Chapter 10 Climate Change

Responding to climate change involves two sets of actions: adaptation and mitigation. Adaptation requires an agency to anticipate potential changes to regional water supplies due to climate change (vulnerability assessment), and to develop and implement strategies to respond to the anticipated changes. Mitigation on the other hand, involves activities to reduce greenhouse gas (GHG) emissions to help reduce the driving factor of climate change. Information in this chapter covers both adaptation and mitigation, and includes an assessment of climate change vulnerability specifically for the water resources system in which PWP is embedded, which includes not only local elements, but also the Sacramento-San Joaquin Bay Delta and the Colorado River.

10.1 Introduction

10.1.1 Climate Change in the Bay Delta and the Colorado River Basin

PWP's largest single source of water in its supply portfolio is imported water from MWD, which imports its supplies from the Bay-Delta and the Colorado River. Climate change is anticipated to cause significant changes to temperature, sea level, and precipitation patterns throughout California, which may impact Bay-Delta supplies that provide the basis for the SWP. The combination of these factors could lead to increased sea water intrusion in coastal aquifers and estuaries, decreased snowpack in the Sierra Nevada mountain range, coupled with earlier melting, leading to decreased water from snowmelt available in summer months, and an increase in the intensity of storm events. Each of these factors presents a unique set of challenges for water supply managers, and necessitates careful planning to ensure sustainable water supplies are available into the future. The potential effects of climate change as they relate to SWP supplies are extensively documented by the DWR[9].

Similar effects of climate change in terms of changes in the amount of precipitation, snowpack, snow melt, and storm events have been documented by the United States Bureau of Reclamation (USBR) as part of their multiple research tasks on the Colorado River Basin[10]. The Colorado River Basin is currently experiencing 20-year drought conditions.

10.1.2 Climate Action Plan

The City of Pasadena's Climate Action Plan (CAP) was adopted by City Council in 2018 and specifically addresses climate change mitigation. The plan is described in detail in Section 1.4.3 and is an integral part of Pasadena's response to climate change.

---

[9] California Department of Water Resources (DWR), 2020. *The Final State Water Project Delivery Capability Report 2019*. August.

[10] U.S. Bureau of Reclamation. 2016. *Managing Water in the West Chapter 3: Colorado River Basin.* March.

10.1.3 Pasadena Specific Climate Change Studies

PWP's Water Quality Manager, Dr. David Kimbrough, completed two Pasadena specific climate change studies, as documented in *"Impact of Local Climate Change on Drinking Water Quality in a Distribution System"* (2017) and *"Local Climate Change in Pasadena, Calif., and the Impact on Streamflow"* (2019).

In the first study, air temperatures were collected between 1985 and 2016 and compared with water temperatures in four locations in PWP's distribution system, which received surface water imported into Pasadena between 2001 and 2016 from MWD. As air temperature in the study area increased, water temperatures also increased resulting in the loss of disinfectant residual and the increase in the activity of ammonia-oxidizing bacteria. In localities where climate change is most measurable, local water purveyors will need to adapt to warmer water to ensure stable concentrations of disinfectants. This might mean more labor dedicated to flushing low residual or nitrified water, more chlorination of the distribution system, and overall increased labor and chemical costs. Local climate change will challenge local water purveyors to maintain water quality.

In the study analyzing climate change effects on streamflow, the streamflow in the Arroyo Seco was analyzed. Pasadena, Calif., has used the Arroyo Seco as a source of water for more than 100 years. During this period, local air temperatures have risen dramatically, resulting in a significant increase in streamflow. The median streamflow in the period 1962–2016 was 30% higher than the median streamflow in the period 1910–1961. A substantial portion of that increase has been in the form of extreme flow episodes, with flows greater than 1 m^3/s. If the data from the recent drought (2011–2016) are eliminated, the increase in streamflow is even greater. The study would suggest that the impacts of local climate change in the Pasadena area are positive for water supply, given that more water is flowing in the stream. There has been an increase in streamflow year-round but especially during the winter months and March. This could mean that more water could be settled, diverted, and spread year-round, increasing stormwater capture and groundwater recharge. During extreme flows, however, large quantities of debris, sediment, and turbidity are mobilized and not captured. Furthermore, the stormwater capture system has limited capacity to capture high-velocity and high-volume streamflows. With high-velocity/high-volume flows, much of the water will simply overtop the weirs and not be diverted to capture facilities. This is why future projects, such as the Arroyo Seco Canyon project described in Section 6.3.3.1, are so important.

10.1.4 Vulnerability Matrix

Table 10-1 presents the prioritized climate change vulnerability issues developed through the Greater Los Angeles County (GLAC) Integrated Regional Water Management (IRWM) planning process, which has been modified to reflect only those issues relevant to PWP and its service area. Given that PWP's service area is not located on the coast and is not reliant on a coastal groundwater basin, nor does it have critical water infrastructure along a coast line, the GLAC vulnerability analysis has been modified to indicate that sea level rise will not significantly impact PWP's local supplies.

Table 10-1: Prioritized Climate Change Vulnerability Issues for PWP

Level	Vulnerability
High	• Decreased ability to meet water conservation goals • Reduced resiliency to drought • Municipal water demand would increase • Decrease in imported water supplies (from impacts to the Bay-Delta system) • Increase in wildfire risk and erosion and sedimentation which may impact water quality, flood control, and habitat
Medium	• Invasive species can reduce water supply available, alter flood regimes, and alter wildfire regimes • Decrease in local surface water supply • Increase in nutrient loading and decreased Dissolved Oxygen • Decrease in dilution flows • Increase in source control or surface water treatment • Increased impacts to habitat and flow availability for species
Low	• Limited ability to meet higher peaks in water demand (both seasonally and annually) • Habitat water demand would increase • Increases in inland and flash flooding

10.1.5 Supply

Local Supplies

Local climate change impacts are expected but they are difficult to predict. The U.S. Department of the Interior Bureau of Reclamation's (Reclamation) Los Angeles County Basin Study[11] predicts a potential increase in basin-wide annual precipitation due to climate change, although the variability of storms could see higher peaks and lower flows. The study also indicates that higher temperatures would be offset by wetter years.

In reviewing results of local studies, it is important to keep in mind that localized results of temperature and precipitation analysis undergo a chain of modeling and analytical steps, each of which is based on multiple sets of assumptions. These steps also include inherent uncertainty, error, and bias, and it is therefore common to see precipitation and temperature model results with significantly varying values for the PWP area of interest. The typical steps included in climate change analysis are presented in Figure 10-1[12].

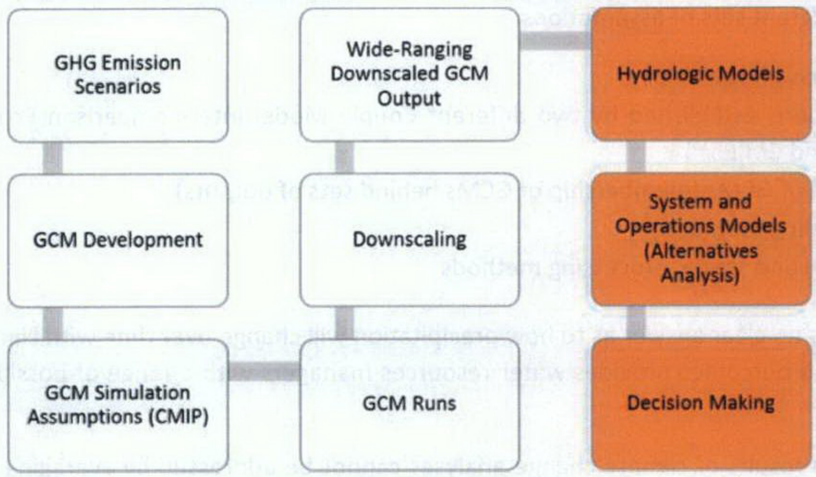
The discussion in the following sections includes studies that have been completed with varying assumptions and methods in the six white boxes shown in Figure 10-1. The studies available to PWP vary

[11] U.S. Bureau of Reclamation. 2016. *Los Angeles County Basin Study.* November.

[12] Lopezcalva, et.al. 2015. *Deconstructing Climate Change Uncertainty to Support Decision Making in Water Supply Planning*. American Water Works Association 2015 Annual Conference. Conference proceedings.

in their assumptions related to the different analytical steps, from the selection of GHG emission scenarios, to downscaling methods, which are highly technical processes to "localize" Global Circulation Model (GCM) results to specific places of interest.

Figure 10-1: Steps in Climate Change Analysis and Decision-Making



Temperature

The Climate Change in the Los Angeles Region Project (CCLARP)[13] engaged in extensive dynamic and statistical modeling to translate GCMs to the regional level. The CCLARP downscaled more than 30 global climate models to a 2-kilometer resolution, allowing for regional-scale climate projections. The project considered two warming scenarios: 'Business as Usual,' which projects recent GHG emissions trends into the future, and a 'Mitigation' scenario based on reduced GHG emissions on a global scale in the coming decades. Under both scenarios, temperature is projected to rise significantly by mid-century; under Business as Usual scenario, the regional average increases by 4.3 ^{0}F with temperatures under the Mitigation scenario reaching 70% of that.

Precipitation

The effect that climate change will have on precipitation is predicted with considerably less consistency than temperature. Some global climate models predict increases in average precipitation, while others predict decreases. This variation is due to the much more complex nature of precipitation as a hydroclimatic response to the warming forcing from GHGs, leading to large differences in predictions.

Based on the downscaling of 36 available GCMs, CCLARP found that the effect of climate change on precipitation by mid-century exhibited greater uncertainty than temperature, as expected. Some of the GCMs predict a slight decrease in total precipitation, others predict an increase, and others predict no change.

---

[13] University of California Los Angeles. 2016. *Our Research: The Climate Change in the Los Angeles Region Project.* http://research.atmos.ucla.edu/csrl/LA_project_summary.html

In contrast, the Los Angeles Basin Stormwater Conservation Study (LABSCS) study [14] predicted precipitation to increase by an average of 40% in Los Angeles County. The GLAC IRWMP vulnerability assessment, on the other hand, was based on a predicted 2 to 5 inch decrease in average rainfall depending on elevation. The seeming contradiction of these precipitation estimates can be explained by the difficulty in predicting a complex phenomenon into the future, and in many cases, it is also explained by the use of different sets of assumptions:

- GHG emission scenarios
- Assumptions established by two different Couple Model Inter-comparison Projects (known as CMIP3 and CMIP5[15])
- Selection of GCMs (membership of GCMs behind sets of outputs)
- Downscaling methods
- Temporal and spatial processing methods

Although there is no clear answer as to how precipitation will change over time with climate change, the range of modeled outcomes provides water resources managers with a range of possible conditions to consider.

The variability in results of climate change analyses cannot be addressed by averaging results of many sources to obtain the most likely values. Similarly, combining results into probability distributions or ensembles from which hydrologic models can sample is not a valid solution in most cases. To make robust decisions, it is important to have a consistent framework and set of assumptions and methods, so that results can be interpreted in a meaningful manner.

Surface Water and Stormwater

Changes in the total volume and timing of precipitation could impact surface and stormwater resources in the Arroyo Seco and Eaton Canyon watersheds. As discussed in Section 10.1.3 above, the increased intensity of precipitation events that is anticipated with climate change could lead to larger volumes of water available more infrequently. This could change the availability of surface water throughout the year even if the total volume of precipitation remains unchanged. Future projects related to the capture and use of stormwater should consider the potential of higher intensity storms delivering larger volumes of water over shorter periods of time, specifically in the winter months. The Arroyo Seco Canyon Project presented in Section 6.3.3.1 would allow for additional capture of stormwater during this time period that benefits the overall groundwater basin. Also, the enlargements of the Eaton Wash Spreading Grounds by Los Angeles County Department of Public Works will help capture additional flows.

---

[14] U.S. Bureau of Reclamation. 2014. *Los Angeles Basin Stormwater Conservation Study - Task 2 Water Supply & Water Demand Projections.*

[15] The significance of CMIP3 and CMIP5 is that they represent efforts by the global community of scientists to establish uniform assumptions and protocols to run Global Circulation Models (GCMs), and they result in two different sets of forecasts. Any GCM will produce different results when running under CMIP3 vs. CMIP5 assumptions. For more detail information visit the Program for Climate Model Diagnosis and Inter-comparison (http://www-pcmdi.llnl.gov/)

Changes in the total volume of rainfall could also impact the availability of supplies. A decrease or no change in precipitation coupled with higher intensity storms would mean longer dry periods. An increase in total precipitation, particularly coupled with higher intensity storms, could increase the likelihood and intensity of flooding.

In addition, warmer temperatures in Southern California will increase evaporation rates in storage reservoirs resulting in additional loss of water supplies.

Groundwater

Climate change is very likely to influence the natural safe yield and/or operational yield of the Raymond Basin, even though the basin is not at risk of salt water intrusion due to sea level rise. The combined impact of temperature and precipitation could impact the rate of recharge to the basin, though the extent to which this may occur is unknown. Given that there is a lack of consensus on the effect of climate change on precipitation, there is little basis on which to estimate the impact of climate change to groundwater supplies. While the impact is likely to occur given the close correlation between local precipitation and yield (natural and operational), that impact cannot be predicted without a specific comprehensive study at the local level. As PWP has demonstrated since the development of the WIRP, climate change is an element of planning that will continue to be explicitly addressed in water supply planning. The yield of any groundwater basin is based on a combination of science and policy, and with better understanding of the potential impacts of climate change to the basin, the policy that governs PWP's access to groundwater supplies can be adjusted with reliability and sustainability as primary goals.

Imported Supplies

Colorado River Aqueduct

The current drought in the Colorado River Basin has persisted since 2000, leading to great concerns about the long-term reliability of basin water supplies. The period from 2000 through 2020 was the driest 21-year period in the Colorado River Basin in more than 100 years of record-keeping and one of the driest in the past 1,200 years based on paleohydrology data[16]. On May 20, 2019, the Department of the Interior, Reclamation, and representatives from the seven Colorado River Basin States signed the Colorado River Drought Contingency Plans at Hoover Dam, ensuring a greater likelihood of sustainable operation of the Colorado River System through December 31, 2026. This required tremendous collaboration, coordination, and compromise by the Basin States, Tribes, non-governmental organizations, and Mexico.

Vulnerability or resource risks in the basin were related to both projected impacts to basin water supply and water demand. Key findings related to projected changes in temperature, precipitation, snowpack, and runoff through 2060 are presented below[17].

- **Temperature** is projected to increase across the basin, with the largest changes in spring and summer and with larger changes in the Upper Basin than in the Lower Basin.

[16] U.S. Bureau of Reclamation. 2021. *Water Reliability in the West.* January.

[17] U.S. Bureau of Reclamation. 2016. *Managing Water in the West Chapter 3: Colorado River Basin.* March.

- **Precipitation** patterns continue to be spatially and temporally complex, but projected seasonal trends toward drying are significant in certain regions. A general trend basin-wide is toward drying, although increases in precipitation are projected for some higher elevation and hydrologically productive regions. Consistent and expansive drying conditions are projected for the spring throughout the basin. For much of the basin, drying conditions are also projected in the summer, although slight increases in precipitation are projected for some areas of the Lower Basin, which may be attributed to the monsoonal influence in this region. Fall and winter precipitation is projected to increase in the Upper Basin but to decrease in the Lower Basin.
- **Snowpack** is projected to decrease as more precipitation falls as rain rather than snow, and warmer temperatures cause an earlier melt. Even in areas where precipitation increases or does not change, decreased snowpack is projected in the fall and early winter as warming temperatures result in more rain and less snow. Substantial decreases in spring snowpack are projected to be widespread, due to earlier melt or sublimation of snowpack.
- **Runoff** (both direct and baseflow) is spatially diverse, but is generally projected to decrease, except in the northern Rockies. As with precipitation, runoff is projected to increase significantly in the higher elevation Upper Basin during winter, but is projected to decrease during spring and summer.
- **Droughts** lasting 5 or more years are projected to occur 50 percent of the time over the next 50 years.

Climate change is likely to decrease the reliability of the CRA and increase the frequency of supply shortages from this source to MWD, with resulting potential shortages to PWP. However with collaborative programs described above, the USBR is progressing to develop a sustainable resource.

State Water Project

SWP deliveries are highly susceptible to climate change. Snowpack in the Sierra Nevada mountain range functions as a fundamentally important reservoir, slowly releasing water supplies into the summer months when supplies are most needed. Increased temperatures and decreased precipitation will decrease the snowpack, thereby decreasing the availability of water into the spring and summer months. The conversion of snowfall to rainfall will also increase the runoff from winter storms, and could lead to increased flooding in winter months. DWR projects that the Sierra Nevada snowpack may diminish by 48–65 percent from 1961–1990 levels[18].

Complications induced by climate change also pose the threat of increased variability in floods and droughts, and the projected sea level rise, caused by the increase in average temperature, complicate efforts to manage salinity levels in the channels affected by tides. Higher ocean levels could result in more frequent water quality degradation in the Delta channels requiring additional outflow from the Delta to maintain water quality objectives, and reduced delivery capability.

---

[18] California Department of Water Resources, 2019. *Climate Action Plan Phase 3: Climate Change Vulnerability Assessment.* February.

The original State Water Contract called for an ultimate delivery capacity of 4.2 MAF, with 1.91 MAF allocated to MWD pursuant to its participation in the SWP[19]. SWP deliveries in the most recent critically dry years lagged these projections and were 5 percent of contractual amounts in 2014 and 20 percent of contractual amounts in 2015. Current dry conditions in 2020 are also only supporting a supply allocation of only 20 percent. Consequently, Metropolitan's key concern is the continual deterioration of water supply reliability, and thereby a reduced reliability to PWP.

10.1.6 Demand

Local demand impacts resulting from climate change cannot be definitively predicted with the results from available studies, due to the degree of discrepancy in precipitation forecasts. The studies referenced above, while agreeing on an increase in temperature under climate change, came to a different conclusion on the impact to overall precipitation due to climate change. The GLAC IRWMP included expected, but unquantified, increases in demand. The LABSCS study considered the impact of an increase in temperature and an increase in precipitation on demand and found that demand would decrease by 1%.

To further illustrate the point of the importance of consistent assumptions and methods for the steps depicted in Figure 10-1, one could consider the outputs used in the above-mentioned studies:

- GLAC IRWMP: outputs available when this study was developed corresponded to what is known as CMIP3
- LABSCS: outputs used for this study correspond to what is known as CMIP5

The CMIP3-based GCM outputs were applied to the same demand model used in the LABSCS, and results show an increase in demand between 4% and 6% (given the dryer conditions predicted by GCM models under CMIP3). This is expected, since water demand is a function of both temperature and precipitation, and predictions of climate change impacts on demand will be highly dependent on predictions of precipitation. For future planning studies, PWP will be able to conduct climate change assessments with a consistent set of data, forecasts and assumptions, using DWR's technical guidance for the analysis.

In order to be prepared for and adaptive to climate change, it is important to consider the possibility of both increased and decreased outdoor demand due to climate change. One method for decreasing the uncertainty associated with climate change-induced increases in demand is to minimize the contribution of outdoor water use to overall demand. Minimization of this contribution to overall demand will help to decrease the sensitivity of total demand to changes in temperature and precipitation.

10.1.7 Conclusion

Multiple studies for Pasadena, the Los Angeles region, California in general, and the Colorado River show clear impacts of climate change in the supply-demand balance of California and PWP's service area in the future. While predictions of precipitation can be very different for different models under different sets of assumptions, predictions on future temperature have a high degree of agreement. There is also a high degree of agreement on changes in precipitation, even though the magnitude and direction of the changes is uncertain.

[19] Metropolitan Water District of Southern California. 2021. *Draft 2020 Urban Water Management Plan.* February.

While climate change predictions at the local (PWP service area) level are uncertain, there is a high degree of agreement from the scientific community on the impact of climate change to SWP and Colorado River supplies, which represent the main and largest sources of supply to MWD, which in turn is the largest supplier for PWP. Given the predicted changes in temperature and precipitation, with resulting changes in water supply-demand balance, PWP will continue to take climate change into account in future supply plans.

10.2 Mitigation

10.2.1 Energy Intensity

This Section includes an assessment of the energy intensity of the water supply operation in PWP's study area as required by Water Code Section 10631.2 (a).

The energy intensity of PWP's water supply was calculated in accordance with recommendations made by DWR as part of the 2020 UWMP. The water- energy intensity is defined by DWR as the total amount of energy required to use a given volume of water within an agency's service area. The water-energy intensity is a sum of the whole water system that is under control of the water agency, thus energy used to treat or transport water to the agency by a wholesaler is not included. PWP was able to break down the energy used by its water system into the categories of extraction and diversion, placement in storage, treatment, conveyance, and distribution through an analysis of booster pump applications and locations within the water system. Table 10-2 presents the energy intensity by water supply process, with data on volumes of water entering the process and energy use for the same process.

All energy consumed by wells was reported as 'extract and divert.' Water was 'placed in storage' during 2020 through infiltration at the Arroyo Seco Spreading Grounds. One booster, Ventura, is associated with treatment; therefore, all energy used by that booster is accounted for in the 'treatment' category. Water is treated on-site, therefore no energy consumption is associated with 'conveyance.' All other boosters are included under 'distribution.' Power usage for both Santa Anita and Allen Boosters, which are outside the City's boundaries, were included by using invoices from Southern California Edison. All other facilities inside City boundaries were included using power invoices from PWP. Arroyo Well & Booster share the same power meter as does Sunset Well & Booster. Power usage was estimated by taking the water usage (meter reads) for both well & booster, and calculating the percentage of total for each. The same ratio was applied to calculate power usage.

The system-wide energy intensity of PWP's water supply was calculated as 1,085 kilowatt-hours (kWh) per acre-foot of water (kWh/AF).

Table 10-2: Water Sector Energy Intensity for PWP's Service Area

DWR Table O-1A: Voluntary Energy Intensity - Water Supply Process Approach						
	Water Management Process					
	Extract and Divert	**Place into Storage**	**Conveyance**	**Treatment**	**Distribution**	***Total Utility***
Volume of Water Entering Process (AF)	11,230	1920	*0*	3702	16,650	*16,650*
Energy Consumed (kWh)	9,335,300	38	*0*	1,073,600	7,652,700	*18,061,638*
Energy Intensity (kWh/AF)	*831*	*0.02*	*0*	*290*	*460*	*1,085*

In addition to the energy intensity of the local water supply operation for PWP, it is important to consider the energy intensity embedded in the imported supply from MWD. MWD has reported its treated water energy intensity in its 2020 Draft UWMP as 1,920 kWh/AF. This value is greater than the 2020 energy intensity of PWP's local supplies of 1,085 kWh/AF.

Moving forward, PWP is analyzing the feasibility of including renewable energy production in all its capital improvement projects to reduce future energy intensity.

PASADENA Water & Power

APPENDIX A

WATER CODE CHECKLIST

Checklist Arranged by Water Code Section

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5	Chapter 5
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Section 5.3.1
10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Section 5.7	Section 5.3.3
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Sections 5.2 and 5.5.7	Section 5.2
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Chapter 10	Section 2.3
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	N/A
10608.4	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	Section 5.3.2

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Chapter 1	Executive Summary
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	Section 2.1
10620(d)(3)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5.2	Section 2.2
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.2.4	Section 7.1
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	Section 2.2
10621(c)	If supplier is regulated by the Public Utilities Commission, include its plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	Section 10.6	N/A
10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	Section 2.3
10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information.	Summary	Chapter 1	Executive Summary

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 3.1.1
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 3.2
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Section 3.1.1, 5.3
10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.4	Section 3.3.1
10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 3.3.2
10631(a)	Describe the land uses within the service area.	System Description	Section 3.5	Section 3.4
10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.2.8	Section 6.7
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 6.2
10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, including changes in supply due to climate change.	System Supplies	Section 6.1, 6.2	Chapter 6
10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 6.1	Chapter 6
10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.1	Section 6.7

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2	Section 6.2.2
10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.2.2	Section 6.2
10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	Section 6.2.2
10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.2.3	N/A
10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years.	System Supplies	Section 6.2.4	Section 6.2.4
10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.2	Section 6.2
10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.7	Section 6.5
10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Section 4.2

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 4.3.2.4	Section 4.3
10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.2.4	N/A
10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	Section 4.2.6	Section 4.4
10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.2.6	Section 4.4
10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.1 and 9.3	Chapter 9
10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.2 and 9.3	N/A
10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	Section 6.8	Section 6.7
10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 6.6
10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	Section 2.5.1	Section 2.2

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	N/A
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	Section 4.5
10631.2(a)	The UWMP must include energy intensity information as stated in the code.	System Suppliers, Energy Intensity	Section 6.4 and App O	Section 10.2
10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Chapter 8	Chapter 8
10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7) in the WSCP.	Water Shortage Contingency Planning	Chapter 8	Section 8.1
10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Section 8.2	Section 8.2.1
10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Section 8.2	Section 8.2.2

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Section 8.3	Section 8.3
10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Section 8.4	Section 8.3
10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Section 8.4	Section 8.4.1
10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Section 8.4	Section 8.4.2
10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Section 8.4	Section 8.4.3
10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Section 8.4	Section 8.3
10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Section 8.4	Section 8.4

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Section 8.5	Section 8.5
10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Section 8.5, 8.6	Section 8.5
10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Section 8.6	Section 8.6
10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Section 8.7	Section 8.7
10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Section 8.7	Section 8.5
10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Section 8.7	Section 8.5
10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8	Section 8.8
10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.8	Section 8.8

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10632(a)(8)(C)	Describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought.	Water Shortage Contingency Planning	Section 8.8	Section 8.6
10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Section 8.9	Section 8.9
10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Section 8.10	Section 8.10
10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Section 8.11	Section 8.11
10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 days after adopting the plan.	Water Shortage Contingency Planning	Section 8.14	Section 8.12
10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Planning	Section 8.4.6	Section 8.4.5.2
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	Section 6.2	Section 6.4

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.2	Section 6.4
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2	Section 6.4
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.2	Section 6.4
10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.2	Section 6.4
10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.2	Section 6.4
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.2	Section 6.4
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability.	Water Supply Reliability Assessment	Chapter 7	Chapter 7

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.3	Section 7.3
10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.3	Section 7.3
10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Section 7.3	Section 7.3
10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.3	Section 7.1
10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.3	Section 7.3
10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change condition, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Section 7.3	Section 7.1
10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 8.12, 10.4	Section 8.12, 2.3

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	Section 2.6	Section 2.2
10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	Section 2.2
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Section 10.2.2	Section 2.2
10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.2	Section 2.3
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4	Section 2.3
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4	Section 2.3
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Section 2.3
10644(b)	If revised, submit a copy of the Water Shortage Contingency Plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 10.7.2	Section 2.3

Water Code Section	UWMP Requirement	Subject	2020 Guidebook Location	2020 UWMP Location
10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Section 2.3
10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Section 2.3

APPENDIX B

DWR SUBMITTAL TABLES

Submittal Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
1910124	City of Pasadena Water and Power	38,421	29,290
	TOTAL	38,421	29,290
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES:			

Submittal Table 2-2: Plan Identification			
Select Only One	Type of Plan		Name of RUWMP or Regional Alliance *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

Submittal Table 2-4 Retail: Water Supplier Information Exchange
The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
Metropolitan Water District of Southern California
NOTES:

Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	170,400	173,508	181,466	185,702	189,927	
NOTES:						

Submittal Table 4-1 Retail: Demands for Potable and Non-Potable [1] Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Single Family		Drinking Water	13,593
Multi-Family		Drinking Water	5,190
Commercial	This category includes both commercial and industrial uses per PWP's billing system	Drinking Water	6,530
Institutional/Governmental	This category includes water use from City Accounts per PWP's customer billing system	Drinking Water	1,311
Losses	This category includes real and apparent water losses	Drinking Water	2,586
Other	This category includes authorized unbilled water use from water loss	Drinking Water	80
		TOTAL	29,290

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*
[2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: In 2020 the water sales were approximately 26,640 AFY. The difference between the production and water sales was approximately 2,650 AF.

Submittal Table 4-2 Retail: Use for Potable and Non-Potable[1] Water - Projected						
Use Type	Additional Description (as needed)	Projected Water Use[2] *Report To the Extent that Records are Available*				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		12,800	12,000	11,900	11,800	
Multi-Family		4,800	4,550	5,000	5,250	
Commercial		6,500	5,900	5,850	6,000	
Institutional/Governmental		900	850	870	900	
Losses		1,650	1,600	1,550	1,500	
Other		100	100	150	180	
	TOTAL	26,750	25,000	25,320	25,630	0

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.* [2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	29,290	26,750	25,000	25,320	25,630	0
Recycled Water Demand[1] *From Table 6-4*	0	0	0	0	0	0
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	29,290	26,750	25,000	25,320	25,630	0

[1] Recycled water demand fields will be blank until Table 6-4 is complete

[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier ***may*** *deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*

NOTES:

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2016	N/A
01/2017	2305
01/2018	1430
01/2019	1640
01/2020	2586

[1] *Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*

[2] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: SB 555 was not in effect in 2016

Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	Section 4.4
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES: This includes compliance with AB 1668 and SB 606	

Submittal Table 5-1 Baselines and Targets Summary From SB X7-7 Verification Form *Retail Supplier or Regional Alliance Only*				
Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*1995*	*2004*	*211*	*169*
5 Year	*2003*	*2007*	*208*	
**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES:				

Submittal Table 5-2: 2020 Compliance SB X7-7 2020 Compliance Form *Retail Supplier or Regional Alliance Only*			From	
2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
153	*0*	*153*	*169*	*Yes*
**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES:				

Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Raymond Basin	10650	11150	10690	7481	11230
	TOTAL	10,650	11,150	10,690	7,481	11,230
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: As CY 2019 was wet with approximately 32" of annual rain, PWP purchased 2,000 AFY of water from MWD at discounted price and turned of its wells to replenish the groundwater basin.						

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
☑	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
Total Wastewater Collected from Service Area in 2020:		0				
** Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020											
☑	**No wastewater is treated or disposed of within the UWMP service area.** The supplier will not complete the table below.										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal ***Drop down list***	Does This Plant Treat Wastewater Generated Outside the Service Area? ***Drop down list***	Treatment Level ***Drop down list***	2020 volumes [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
							Total	0	0	0	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES:

Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area

☑ Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.

Name of Supplier Producing (Treating) the Recycled Water:	
Name of Supplier Operating the Recycled Water Distribution System:	
Supplemental Water Added in 2020 (volume) *Include units*	
Source of 2020 Supplemental Water	

Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units* [1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020 [1]	2025 [1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)
Agricultural irrigation										
Landscape irrigation (exc golf courses)										
Golf course irrigation										
Commercial use										
Industrial use										
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)										
				Total:	0	0	0	0	0	0
				2020 Internal Reuse						

[1] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:

Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.	
Beneficial Use Type	**2015 Projection for 2020** [1]	**2020 Actual Use**[1]
Insert additional rows as needed.		
Agricultural irrigation		
Landscape irrigation (exc golf courses)	120	0
Golf course irrigation	550	0
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)	30	0
Total	700	0
[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.		
NOTE: Other include mixed uses and cooling. The projections in the 2015 UWMP Table 5-5, page 5-17, were based on the schedule for the Pasadena Non-Potable Water Project. However, Pasadena in partnership with the City of Los Angeles is in a process of modifying the project to a Direct Potable Reuse project, which will produce drinking water from the recycled water.		

Submittal Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☑	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
		Total	0
**Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: n/a			

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
Arroyo Seco Canyon Project	No		Expansion of spreading basins in the Arroyo Seco	2022	All Year Types	800
Arroyo Seco Pump Back Project	No		Spreading of surface water captured behind Devil's Gate Dam	2023	All Year Types	600
***Units of measure (AF, CCF, MG)** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-8 Retail: Water Supplies — Actual					
Water Supply	Additional Detail on Water Supply	2020			
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Groundwater (not desalinated)		11,230	Drinking Water	
Purchased or Imported Water		18,120	Drinking Water	
Other	Sold to other agencies	-60	Drinking Water	
	Total	29,290		0
**Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: Purchased water includes 17,940 AF of imported water from MWD and 180 AF from other utilities. Pasadena sold approximately 60 AF to other utilities.				

Submittal Table 6-9 Retail: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	Projected Water Supply * Report To the Extent Practicable									
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		2025		2030		2035		2040		2045 (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Groundwater (not desalinated)	Drinking water	19,248		19,362		19,454		19,527		n/a	
Purchased or Imported Water	Drinking water	11,830		11,830		11,830		11,830		n/a	
	Total	31,078	0	31,192	0	31,284	0	31,357	0	0	0

**Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Projections by MWD, dated 2/21/2021 for Pasadena

Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location ______________	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	**% of Average Supply**
Average Year	2012	36700	100%
Single-Dry Year	2018	33700	92%
Consecutive Dry Years 1st Year	2014	34100	93%
Consecutive Dry Years 2nd Year	2015	35000	95%
Consecutive Dry Years 3rd Year	2016	33700	92%
Consecutive Dry Years 4th Year	2017	34200	93%
Consecutive Dry Years 5th Year	2018	33700	92%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

****Units of measure (AF, CCF, MG*** *) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: In 2012 pumped groundwater was 13,700 AFY, available imported water was 23,000 AFY. In 2018 pumped groundwater was about 10,700 AFY, available imported water was 23,000 AFY. For the 5 consecutive historic dry years pumped groundwater was from approximately 10,700 to 12,000 AFY, the available imported water from MWD was 23,000 AFY.

Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	31,078	31,192	31,284	31,357	0
Demand totals *(autofill from Table 4-3)*	26,750	25,000	25,320	25,630	0
Difference	4,328	6,192	5,964	5,727	0
NOTES:					

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	31,886	32,003	32,098	32,172	
Demand totals*	26,750	25,000	25,320	25,630	
Difference	5,136	7,003	6,778	6,542	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: MWD projections for available supply to Pasadena for single dry-year, dated 2/21/2021. Future active conservation will lower the demands.					

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	31,533	31,943	32,047	32,130	
	Demand totals	26,750	25,000	25,320	25,630	
	Difference	4,783	6,943	6,727	6,500	0
Second year	Supply totals	31,533	31,943	32,047	32,130	
	Demand totals	26,750	25,000	25,320	25,630	
	Difference	4,783	6,943	6,727	6,500	0
Third year	Supply totals	31,533	31,943	32,047	32,130	
	Demand totals	26,750	25,000	25,320	25,630	
	Difference	4,783	6,943	6,727	6,500	0
Fourth year	Supply totals	31,533	31,943	32,047	32,130	
	Demand totals	26,750	25,000	25,320	25,630	
	Difference	4,783	6,943	6,727	6,500	0
Fifth year	Supply totals	31,533	31,943	32,047	32,130	
	Demand totals	26,750	25,000	25,320	25,630	
	Difference	4,783	6,943	6,727	6,500	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

***Units of measure (AF, CCF, MG)** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: MWD projections for available supplies to Pasadena during 5-consecutive drought years, dated 2/21/2021. Future active conservation will lower the demands.

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)

2021	Total
Total Water Use	28,500
Total Supplies	29,290
Surplus/Shortfall w/o WSCP Action	790
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	182
WSCP - use reduction savings benefit	56
Revised Surplus/(shortfall)	1,028
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	28,065
Total Supplies	31,533
Surplus/Shortfall w/o WSCP Action	3,468
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	182
WSCP - use reduction savings benefit	1,129
Revised Surplus/(shortfall)	4,779
Resulting % Use Reduction from WSCP action	4%

2023	Total
Total Water Use	27,625
Total Supplies	31,533
Surplus/Shortfall w/o WSCP Action	3,908
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	182
WSCP - use reduction savings benefit	1,129
Revised Surplus/(shortfall)	5,219
Resulting % Use Reduction from WSCP action	4%

2024	Total
Total Water Use	27,200
Total Supplies	31,533
Surplus/Shortfall w/o WSCP Action	4,333
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	182
WSCP - use reduction savings benefit	1,129
Revised Surplus/(shortfall)	5,644
Resulting % Use Reduction from WSCP action	4%

Submittal Table 8-1
Water Shortage Contingency Plan Levels

Shortage Level	Percent Shortage Range	Shortage Response Actions (*Narrative description*)
1	Up to 10%	This level corresponds to Pasadena Water and Power's Level 1 Shortage Plan, and includes all permanent water waste prohibitions, plus incremental prohibitions as follows: 1) Limits watering to one day per week from November 1 through March 31, and 3 days per week from April 1 through October 31; and 2) Requires leaks to be repaired within 72 hours of notification.
2	Up to 20%	This level corresponds to Pasadena Water and Power's Level 2 Shortage Plan and includes all permanent water waste prohibitions, plus incremental prohibitions as follows: 1) Limits watering to one day per week from November 1 through March 31, and 2 days per week from April 1 through October 31; 2) Requires leaks to be repaired within 48 hours of notification; and 3) Prohibits the filling or re-filling of ornamental lakes or ponds.
3	Up to 30%	This level corresponds to Pasadena Water and Power's Level 2 Shortage Plan and includes all permanent water waste prohibitions, plus incremental prohibitions as follows: 1) Limits watering to one day per week from November 1 through March 31, and 2 days per week from April 1 through October 31; 2) Requires leaks to be repaired within 48 hours of notification; and 3) Prohibits the filling or re-filling of ornamental lakes or ponds. This Shortage Level also includes enhanced enforcement through water waste patrols deployed during the day, evenings, weekends and nighttime; increased use of violation notices and fines; and enhanced marketing and outreach to customers.
4	Up to 40%	This level corresponds to Pasadena Water and Power's Level 3 Shortage Plan and includes all permanent water waste prohibitions, plus incremental prohibitions as follows: 1) Limits watering to one day per week; 2) Requires leaks to be repaired within 36 hours of notification; and 3) Prohibits the filling or re-filling of ornamental lakes or ponds. This Shortage Level also includes enhanced enforcement through water waste patrols deployed during the day, evenings, weekends and nighttime increased use of violation notices and fines; and enhanced marketing and outreach to customers.

Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only Drop Down List***
Add additional rows as needed				
Permanent	Provide Rebates on Plumbing Fixtures and Devices	829 AF Lifetime Savings		No
Permanent	Offer Water Use Surveys		To recommend to the cus	No
Permanent	Provide Rebates for Turf Replacement	519 AF Lifetime Savings		No
Permanent	Landscape - Restrict or prohibit runoff from landscape irrigation			Yes
Permanent	Provide Rebates for Landscape Irrigation Efficiency	62 AF Lifetime Savings		No
Permanent	Expand Public Information Campaign	278 AF Savings	Use of behavioral efficiency software such as WaterSmart for providing information to customer on their water use	No
Level 1	Increase Water Waste Patrols	Up to 10% GPCD Savings from SBX7-7 Baseline = 715 AF	Increase Water Waste Patrols to actively patrolling areas showing high water use	Yes
Level 1	Reduce System Water Loss	Up to 10% GPCD Savings from SBX7-7 Baseline = 715 AF	Leaks must be repaired within 72 hours	Yes
Level 1	Expand Public Information Campaign	Up to 10% GPCD Savings from SBX7-7 Baseline = 715 AF		
Level 2	Increase Water Waste Patrols	Up to 30% GPCD Savings from SBX7-7 Baseline = 8,696 AF	Increase patrols shifts to cover a 24 hour period with 50% coverage across city neighborhoods	Yes