5k-7k (SF 4)	825	0.44
	7k-10k (SF 5)	731	0.48
	10k-17k (SF 6)	2,112	0.60
	17k-35k (SF 7)	938	0.80
	35k-90k (SF 8)	2,065	1.10
	>90k (SF 9)	144	0.85
All Zone 1	Multi-family (dwelling units)		
	MF 20.1+ DU/Ac.	60	0.20
	MF 15.1-20 DU/Ac.	9,682	0.04
	Non-residential (accounts and acres)		
	Commercial	1,872	1.25
	Industrial	3,745	2.00
	Municipal	480	1.15
	Landscape-Greenbelt	1,295	1.20

Coupling the demand factors with the increment of new customers provides a basis for estimating new Zone 1 retail customer demands at build-out. However, **Table 2-5** only presented the expected build-out conditions for each Zone 1 subarea, not incremental growth aligned with the required 5-year demand forecasting time horizons. To develop demand forecasts for each 5-year horizon, PCWA needed to identify an incremental annual growth rate. Because growth is unlikely to be consistent throughout the many different residential and non-residential land classifications, or within the various subareas, PCWA established

unique growth assumptions by land classification for the generalized lower and upper Zone 1 areas. These values are presented in **Table 4-7**.

Table 4-7 – Assumed Growth Rates for Demand Forecasting

	Land-class	Incremental Growth to 2020	Annual Growth Rate beyond 2020	Resulting 5-year Growth Rate
Upper Zone 1	Residential (dwelling units)			
	<2.9k (SF 1)	0%	0%	0%
	2.9k-4.4k (SF 2)	5%	4%	19%
	4.4k-5.5k (SF 3)	3%	3%	16%
	5.5k-7k (SF 4)	2%	3%	16%
	7k-10k (SF 5)	1%	4%	19%
	10k-17k (SF 6)	2%	2%	10%
	17k-35k (SF 7)	2%	3%	16%
	35k-90k (SF 8)	0%	0%	0%
	>90k (SF 9)	0%	3%	16%
Lower Zone 1	Residential (dwelling units)			
	<2.9k (SF 1)	0%	0%	0%
	2.9k-4.4k (SF 2)	15%	3%	16%
	4.4k-5.5k (SF 3)	10%	3%	16%
	5.5k-7k (SF 4)	5%	1%	5%
	7k-10k (SF 5)	3%	4%	19%
	10k-17k (SF 6)	1%	2%	10%
	17k-35k (SF 7)	1%	3%	16%
	35k-90k (SF 8)	1%	5%	28%
	>90k (SF 9)	1%	1%	5%
All Zone 1	Multi-family (dwelling units)			
	MF 20.1+ DU/Ac.	0%	20%	100%
	MF 15.1-20 DU/Ac.	3%	4%	12%
	Non-residential (accounts and acres)			
	Commercial	3%	3%	15%
	Industrial	3%	2%	10%
	Municipal	3%	2%	10%
	Landscape-Greenbelt	0%	3%	15%

The resulting 5-year incremental new customer demands are presented in the next section.

4.4.2.3 Zone 1 Retail Distribution System Losses

The demand factors presented in the *Zone 1 Retail Demand Summary* represent the demand for water at each customer location. To fully represent the demand, distribution system losses must also be included. Often, distribution system losses water represents water that is lost due to system leaks, fire protection, construction water, unauthorized connections, and inaccurate meters. Essentially, this is the water that is treated by PCWA that does not make it to the customer – either as a real loss or an apparent loss (e.g. such as may result when a customer meter underreports actual use).

In most instances, the predominant source of distribution system losses is from leaks that inevitably exist throughout the many miles of pipes and fitting that bring water to PCWA's customers.

Pursuant to CWC 10631(e)(3)(B), PCWA must quantify and report the distribution 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, PCWA calculated a loss equal to 8.2 percent of the water supplied into the distribution system. The AWWA spreadsheets are included as **Appendix A-4**.

For purposes of estimating future demand from new connections, the distribution system loss is assumed to be 8 percent to reflect on-going PCWA programs to find and fix identified system leaks and to address meter inaccuracies.[49]

4.4.2.4 Summary of Zone 1 Retail Demands

Water demand projections within PCWA's service area reflect the combination of continued conservation by existing customers and the addition of new customers over the planning horizon. **Table 4-8a** and **Table 4-8b** provide the summation of this analysis and the resulting expected demands for each 5-year planning horizon by the designated land classifications. This information meets the requirements of the UWMPA.[50]

However, as a more usable representation of build-out demand forecasts, PCWA redistributed the grouped land-use based estimates back into their respective Zone 1 subareas (see **Figure 2-2**). Redistributing these demands to each Zone 1 subarea provides a practical comparison of existing and future demands by subarea. **Table 4-9** presents the results.

[49] 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.
[50] CWC Section 10631(e)(2).

Table 4-8a – Zone 1 Retail Treated Demand Summary (Part 1)

Land-class			Forecast Demand (af/yr)						
			2020	2025	2030	2035	2040	2045	Buildout
Upper Zone 1	Single Family (dwelling units)								
	<2.9k (SF 1)	Existing	42	42	42	42	42	42	42
		Future	0	0	0	0	0	0	0
	2.9k-4.4k (SF 2)	Existing	49	49	49	49	49	49	49
		Future	26	124	222	320	418	516	521
	4.4k-5.5k (SF 3)	Existing	54	54	54	54	54	54	54
		Future	4	27	49	72	95	117	142
	5.5k-7k (SF 4)	Existing	151	151	151	151	151	151	151
		Future	7	61	116	170	224	279	342
	7k-10k (SF 5)	Existing	600	600	600	600	600	600	600
		Future	4	114	224	334	444	554	564
	10k-17k (SF 6)	Existing	1,272	1,272	1,272	1,272	1,272	1,272	1,272
		Future	24	146	269	391	508	508	507
	17k-35k (SF 7)	Existing	714	714	714	714	714	714	714
		Future	4	11	11	11	11	11	11
	35k-90k (SF 8)	Existing	217	217	217	217	217	217	217
		Future	0	0	0	0	0	0	0
	>90k (SF 9)	Existing	213	213	213	213	213	213	213
		Future	0	150	300	449	599	749	942
Lower Zone 1	Single Family (dwelling units)								
	<2.9k (SF 1)	Existing	99	99	99	99	99	99	99
		Future	0	0	0	0	0	0	0
	2.9k-4.4k (SF 2)	Existing	201	201	201	201	201	201	201
		Future	373	768	1,163	1,558	1,953	2,348	2,484
	4.4k-5.5k (SF 3)	Existing	380	380	380	380	380	380	380
		Future	242	627	1,012	1,396	1,781	2,166	2,420
	5.5k-7k (SF 4)	Existing	2,049	2,049	2,049	2,049	2,049	2,049	2,049
		Future	98	198	197	197	197	197	363
	7k-10k (SF 5)	Existing	3,497	3,497	3,497	3,497	3,497	3,497	3,497
		Future	11	76	142	208	274	340	351
	10k-17k (SF 6)	Existing	2,697	2,697	2,697	2,697	2,697	2,697	2,697
		Future	25	279	534	789	1,044	1,244	1,267
	17k-35k (SF 7)	Existing	1,271	1,271	1,271	1,271	1,271	1,271	1,271
		Future	12	202	392	582	750	750	750
	35k-90k (SF 8)	Existing	1,377	1,377	1,377	1,377	1,377	1,377	1,377
		Future	12	344	676	1,008	1,340	1,671	2,272
	>90k (SF 9)	Existing	1,002	1,002	1,002	1,002	1,002	1,002	1,002
		Future	14	59	104	122	122	122	123

Table 4-8b – Zone 1 Retail Treated Demand Summary (Part 2)[51]

Land-class			Forecast Demand (af/yr)						
			2020	2025	2030	2035	2040	2045	Buildout
All Zone 1	Multi-family (dwelling units)								
	MF 20.1+ DU/Ac.	Existing	559	559	559	559	559	559	559
		Future	0	12	12	12	12	12	12
	MF 15.1-20 DU/Ac.	Existing	1,366	1,366	1,366	1,366	1,366	1,366	1,366
		Future	58	290	523	755	988	1,220	1,936
	Non-residential (accounts and acres)								
	Commercial	Existing	2,853	2,853	2,853	2,853	2,853	2,853	2,853
		Future	70	421	1,272	2,123	3,271	3,622	4,137
	Industrial	Existing	415	415	415	415	415	415	415
		Future	225	974	1,723	2,472	3,221	3,970	7,490
	Municipal	Existing	1,200	1,200	1,200	1,200	1,200	1,200	1,200
		Future	17	72	127	182	237	293	552
	Landscape-Greenbelt	Existing	2,181	2,181	2,181	2,181	2,181	2,181	2,181
		Future	4	53	212	509	877	1,179	1,319
	Other Uses	Existing	500	500	500	500	500	500	500
		Future	50	125	250	375	500	500	500
Totals									
	Total Residential	Existing	17,809	17,809	17,809	17,809	17,809	17,809	17,809
		Future	912	3,489	5,946	8,376	10,760	12,805	15,007
	Total Non-Residential	Existing	7,149	7,149	7,149	7,149	7,149	7,149	7,149
		Future	366	1,645	3,584	5,662	8,106	9,563	13,998
	Total	Existing	24,959	24,959	24,959	24,959	24,959	24,959	24,959
		Future	1,278	5,134	9,529	14,038	18,866	22,368	29,005
	Total Zone 1 Customer Demands		**26,200**	**30,100**	**34,500**	**39,000**	**43,800**	**47,300**	**54,000**
	Distribution System Losses		2,360	2,710	3,110	3,510	3,940	4,260	4,900
	Regional Buffer						2,000	3,000	4,000
	Zone 1 Retail Treated System Demand		**28,600**	**32,800**	**37,600**	**42,500**	**49,700**	**54,600**	**63,000**

4.4.2.5 Zone 1 Regional Demand Buffer

Table 4-9 represents estimated land-use growth and demand by the subareas defined in **Figure 2-2**. Because the planning horizon assumed by the land-planning authorities in the County is not always consistent (e.g. projections vary from 2030 to 2050), and some anticipated projects emerge and disappear between UWMP updates (e.g. the proposed Curry Creek project was in the 2010 UWMP but is currently inactive), future land-planning updates may identify growth in the Western Area not currently contemplated. To accommodate this potential additional demand, PCWA has established a placeholder of 2,000 acre-feet of annual demand beginning in 2040, expanding to 4,000 acre-feet by build-out conditions.[52]

[51] The forecast commercial value includes demands for the Regional University, a proposed mixed-use project that includes residential and non-residential features. The project's estimated demand is presented in Table 4-9.
[52] The assumed buffer of 2,000 acre-feet through 2040 is the approximate difference between PCWA's prior estimate of the Curry Creek area, which included the Regional University area, and the current estimate of only the Regional University area (see Table 4-9). The next 2,000 acre-feet of buffer accounts for infill between master planned development projects between 2040 and buildout.

Table 4-9 – Summary of Zone 1 Retail Treated Demand by Subarea

Zone 1 Subarea	Customer Demand		System Demand	
	Existing Demand	Future Demand	Existing (10% loss)	Future (8% loss)
Upper Zone 1	(acre-feet/year)			
Auburn/Bowman	1,736	4,109	1,927	4,478
City of Auburn	2,615	3,510	2,903	3,826
City of Auburn (Airport)	173	480	192	523
Newcastle/Ophir	2	432	2	471
Unincorp. Area C (Newcastle)	440	2,266	488	2,470
Lower Zone 1				
Bickford Ranch	0	1,318	0	1,437
Horseshoe Bar/Penryn	669	3,448	742	3,758
Unincorp. Area B (Loomis Basin)	2	81	2	88
Town of Loomis	1,665	2,812	1,848	3,065
Granite Bay	670	763	744	832
City of Rocklin	12,551	17,378	13,932	18,942
Whitney Ranch	943	2,156	1,047	2,350
City of Roseville (PCWA)	490	624	544	681
Sunset Industrial Area	1,505	8,859	1,670	9,656
Total Zone 1				
Regional University	0	1,796	0	1,958
		Greenbelts	2,180	3,820
		Regional Buffer	0	4,000
		Other	500	1,000
		Grand Total Retail	**28,700**	**63,000**

4.4.3 Irrigation (Untreated) Water Demand in Zone 1 and Zone 5

Irrigation water is sold by PCWA directly to end-users. This supply is a non-potable supply generally used for commercial agriculture, irrigation customers, landscape greenbelts, and metered irrigation. The information presented below provides further details about these customers, their current demands, and projections of future demands. The resulting demand forecasts are included in **Table 4-10**. In total, the Zone 1 and Zone 5 irrigation water service currently represents about 70 percent of the total Zone 1 and Zone 5 water sales by volume, but represents many fewer accounts – about 3,600 accounts compared to 33,000 retail treated water accounts.[53]

[53] 2013 PCWA "Water Revenue and Sales Report"

- Commercial Agriculture - Commercial agriculture is supplied to a little over 300 accounts and represents nearly 30 percent of the Zone 1 and Zone 5 irrigation water demands.[54] With planned growth by the City of Lincoln westward into Zone 5, PCWA expects the Zone 5 demands to decrease over the next twenty to thirty years – dropping from a current area of about 4,400 acres to about 1,800 acres.[55] This has an associated reduction in demand over time, as presented. In contrast to Zone 5, the water demands from the Zone 1 commercial agricultural customers are expected to remain similar to current sales and are kept constant through this UWMPs planning horizon.
- Irrigation Customers – With over 3,100 accounts, irrigation customers represent nearly 60 percent of the Zone 1 irrigation water sales.[56] These customers include the many rural residences within Zone 1 that receive "ditch water" for use in gardens, for landscaping, for small pastures, to maintain stock water sources and small ponds, and other rural residential needs. For purposes of long-term planning, PCWA anticipates the demands from this class of customers to be similar to recent sales, with expected annual variations depending on the length of the irrigation season.[57] To further support this assumption, sales to this customer class only varied by +/- 2 percent between 2011 and 2014 even though rainfall amounts and climate conditions varied over this period.
- Landscape – The landscape designation is used by PCWA to represent greenbelts irrigated with irrigation water supplies. With only about 30 active accounts, this category of "customer" still represents a sizable quantity of demand – accounting for approximately 15 percent of the current Zone 1 irrigation demand. The demand of existing customers is expected to decrease over time with on-going conservation measures implements. But, even with adoption of the updated Model Water Landscape Efficiency Ordinance, new urban growth is anticipated to add new landscape accounts, adding to the total demand. For purposes of long-term planning, PCWA anticipates this demand to remain consistent with existing total sales. This value is represented by the average sales recorded for this category between 2011 and 2015, which ranged between 10,103 to 11,864 acre-feet annually.[58]

[54] Based on 2013 PCWA "Water Revenue and Sales Report"
[55] Although Zone 5 covers a large geographic area of rural western Placer County (see **Figure 2-1**), only about 4,400 acres currently receive irrigation water from PCWA. Many of these lands are within the identified westward growth area of the City of Lincoln and will be displaced with urban uses served by the City of Lincoln. However, unlike assumptions made for the 2010 UWMP, the *Placer County Conservation Plan*, adopted by Placer County in 2013, resulted in lands previously assumed to convert to urban uses and served by the City of Lincoln to instead remain as irrigated agriculture.
[56] There are no "irrigation" customers in Zone 5, only "commercial agricultural" customers.
[57] It is PCWA's experience that irrigation water deliveries to irrigation customers vary depending on the timing of spring rainfall. When the rainy season is short, irrigation events begin earlier, increasing annual demand when compared to years when rain continues well into spring.
[58] Based upon 2011 through 2015 PCWA "Water Revenue and Sales Reports."

- Metered – This classification of irrigation demand has very insignificant demands, reflecting less than 1 percent of recent annual irrigation deliveries. PCWA anticipates these demands will remain consistent into the future.

Table 4-10 – Irrigation Demands for Zone 1 and Zone 5

Category	Current	2020	2025	2030	2035	2040	2045	BO
Zone 5 Agriculture	12,433	11,238	10,022	8,810	7,597	6,382	5,169	5,169
Zone 1 Canal Customers*	60,612	60,612	60,612	60,612	60,612	60,612	60,612	60,612
Total	73,045	71,850	70,634	69,422	68,209	66,994	65,781	65,781
Distribution Losses	3,842	3,779	3,715	3,652	3,588	3,524	3,460	3,460
Total System Demand	**76,900**	**75,600**	**74,300**	**73,100**	**71,800**	**70,500**	**69,200**	**69,200**

*Note: Zone 1 Canal Customers includes the demands for customers designated as: commericial agriculture, irrigation, landscape, and metered.

4.4.4 Wholesale Treated Water Demands in Zone 1

In addition to being a retail purveyor of treated and raw water suppliers, PCWA also wholesales treated water to a number of retail water systems located within Zone 1. This section presents the current and projected demands associated with these wholesale arrangements, and the basis for those projections. The resulting demand forecasts are included in **Table 4-11**.

- City of Lincoln – The City of Lincoln is the largest retail customer of wholesale treated water from PCWA, receiving about 90 percent of the wholesale treated water currently sold by PCWA. The City has a renewable contract with the PCWA for treated surface water. PCWA, based on the City's current General Plan, will supply to the City limits, on a "first-come- first-served" basis, the volume of potable surface water required to meet maximum day demands for build-out of the City limits. With significant growth occurring over the last decade, the City has steadily increased its demand for treated water from PCWA under the first-come-first served basis. During the course of this 2015 UWMP preparation, PCWA coordinated with the City to understand its most recent forecast for future demands. According to discussions with the City, the City anticipates total potential demands estimated to be about 37,400 acre-feet annually to serve the entire City's projected growth.[59] While some of this demand may be met with other City water assets under some circumstances, the City primarily plans for this demand to be served by PCWA supplies.

[59] This demand is significantly lower than the 53,000 acre-feet the City had initially estimated in its 2008 General Plan. The reduction is primarily a result of on-going conservation efforts coupled with building and plumbing code requirements, the State's Model Water Efficient Landscape Ordinance, and low-water using appliances and fixtures.

- California American Water – With multiple retail service areas around greater Sacramento, California American (Cal-Am) specifically receives wholesale treated supplies from PCWA for its West Placer community (located in western Placer County just southwest of the City of Roseville). Currently, this Cal-Am service area receives about 10 percent of the PCWA wholesale treated supplies. The general area of Cal-Am's West Placer service area is anticipated to grow, resulting in an expanded wholesale agreement with Cal-Am. For purposes of PCWA's long-term planning, the anticipated growth in this general area is represented within this category of PCWA customers, and is subdivided into two growth areas: (1) Placer Vineyards and (2) Existing Cal-Am.

    1. Placer Vineyards: This currently undeveloped region is slated for significant growth, with over 13,000 new residential units expected over the planning horizon. Demands for this project were estimated using the project's 2006 study as a baseline, then reducing demands to reflect the various unit demand factor drivers discussed in Section 4.3.[60] PCWA reduced the project's overall demand of 11,400 acre-feet by about 25 percent to reflect today's estimated water demand for the same project.

    2. Existing Cal-Am: This includes the existing service of about 1,000 acre-feet annually, with an expected slight reduction through customer conservation activities over time, and significant new growth. Combined, this portion of Cal-Am's service is expected to increase to nearly 2,400 acre-feet.

- Other Retailers – Several small community retail water systems exist within Zone 1 (there are no retail suppliers in Zone 5). Generally organized as homeowner associations, these small retail systems include Folsom Lake Mutual Water Company, Golden Hills Mutual Water Company, Hidden Valley Community Association, Lakeview Hills Community Association, and Willow-Glen Water Company. Golden Hills Mutual Water Company, Hidden Valley Community Association, and Willow-Glen Water Company are each served by PCWA with a single master meter. Usage in these areas with master meters is averaged over the number of parcels served to calculate unit demands. These three systems also have a parallel raw water system that reduces treated demand. With most of these small retail systems serving communities that are built-out or are nearly build-out, PCWA does not anticipate growth within this category of wholesale treated water. Rather, PCWA anticipates future demands to be reduced slightly with the implementation of conservation measures over time. For purposes of projected demands, conservation is expected to reduce the current demand by 5 percent by 2020, with an additional 2 percent by 2025.

[60] MacKay & Somps Civil Engineers, Water Supply and Distribution Master Plan for Placer Vineyards Specific Plan, March 2006.

Table 4-11 – Wholesale Treated Water Demand for Zone 1

Category	Current	2020	2025	2030	2035	2040	2045	BO
City of Lincoln	9,690	13,239	15,421	18,335	21,187	25,533	30,260	37,392
Amoruso Ranch	--	150	500	800	1,100	1,100	1,100	1,100
California American	1,090	1,178	1,404	1,684	1,965	2,385	2,385	2,385
Placer Vineyards (Cal-Am)	--	--	1,688	3,376	5,064	6,752	8,440	8,440
Hidden Valley HOA	80	78	77	75	75	75	75	75
Lakeview Hills HOA	10	10	10	9	9	9	9	9
Folsom Lake Mutual Water Co.	60	58	57	55	55	55	55	55
Golden Hills Mutual Water Co.	35	33	32	30	30	30	30	30
Willow Glen Water Co.	150	147	143	140	140	140	140	140
Total System Demand	11,115	14,894	19,331	24,505	29,625	36,079	42,494	49,626
Distribution System Losses	416	116	313	510	707	891	1,037	1,037
Total System Demand	**11,500**	**15,000**	**19,600**	**25,000**	**30,300**	**37,000**	**43,500**	**50,700**

4.4.5 Western Area Untreated Water Demands

In addition to being a retail purveyor of treated and raw water suppliers, PCWA also wholesales treated water to a number of retail water systems located within Zone 1. This section presents the current and projected demands associated with these wholesale arrangements, and the basis for those projections. PCWA has contracts with San Juan Water District (SJWD), Sacramento Suburban Water District (SSWD), and the City of Roseville (Roseville) to provide each with raw water supplies up to quantities as defined in each contract. The resulting demand forecasts are included in **Table 4-12**.

4.4.5.1 San Juan Water District

PCWA's current contract with SJWD includes an annual entitlement of 25,000 acre-feet of water from the Middle Fork Project (MFP). SJWD's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with Water Forum Agreement restrictions that limit the amount of water that SJWD is able to divert from the American River. SJWD also has an agreement with the City of Roseville (the City) to supply 4,000 acre-feet of its PCWA contract supply to the City in wet years, as defined in the Water Forum Agreement.

According to SJWD's Water Forum Purveyor Specific Agreement, SJWD's American River diversion restrictions are dependent upon the projected March through November Unimpaired Inflow into Folsom Reservoir (UIFR). SJWD can divert its full 82,200 acre-feet per year from the American River in wet years (when projected March through November UIFR is greater than 950,000 acre-feet). This would include the 25,000 acre-feet MFP supply from PCWA. During drier years when the UIFR is between 950,000 and 400,000 acre-feet, SJWD decreases its diversion amounts from 82,200 acre-feet per year to 54,200 acre-feet per year, which includes a reduction of the MFP supply to 10,000 ac-ft. During the

driest years when projected March through November UIFR is less than 400,000 acre-feet, the Water Forum signatories have agreed to meet and confer to develop a plan for water use.

The MFP supply will be delivered to SJWD pursuant to its contract with PCWA and Water Forum Agreement commitments, as described above. In the future, if SJWD amends its current Warren Act Contract with the U.S. Bureau of Reclamation to include delivery of MFP water into its Sacramento County retail service area, PCWA will reevaluate SJWD's build-out demand and update in future UWMP projections. PCWA intends to meet all obligations of its contract with SJWD as future conditions and contract terms evolve.

Based on coordination with SJWD during preparation of each purveyor's 2015 UWMP, SJWD's demand projections through 2040 estimate total retail demand of 20,672 acre-feet.[61] PCWA's interpretation of SJWD's 2040 demand for MFP water in its Placer County retail service area in wet and normal years is 15,500 acre-feet[62] plus an additional 4,000 acre-feet (Roseville supply). For purposes of this UWMP, the Roseville supply is not available in single-dry and multi-dry conditions. The primary SJWD supply is assumed to remain at 15,500 acre-feet under multi-dry year conditions, but drop to 10,000 acre-feet in driest years.

For purposes of demand forecasting, the 2040 demand is reached incrementally, growing from the current estimated 11,300 acre-feet (the 2013 delivered quantity) at a rate of 1.5 percent annually to 2040, then remaining at the maximum value through the remainder of PCWA's planning horizon.

4.4.5.2 Sacramento Suburban Water District

PCWA's current contract with SSWD includes an annual entitlement of 29,000 acre-feet of water from the MFP.[63] SSWD's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with Water Forum Agreement restrictions that limit the amount of water that SSWD is able to divert from the American River.

According to SSWD's Water Forum Purveyor Specific Agreement, SSWD's American River diversion restrictions are dependent upon the projected March through November UIFR. SSWD can divert 29,000 acre-feet per year of MFP water from Folsom Reservoir in wet years (when projected March through November UIFR is greater than 1,600,000 acre-feet). During drier years when the UIFR is less than 1,600,000 acre-feet, SSWD does not receive MFP water from PCWA.

[61] PCWA continued coordination with SJWD during the course of preparation of this plan, resulting in demand forecasts that may have varied from those originally stated in the 60-day notification letter (see **Appendix B-3**).
[62] The Placer County portion is approximately 75 percent of SJWD's retail service area, which would be 15,504 acre-feet of SJWD's estimated demand of 20,672 acre-feet.
[63] For further details about the contract please contact PCWA

MFP water will be delivered pursuant to SSWD's contact with PCWA and Water Forum Agreement commitments, as described above. PCWA intends to meet all obligations of its contract with SSWD as future conditions and contract terms evolve. Based on coordination with SSWD during preparation of this 2015 UWMP, PCWA's interpretation of SSWD's build-out demand for MFP water in normal years is 29,000 acre-feet, reducing to zero acre-feet in single dry and multiple dry years.

For planning purposes, PCWA is assuming the full demand will occur by 2025, and continue to exist throughout PCWA's 2015 UWMP planning horizon.

4.4.5.3 City of Roseville

PCWA's current contract with the City of Roseville (Roseville) includes an annual entitlement of 30,000 acre-feet of water from the Middle Fork Project (MFP). Roseville's available surface water supply from the MFP is subject to terms in its PCWA contract, combined with Water Forum Agreement restrictions that limit the amount of water that Roseville is able to divert from the American River.

According to Roseville's Water Forum Purveyor Specific Agreement, Roseville's American River diversion restrictions are dependent upon the projected March through November UIFR. Roseville can divert 54,900 acre-feet per year from the American River in wet years (when projected March through November UIFR is greater than 950,000 acre-feet). During drier years when the UIFR is between 950,000 and 400,000 acre-feet, Roseville decreases its diversion amounts from 54,900 acre-feet per year down to 39,800 acre-feet per year. During the driest years when projected March through November UIFR is less than 400,000 acre-feet, the Water Forum signatories have agreed to meet and confer to develop a plan for water use.

The MFP supply will be delivered to Roseville pursuant to its contract with PCWA and Water Forum Agreement commitments, as described above. PCWA intends to meet all obligations of its contract with Roseville as future conditions and contract terms evolve. Based on coordination with Roseville during preparation of this 2015 UWMP, PCWA's interpretation of Roseville's contractual demand for MFP water is 30,000 acre-feet in all year types.

For purposes of demand forecasting, the 2040 demand is reached incrementally, growing from the current estimated 8,500 acre-feet (the 2013 delivered quantity) at a rate of 5 percent annually to 2040, then remaining at the maximum value through the remainder of PCWA's planning horizon.

Table 4-12 – Untreated Water Demand for Western Area

Untreated User	Year-Type	Current	2020	2025	2030	2035	2040	2045	BO
San Juan Water District	Average	11,302	12,150	13,061	14,040	15,093	15,500	15,500	15,500
	Multi-dry		12,150	13,061	14,040	15,093	15,500	15,500	15,500
	Single-dry		10,000	10,000	10,000	10,000	10,000	10,000	10,000
San Juan Water District (Roseville)	Average	0	4,000	4,000	4,000	4,000	4,000	4,000	4,000
	Multi-dry		0	0	0	0	0	0	0
	Single-dry		0	0	0	0	0	0	0
Sacramento Suburban Water District *[recent has ranged from zero to +14,000]*	Average	[ranges]	20,000	29,000	29,000	29,000	29,000	29,000	29,000
	Multi-dry		0	0	0	0	0	0	0
	Single-dry		0	0	0	0	0	0	0
City of Roseville	Average	8,537	10,671	13,339	16,674	20,842	30,000	30,000	30,000
	Multi-dry		10,671	13,339	16,674	20,842	30,000	30,000	30,000
	Single-dry		10,671	13,339	16,674	20,842	30,000	30,000	30,000
Total	**Average**	--	**46,821**	**59,400**	**63,714**	**68,936**	**78,500**	**78,500**	**78,500**
	Multi-dry		**22,821**	**26,400**	**30,714**	**35,936**	**45,500**	**45,500**	**45,500**
	Single-dry		**20,671**	**23,339**	**26,674**	**30,842**	**40,000**	**40,000**	**40,000**

4.4.6 Summary of Western Area Demands

As shown in **Table 4-13**, the total water demands for the Western Area anticipated by 2045, the planning horizon for the 2015 UWMP, indicate a growth in total demand of about 50 percent.

Table 4-13 – Summary of Western Area Water Demands

Category	Demand (acre-feet/year)						
	2020	2025	2030	2035	2040	2045	BO
Retail Treated	28,600	32,800	37,600	42,500	49,700	54,600	63,000
Retail Untreated (Irrigation)	75,600	74,300	73,100	71,800	70,500	69,200	69,200
Wholesale Treated	15,000	19,600	25,000	30,300	37,000	43,500	50,700
Wholesale Untreated (Avg year)	46,821	59,400	63,714	68,936	78,500	78,500	78,500
Total Demand	**166,021**	**186,100**	**199,414**	**213,536**	**235,700**	**245,800**	**261,400**

4.5 Zone 3 Water Demands

Zone 3 is the second largest zone in the PCWA system and extends through Applegate, Weimer, Meadow Vista, Colfax, Gold Run, Monte Vista, Dutch Flat, and Alta (see **Figure 2-3)**. The predominant demand in Zone 3 is for untreated water, with only about 1,280 accounts served with retail treated water.[64]

4.5.1 Historical Demands

The data in **Table 4-14** indicates the rate of growth in the number of retail treated water connections and associated water treatment plant production serving the connections.

Table 4-14 – Zone 3 Historic Connections and Treated Water Deliveries

Year	Number of Connections	Customer Demand (AF/yr)	Average Connection Demand (AF/yr)
2011	1,277	505	0.40
2012	1,283	537	0.42
2013	1,280	567	0.44
2014	1,280	484	0.38
2015	1,294	442	0.34

4.5.2 Retail Treated Water Demand

As with Zone 1, retail treated water demands in Zone 3 are an important component of PCWA's long-term planning. Representing only a fraction of PCWA's current demands, this demand category will only increase slightly over the next several decades as a result of nominal growth of mountain communities within Placer County, coupled with some conservation by existing customers. This category for Zone 3 is small amounting to about 10 percent of the Zone 3 demands and just 3 percent of the total retail treated service demands of Zone 1 and Zone 3 combined.[65] Changes in this zone are unlikely to have significant impacts on the expected increase in total demands served by PCWA.

4.5.3 Irrigation Water Demand in Zone 3

Irrigation water is sold by PCWA directly to end-users in Zone 3. This supply is a non-potable supply generally used for commercial agriculture, irrigation customers, landscape greenbelts, and metered irrigation. The information presented below provides further details about these customers, their current demands, and projections of future demands. In total, the Zone 3 irrigation water service currently represents over 90 percent of the total Zone 3

[64] Based on approximation from 2013 Water Sales Report
[65] Based on 2013 Water Sales Report.

water sales by volume, but represents fewer accounts – about 500 accounts compared to 1,280 retail treated water accounts.[66]

- Commercial Agriculture - Commercial agriculture is supplied to only 17 accounts and represents only 8 percent of the Zone 3 irrigation water demands.[67] Demands from the Zone 3 commercial agricultural customers are expected to remain similar to current sales.
- Irrigation Customers – With nearly 300 accounts, irrigation customers represent about 60 percent of the Zone 3 irrigation water sales. These customers include the many rural residences within Zone 3 that receive "ditch water" for use in gardens, for landscaping, for small pastures, to maintain stock water sources and small ponds, and other rural residential needs. For purposes of long-term planning, PCWA anticipates the demands from this class of customers to be similar to recent sales, with expected annual variations depending on the length of the irrigation season.[68]
- Landscape – The landscape designation is used by PCWA to represent greenbelts irrigated with irrigation water supplies. With only a few active accounts, this category of "customer" still represents a sizable quantity of demand – accounting for approximately 25 percent of the current Zone 3 irrigation demand. With adoption of MWLEO, the demand of existing customers is expected to decrease, but new urban growth is anticipated to add new landscape accounts, adding to the total demand. For purposes of long-term planning, PCWA anticipates this demand to remain consistent with existing total sales.
- Metered – This classification of irrigation demand has about 200 active accounts, but very insignificant demands, reflecting less than 1 percent of recent annual irrigation deliveries. PCWA anticipates these demands will remain consistent into the future.

4.5.4 Untreated Water Sales to Other Agencies in the Central Area

This section presents the existing and anticipated future water demand of five small water purveyors that purchase about 2,150 acre-feet annually of untreated water from PCWA for treatment and delivery. These purveyors include: Alpine Meadows Water Association, Dutch Flat Water Association, Heather Glen CSD, Meadow Vista County Water District, and Weimar Water Company. Recent sales to these retail agencies have remained fairly consistent. For purposes of long-term planning, PCWA anticipates these demands to remain consistent with recent sales.

[66] Based on 2013 Water Sales Report
[67] Based on 2013 Water Sales Report
[68] It is PCWA's experience that irrigation water deliveries to irrigation customers vary depending on the timing of spring rainfall. When the rainy season is short, irrigation events begin earlier, increasing annual demand when compared to years when rain continues well into spring.

4.5.5 Summary of Zone 3 Water Demands

As shown in **Table 4-15**, the total water demands for Zone 3 anticipated by 2030, the planning horizon for the 2010 UWMP, indicate a very nominal growth in total demand of about one percent. This small increase is the result of limited growth and the adoption of conservation measures. Absent the growth, the demands in Zone 3 would likely decrease from existing quantities simply due to on-going conservation measures.

Table 4-15 – Summary of Forecast Demands for Zone 3

Category	Demand (acre-feet/year)						
	2020	2025	2030	2035	2040	2045	BO
Retail Treated	760	730	740	720	750	780	810
Retail Untreated (Irrigation)	8,420	7,970	7,650	7,650	7,650	7,330	7,330
Wholesale Untreated (Avg year)	2,150	2,150	2,150	2,150	2,150	2,150	2,150
Total Demand	**11,330**	**10,850**	**10,540**	**10,520**	**10,550**	**10,260**	**10,290**

4.6 Total PCWA Demand

As detailed in the previous sections, PCWA has many different customer types with different projected growth representations. Existing customers throughout Zone 1, Zone 3 and Zone 5 combine to demand about 140,000 acre-feet annually. Over the planning horizon represented by this 2015 UWMP, that demand is expected to nearly double by 2045. **Table 4-16** provides the total PCWA customer demand summary for the 5-year planning horizons.

Table 4-16 – Summary of All PCWA Demands

Category	Demand (acre-feet/year)						
	2020	2025	2030	2035	2040	2045	BO
Zone 1 and 5 (Table 4-13)	166,021	186,100	199,414	213,536	235,700	245,800	261,400
Zone 3 (Table 4-15)	11,330	10,850	10,540	10,520	10,550	10,260	10,290
Total Demand	**177,351**	**196,950**	**209,954**	**224,056**	**246,250**	**256,060**	**271,690**

4.7 Low Income Demand

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 Placer County General Plan provides the income distribution used for this analysis. This housing element 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. The median household income in Placer County in 2009 was $74,447, which was significantly higher than California's median income of $60,883. In 2009 38,420 households in Placer County were below the threshold for low income out of a total of 149,685 households, resulting in a weighted average between incorporated and unincorporated areas of 25.7 percent. For lack of more detailed income distributions, this percentage is assumed to remain constant into the future. Using 25.7 percent of the projected population, a persons-per-household from the 2010 county average of 2.60, and an averaged demand factor from the single and multi-family housing units that ramps down into the future from 0.40 to 0.34 by 2040, the current and future demand from "lower income" customers is estimated (see **Table 4-17**).

Table 4-17 – Lower Income Demands

	2020	2025	2030	2035	2040	2045
Projected Population	103,885	110,387	117,368	125,384	133,706	141,365
Low Income Population	26,698	28,370	30,164	32,224	34,362	36,331
Calculated Demands	**4,107**	**4,201**	**4,293**	**4,400**	**4,494**	**4,751**

CHAPTER 5. WATER DEMAND MANAGEMENT MEASURES

5.1 District Participation

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.

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. All the categories are outlined in **Table 5-1.**

PCWA signed the MOU in 2003. As a signatory to the CUWCC MOU, PCWA is committed to implement best management practices designed to achieve water conservation across existing and future demand sectors. PCWA has submitted annual reports to the CUWCC, complying with CWC § 10631. A copy of the most recent report from 2013-2014 is available in **Appendix C-1**. The CUWCC MOU requires that a water utility implement only the BMPs that are economically feasible. PCWA'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.

Table 5-1 – CUWCC BPM Requirements[69]

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

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

CHAPTER 6. WATER SHORTAGE CONTINGENCY PLAN

PCWA adopted its most recent Water Shortage Contingency Plan (WSCP) in 2015. The WSCP became a critical tool to help PCWA manage conditions during the recent drought cycle, especially as necessary to meet the State-mandated conservation target. The WSCP also guides PCWA's actions during supply shortages caused by infrastructure constraints such as the Bear River Canal failure in 2011. The complete version of the Water Shortage Contingency Plan can be found in **Appendix C-2**.

PCWA's WSCP identifies four levels of water conditions. The plan also identifies a demand reduction goal to meet the projected supply in each stage. PCWA used the following principles to develop the demand reduction requirements for each stage:

- Maintain water quality, safe operating conditions, and fire flow capability at all times;
- Provide flexibility to residential customers to allow them to choose the best use of their water during decreased demand requirements;
- Preserve landscaping as much as possible, with permanent plantings such as trees and shrubs receiving more importance than replaceable plantings such as turf and annuals;
- Maintain public playing fields as long as possible; and
- Minimize economic impact to commercial, industrial, and institutional customers.

6.1 Stages of Action

In the event of a shortage, water conservation is implemented in stages based on the quantity of the supply available compared to the projected demand. Rationing stages may be triggered by a shortage in a single water source or a combination of sources, or resulting from state-imposed regulatory actions. PCWA has separate conservation measures to address shortages in its irrigation canal systems and its treated water systems.

6.1.1 Irrigation Canal Shortage Actions

To conserve water in the canal system, the PCWA Board may take preapproved actions. These actions may include shrinking the diversion orifices utilized to transfer and deliver water to customers as well as rolling canal outages among PCWA's delivery system. In the event of a shortage, the Board of Directors would declare the level of required conservation for the canal system and provide specific guidelines to customers and staff on how to meet the conservation goals. Any declaration made by the Board of Directors will require a resolution providing the level of conservation. For the full text regarding irrigation canal shortage actions see **Appendix C-2**.

6.1.2 Treated Water Shortage Actions and Prohibitions

In the event of a shortage affecting PCWA's treated water occurs, the WSCP outlines specific stages of actions to be taken. **Table 6-1** summarizes the plan stages as defined in WSCP for the treated water systems. The WSCP attached in **Appendix C-2** provides greater detail for the exact methods of reaching the reduction goals for each stage.

PCWA's WSCP contains a response plan to achieve the demand reduction goals for each stage. The response plan includes specific prohibitions and recommended actions for PCWA depending on the water supply conditions. As water supply conditions become worse, the water use restrictions become more severe in an attempt to align available supplies with anticipated water demands.

PCWA uses increasingly strict water use prohibitions to manage water demands as detailed below. For example, no landscape watering is allowed 48 hours after measurable rainfall, automatic shut-off devices are required on all hoses and unauthorized use of hydrants is prohibited. As conservation stages are implemented the time of day when landscape watering is allowed will become more restrictive until landscape irrigation is prohibited altogether in Stage 4. Note that every complete water use prohibition from an earlier stage applies to a later stage as well.

6.1.2.1 Stage 1

During Stage 1, a *Water Alert*, PCWA will seek to reduce demand by up to 20 percent. This will be accomplished by having turf watering limited to 3 days a week, restaurants provide water only upon request, and hotels offer an option to not have towels and linens laundered.

6.1.2.2 Stage 2

During Stage 2, a *Water Warning*, PCWA will seek to reduce demand by up to 30 percent. New landscape installations will be limited to native and drought tolerant plants. Moreover, water features shall be drained and kept dry and a drought surcharge may be implemented. Turf watering under this stage will be limited to two days a week and construction will not be allowed to use water for dust control.

6.1.2.3 Stage 3

When implementing WSCP Stage 3, a *Water Crisis*, PCWA will seek to reduce demand by up to 40 percent. This will include limiting turf watering to once a week. Existing pools shall not be emptied and refilled unless required by public health and safety purposes. Only car washing with a low volume commercial carwash will be allowed. Furthermore, no new landscape can be installed.

6.1.2.4 Stage 4

During Stage 4, a *Water Emergency*, PCWA will require up to 50 percent, and greater if necessary, demand reduction. In this instance water will only be used for health and safety purposes. In addition to the prohibitions in Stages 1 through 3, Stage 4 will prohibit all landscape irrigation and any other uses that impede public health and safety objectives. The incorporated WSCP includes greater details on the specific actions that would implement the demand reduction requirements.

Table 6-1 – Treated Water Shortage Contingency Plan Stages

Stage	Water Supply Conditions	Target	Response Actions
Normal	Normal supply	None	Water use efficiency
1 – Water Alert	Slightly restricted water supplies	Up to 20%	Mandatory actions as provided
2 – Water Warning	Moderately restricted water supplies	Up to 30%	Mandatory actions as provided
3 – Water Crisis	Severly restricted water suplies	Up to 40%	Mandatory actions as provided
4 – Water Emergency	Extremely restricted water supplies	Up to 50% and greater	Mandatory actions as provided

6.2 Prohibitions, Penalties and Charges

The WSCP also outlines the available penalties should a customer violate provisions of the ordinance. The penalties and the associated stage when the penalties take effect are listed in **Table 6-2**. PCWA specifically provides that the amount of irrigation water a customer may purchase can be reduced by PCWA, and that if the customer is notified of a water waste occurrence and fails to eliminate the waste, PCWA may permanently reduce the size of the customer's delivery until the waste is addressed.[70] For treated water customers, PCWA notifies customers of waste and unreasonable water use which can ultimately result in a lock-out of service.

While PCWA's Water Shortage Contingency Plan does rely on specific prohibitions and the potential for penalties to manage demands, the Water Shortage Contingency Plan relies heavily on consumption reduction mechanisms designed to engage customers in a cooperative fashion and also improve the efficiency of their water delivery infrastructure. As

[70] PCC 41221.

noted in *Normal* conditions "Voluntary Conservation" is the preferred action and consumer cooperation is the most effective mechanism to achieve conservation objectives.

Table 6-2 – Penalties for Violations of Contingency Plan

Occurance	Penalty
First	personal/written notification
Second	Writing warning and notice of correction
Third	$75 fine
Fourth	$75 fine and service disconnection

6.3 Revenue and Expenditure Impacts Under the WSCP

PCWA's WSCP recognizes the potential costs associated with drought stage implementation and also the potential need to use drought surcharge rates to not only influence customer behavior but to cover the general reduction in revenue that is likely to result with a reduction in water demand. Additional budgets will also be needed to cover implementation of additional drought measures throughout different stages of action. PCWA has established reserve funds to supplement the reduced revenue during a water shortage. This would help prevent the need to implement drought pricing. As of the end of 2014, this fund totaled just over $8.5 million. For any of this reserve money to be utilized, the Board of Directors must approve its usage. The other option available to the Board would be to establish drought rates.

6.4 Measuring Consumption Reduction

PCWA will use its available resources at each stage to monitor water use and assess the effectiveness of existing demand management measures and the potential need to exert a greater level of effort to control water demand. PCWA is fully metered, allowing it to monitor actual water usage data during shortages and compare to previous usage to determine the reductions in use.

6.5 Minimum Supply Available

As discussed in **Chapter 3**, PCWA has highly reliable water supplies. Currently, PCWA is not projecting a shortage in its water supplies for 2016, with full allocation being available from PG&E. This is consistent with the values shown for 2020 in **Table 3-3**. For 2017 and 2018, PCWA is representing its minimum supply available as a slightly modified version of the multiple dry-year supplies shown in **Table 3-5**. The only change from that table is to the PG&E supplies. This supply was modified to reflect deliveries from PG&E during 2014 and 2015, which were about 68 percent of the average year rather than the estimated 75 percent used in **Table 3-5**. **Table 6-3** shows the total estimated minimum supply in AFY available

for the next three years that is used by PCWA to meet its wholesale and retail customer demands.

Table 6-3 – Three-Year Minimum Supply Available

Supply Source (values in acre-feet/yr)	2016	2017	2018
MFP	120,000	120,000	120,000
CVP Contract	0	0	0
PG&E Agreements	110,400	75,000	75,000
Pre 1914 Appropriations	3,400	1,700	1,700
Recycled Water	0	0	0
Groundwater	0	0	0
Total Supply	233,800	196,700	196,700

6.6 Catastrophic Interruption

The Agency's water systems are susceptible to interruption in water supply due to catastrophic events. In particular, fire, landslides, major pipeline failures, power outages, and earthquakes are risks to PCWA water supply infrastructure.

Water supplied by PG&E is delivered through a canal system that traverses hillsides and crosses valleys using raised flumes and pipelines. The Agency has established a Renewal and Replacement Program to replace aging infrastructure along the canal system; however, this program is phased over a long period of time. The remaining supplies are delivered through pumping stations that have back-up power, with the exception of the American River and Ophir Road Pump Stations.

The Agency has prepared an Emergency Response Plan. The Emergency Response Plan provides general procedures for responding to catastrophic supply interruption (i.e. infrastructure failure).

6.7 Current Drought

As discussed in previous sections, the current drought has impacted PCWA's water supply and approach to usage. The State's 2020 goal for a 20 percent reduction in water use encourages irrigation districts and end users to conserve more water. Throughout the drought, PCWA has taken action to ensure it is able to reduce water use and continue providing water to all of its customers. PCWA initially declared itself in a drought in

February 2014, then in June of 2015, under Resolution 15-10, the PCWA Board of Directors declared a drought emergency and instituted Stage 2 at a 25 percent conservation level. Subsequent to adopting Resolution 15-10, the SWRCB required PCWA to achieve 32 percent water use reduction, prompting a new resolution incorporating this conservation goal. PCWA's consistent application of water reductions was successful in conserving water and allowed PCWA to emerge from the drought conditions in 2016.

CHAPTER 7. SUPPLY & DEMAND INTEGRATION

The purpose of this chapter is to compare the total water supply sources available to PCWA with the total projected water use over the next 25 years, in five-year increments, for a normal water year, a single-dry water year, and multiple dry water years.[71] Water supply and demand data presented in this section is presented in prior sections of this 2015 UWMP.

Also, because PCWA's demand characteristics detailed in **Chapter 4** include more than just the needs of its urban clients, the integration takes a holistic look at the availability and reliability of supplies to meet the full complement of demands.

7.1 Average Water Year Conditions

Under this water supply scenario, PCWA would anticipate full availability of its supplies as detailed in Chapter 3. The resulting total supplies from **Table 3-3** and the forecasted demands from **Table 4-16** are shown in **Table 7-1**. As demonstrated, PCWA has sufficient water supplies through projected build-out conditions during an average year.

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

Average	2020	2025	2030	2035	2040	2045	BO
Supply	233,800	268,300	270,800	272,800	273,800	274,800	274,800
Demand	177,351	196,950	209,954	224,056	246,250	256,060	271,690
Difference	56,449	71,350	60,846	48,744	27,550	18,740	3,110

7.2 Single Dry Year Conditions

In a single dry year condition, PCWA anticipates reductions to its surface water supplies consistent with the projection in **Table 3-4**.

For purposes of this 2015 UWMP, PCWA includes the following assumptions regarding demands in a single dry year:

- Retail treated water demands are increased by 5 percent for each 5-year increment to account for customers demanding supplies earlier in the spring than during a normal year when rainfall would otherwise satisfy landscape irrigation water needs. PCWA has experienced this phenomenon in the past. However, PCWA also anticipates earlier triggering of its WSCP during extreme single dry conditions such as reflected in the constraints to supplies discussed in Chapter 3. To reflect this assumption, the

[71] This is consistent with CWC Section 10635, but extends the period an additional 5 years to provide "20-year" analysis coverage for the intervening years between UWMP updates.

now-increased retail treated demands are reduced by 30 percent, consistent with Stage 2 of the WSCP.

- Retail untreated (irrigation) customers are expected to absorb the largest reduction in demand when supplies are significantly constrained under this type of condition. For purposes of this 2015 UWMP, this class of retail customers, often agricultural customers, are expected to reduce demand for PCWA supplies by 50 percent.
- Wholesale treated demands are also anticipated to diminish, but only as governed by the retail purveyor's own shortage actions. For purposes of this 2015 UWMP, this class of customer's demand is conservatively assumed to reduce only 25 percent from the normal condition.
- Wholesale untreated demands during this type of supply shortage condition are governed by the contracts. The assumed single-dry year values are detailed in **Table 4-12**.

Table 7-2 details the results of these demand reduction assumptions in comparison to available supplies under single dry year conditions. As demonstrated, and with the represented demand adjustments, PCWA has sufficient water supplies through projected build-out conditions during the single driest year.

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

Single Dry	2020	2025	2030	2035	2040	2045	BO
Supply	138,450	156,950	161,450	163,450	165,450	166,450	166,450
Demand	98,673	106,892	116,988	128,069	146,915	154,538	166,133
Difference	39,777	50,058	44,462	35,381	18,536	11,912	317

7.3 Multiple Dry Year Conditions

For purposes of this UMWP, PCWA has assessed a three-year series of dry conditions that mimic supply conditions from 1990 through 1992. The supplies available during this series of multiple dry years were not as constrained as during the representative single dry year condition. Although, as experienced with this most recent drought period, actual water supply availability over multiple years is dependent on many factors that will require flexibility for PCWA to manage supplies and implementation of its WSCP stages accordingly.

The supply assumptions for the multi-dry year condition are presented in **Table 3-5**. Because these supplies are less constrained, modifications to demand are also less constrained than assumed for the single-dry year condition. For purposes of this 2015 UWMP, the following demand modifications are assumed:

- Retail treated demands are still expected to increase, consistent with the single-dry year assumption. To reflect this condition, average water demands for this customer class are increased by 5 percent. But, because supplies are less restricted, PCWA is assumed to only implement Stage 1 of its WSCP, seeking a 20 percent reduction from these elevated demands. However, for this 2015 UWMP, demands are only reduced by a conservative value of 10 percent.
- To maintain parody among retail customers, the retail untreated (irrigation) customers are also only reduced by 10 percent (e.g. 90 percent of their demand is planned to be met).
- Wholesale treated water customers are conservatively only assumed to reduce by 5 percent.
- Wholesale untreated demands during this type of supply shortage condition are governed by the contracts. The assumed multi-dry year values are detailed in **Table 4-12.**

This resulting analysis has been represented in **Table 7-3**. PCWA anticipates adequate water supplies being available. As demonstrated, and with the represented demand adjustments, PCWA has sufficient water supplies through projected build-out conditions during a series of multiple dry year conditions.

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

Multi-Dry	2020	2025	2030	2035	2040	2045	BO
Supply	204,500	231,000	233,500	235,500	236,500	237,500	237,500
Demand	142,335	152,651	165,272	178,971	200,562	209,936	224,741
Difference	62,165	78,349	68,228	56,529	35,939	27,564	12,759

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