Attachment 2. Drought Impacts

Monterey Peninsula, Carmel Bay, and South Monterey Bay
Integrated Regional Water Management
2014 Drought Grant Proposal

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2.1 Drought Impacts

2.1.1 Introduction

The ongoing drought across the State of California is having impacts that have brought to the forefront long standing regional water supply and water management vulnerabilities. This is acutely true throughout the Monterey Bay Region that depends solely on local water supplies and has been constantly under pressure to reduce water demands for the protection of critical habitat and prevention of seawater intrusion. The U.S. Drought monitor shows that the Monterey Peninsula region is within the hardest hit area of California undergoing a class D4 "Exceptional Drought."

A first step in recognizing the impact of the current drought on the Monterey Peninsula is to understand factors that make the region uniquely vulnerable. Key factors include the following items that are discussed herein:

- Lack of connection to state and federal water supply projects results in lack of access to surface water and groundwater storage managed by, or connected to, those projects
- Lack of adequate local surface water storage capacity
- Limited capacity to capture and store stormwater runoff in local aquifers
- State mandated limits on pumping from coastal aquifers to prevent environmental damage, including impacts to listed species and from saltwater intrusion
- A history of the Best Management Practices (BMP's) that have reduced urban water consumption from over 90 gallons per capita per day (gpcd) in the mid-1980s to a current use of 60 gpcd, one of the lowest in California

The population of the Monterey Peninsula, approximately 106,400 persons, is entirely dependent on local rainfall and runoff for its potable water supply, with no connections to state or federal water supply projects. As shown in Figure 1, total water production from all sources within the Monterey Peninsula Water Management District (MPWMD) averaged 18,500 acre-feet per year (AFY) during Water Years 1996 through 2013, with the last two years production falling to 16,000 AFY. Suppliers include the largest purveyor in the region – investor-owned California American Water (Cal-Am) – and private wells and water supply systems not connected to Cal-Am. The Cal-Am system, which supplies about 90% of the population in the Monterey Peninsula, supplies about 70% of its demand from well water diverted from the Carmel River Alluvial Aquifer, which underlies the lower 18 miles of the Carmel River. The balance of supply is from wells in the Seaside Groundwater Basin (SGB). In recent years, Cal-Am demand was less than 12,000 AFY, which is a significant drop from its peak production of nearly 19,000 AFY during the 1987 to 1991 drought. Projects benefitting the Monterey Peninsula region in this grant proposal focus on users within the main Cal-Am system.

The average annual runoff of the Carmel River, the largest stream in the region, was 74,400 AF for the period 1962-2013[1]. In 1995, the SWRCB found that water flowing in subterranean channels of the Carmel River (the

[1] U.S. Geological Survey, (USGS) Near Carmel gage.

alluvial aquifer) was under its jurisdiction and ordered Cal-Am to reduce its diversions and find a new water supply. In 2009, the SWRCB issued a Cease-and-Desist Order (CDO) to Cal-Am that implemented a production ramp-down schedule and that would result in a dramatic curtailment of diversions from the Carmel River if the CDO is fully enforced in 2017. Cal-Am could be required to reduce Carmel River diversions from about 10,000 AFY today to its authorized amount of 3,376 AFY.

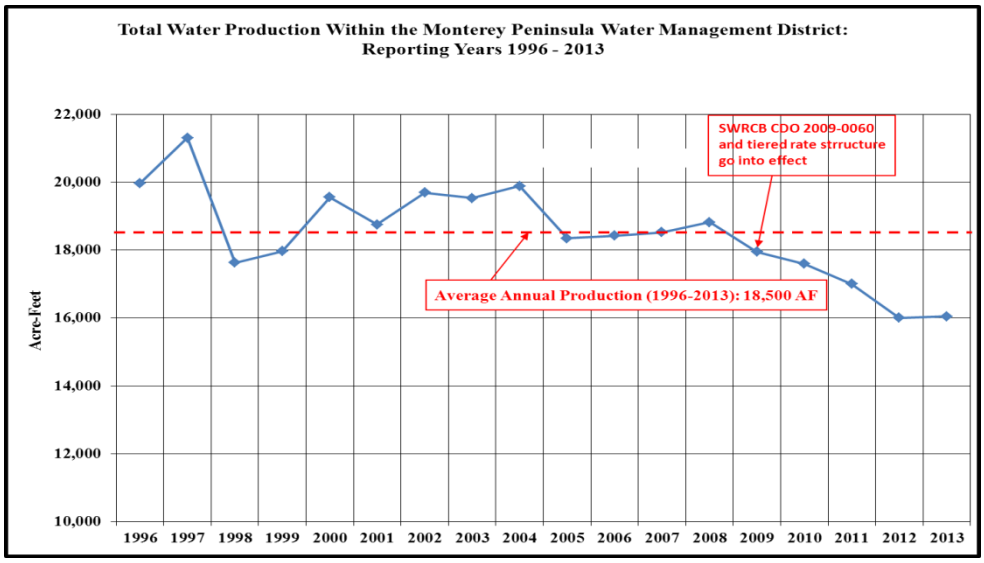

Figure 1 – Water Production in the Monterey Peninsula

Los Padres Reservoir, the one remaining main stem reservoir with storage capacity on the Carmel River, has a maximum usable capacity of about 1,400 AF, representing less than 2% of the average annual flow in the watershed. Direct surface diversions from the Carmel River are no longer used to meet municipal needs and reservoir releases are made during dry periods to support habitat and satisfy instream flow requirements for steelhead trout. In most years, runoff from the upper watershed fills Los Padres Reservoir and completely recharges the alluvial aquifer downstream of the reservoir; however, in dry periods lack of runoff and dewatering of the aquifer to meet domestic demand depletes aquifer storage and dries up the river. Due to evapotranspiration along the streamside corridor and surface diversions by riparian pumpers between Los Padres Reservoir at river mile (RM) 25 and the closest Cal-Am production well at RM 9, the ability to recharge the aquifer with reservoir releases is significantly reduced. Thus, during dry periods – such as the past three years – when runoff from the upper watershed approaches low single digits (2-4 cfs), local groundwater pumping for municipal supply results in dewatering of up to 10 miles of the Carmel River.

While, the Carmel River Basin (CRB) is the major source of water supply, only 70% of municipal demands can be met under typical conditions by groundwater pumped from the CRB. Therefore, water is also pumped from the Seaside Groundwater Basin (SGB). To the extent feasible, production is balanced between the two sources in order to minimize the impacts to each source. Although there is significant storage capacity available in the SGB (>52,000 AF of usable storage space), the basin has been overpumped since the mid-1960s, and, to minimize the possibility of seawater intrusion in the aquifer caused by over-pumping, a 2006 adjudication ordered a phased reduction in the annual rate of extraction to a physical safe yield by all of the basin pumpers of 3,000 AFY by 2021. Typically, during wet conditions, the District and Cal-Am operate injection wells in the SGB to store CRB water for future use. However, due to drought no water was injected in the 2013-14 water year.

The factors described above highlight the limited portfolio of water supply options available to the region and underscore the severe and rapid impacts of drought. As explained in the following section on Water Conservation Measures, one of the primary reasons why the impacts of the current drought that have been experienced to date have not been more severe is that actions emphasized in the recently-released Governor's California Water Action Plan have been adopted in the Monterey Peninsula for many years. In particular, the leading action "Make Conservation A California Way of Life" has been a long-standing practice in the region where per capita water consumption is 60 gallons per capita per day (gpcd) in contrast to the statewide average of more than twice that. Thus, although conservation, recycling and other established programs have forestalled the worst impacts of the current drought, they will not remedy the Monterey region's underlying vulnerabilities nor do they provide the level of drought protection and preparedness needed to secure the region against serious impacts should the drought continue into 2015.

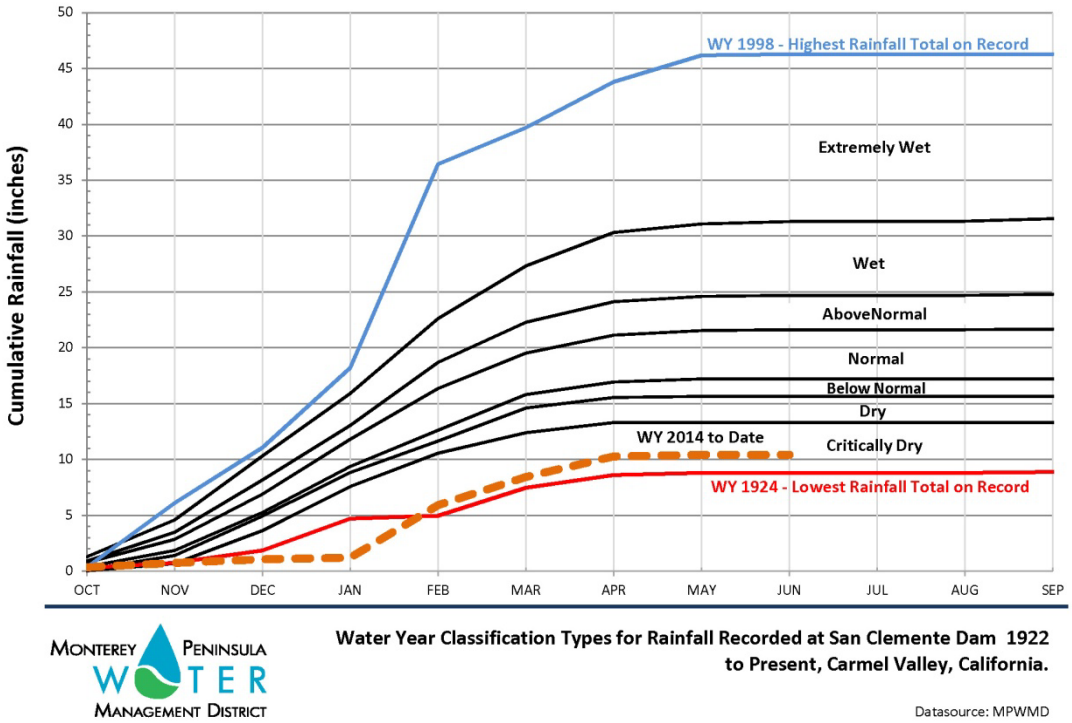

Figure 2 – Rainfall Recorded at San Clemente Dam

2.1.2 Response to questions

At risk of not meeting existing drinking water demands – The lack of sufficient recharge places at risk the domestic water supply. As of May 1st, existing supplies were approximately sufficient to meet 18 months of consumer demand. Further drought into 2015 would jeopardize domestic supply. Further, due to the region's reliance on groundwater pumped from coastal aquifers and from beneath the Carmel River, increases in pumping that lowers potable water level elevations would create conditions for seawater intrusion into aquifers. Therefore, on the Peninsula, continued pumping to satisfy demands risks compromising water quantity and quality and is not a feasible alternative. While protecting the quality of drinking water sources will be the paramount priority, this protection can only be achieved by implementing controls on water supply that will become increasingly more

restrictive as the drought continues. Most at risk is the Castroville Community Services District (CCSD), which delivers about 820 AFY to 7,400 residents from 3 wells drawing. The static water levels in the wells have dropped nearly 80 feet over the past three months.

At risk of not meeting existing agricultural water demands – Agricultural water use in the Monterey Peninsula Region is not extensive; however, the region borders on the Salinas Valley, some of the most productive farmland in the nation. An existing program that ties the Monterey Peninsula region with the neighboring Greater Monterey County Region is the Castroville Seawater Intrusion Project (CSIP). This project delivers recycled water from the Peninsula and portions of northern Monterey County, including the City of Salinas, to growers in the Castroville area. In operation since 1998, the program has reduced the rate of seawater intrusion into potable aquifers. The in-lieu use of recycled water from CSIP protects water quality in the 400-foot aquifer of the Salinas Valley Groundwater Basin (SVGB) that is a source for both agricultural and domestic uses.

As a consequence of the drought, MCWRA has suspended diversions from the Salinas River Diversion Facility, which also provides irrigation water to growers in the CSIP area, because of insufficient supply in the Nacimiento and San Antonio reservoirs. In addition, conservation has reduced the flow of wastewater to the Regional Treatment Plant (RTP) for recycling to the CSIP area by more than 10% over the past two. In response, the City of Salinas temporarily increased flow to the RTP by shunting 3 million gallons per day (MGD) of its industrial wastewater to the RTP for treatment and use through CSIP. However, growers in the CSIP area continue to compensate for the drought by increasing pumping from local wells. This renewed use of groundwater may undermine recent achievements in slowing seawater intrusion in the Castroville area.

At risk of not meeting ecosystem water demands – The CRB supports the largest sustainable run of steelhead trout on the west coast south of San Francisco. The drought and continued dependence on pumping has diminished flows in the Carmel River to the point that as many as 10 miles of the river will go dry by October 2014 and wetted areas will likely experience significant deterioration in water quality. Steelhead that did not escape the system this past spring because the river did not flow to the ocean will likely come under severe stress due to low flow. If the river remains closed to upstream migration through the winter of 2014-15, another year of steelhead spawning will be lost.

For the remainder of 2014, planned releases from Los Padres Reservoir will not meet the minimum flow requirement set by California Department of Fish and Wildlife. Even with lower flow releases, by December 31, 2014, reservoir storage is projected to reach a level at which no flow augmentation can be achieved. Should Los Padres Reservoir fill partially in the spring of 2015 (as happened in 1977), and releases from storage remain curtailed, the river could dry up along most of the 25-mile reach between Los Padres Dam and the ocean resulting in stress or mortality of most of the remaining steelhead population and other aquatic life dependent on adequate streamflow.

Drinking water MCL violations – For reasons discussed in other responses, groundwater in the Peninsula generally complies with MCLs and will continue to be managed to protect drinking water quality and avoid violation of MCLs. Therefore no drought-related drinking water MCL violations are anticipated this year or in 2015.

Groundwater basin overdraft – As discussed in previous responses, the consequences of groundwater overdraft in both planning regions are particularly severe. Physically, CRB storage is limited by the geologic formations below and to the sides of the Carmel River. In general, the alluvium varies in depth from about 150 feet at the mouth of the river to less than 10 feet near the upstream end of the aquifer. As groundwater elevations drop and the potential for pump cavitation increases, well production must be reduced, especially in the larger wells used for domestic supply near the coast. Moreover, should groundwater levels continue to fall near the coast

in this unconfined aquifer, data from the 1987-91 drought shows that the existing positive gradient normally exhibited in the aquifer could reverse and seawater could begin to mix with freshwater.

Although the SGB is an adjudicated basin with production targets managed to maintain groundwater elevations at levels that will not allow seawater intrusion, groundwater levels in the two confined aquifers continue to drop, which increases the threat of seawater intrusion. Because of the physical and legal constraints to production from the CRB, there is no alternative except to continue to produce water from the SGB in excess of the safe yield in order to meet demand.

Seawater intrusion into coastal areas of the SVGB was documented in the 1940s by DWR in Bulletin 52; however, although there has been some progress in recent years to reduce the rate of seawater intrusion, groundwater extraction primarily for agricultural use continues to exceed the recharge rate and seawater intrusion continues to march inland as growers continue to rely on groundwater production to provide irrigation water. Continued drought will intensify this reliance and speed up the rate of saltwater intrusion.

Discharge water TMDL violations - Runoff from the City of Salinas Stormwater Diversion Project currently discharges to the Salinas River, which flows to the Monterey Bay. This water carries with it pollutants from several urban, industrial and agricultural sources. Based on published data and state evaluation, the lower Salinas River is one of the more polluted water bodies within the state. Segments of the river have continually failed to meet established minimum beneficial use standards and are listed federally (Federal Clean Water Act Section 303[d]) for non-attainment of water quality standards. Pollutants discharged to the river may cause serious adverse impacts in downstream environments, including critical habitat for steelhead as well as other sensitive habitats within the Monterey Bay National Marine Sanctuary. As the drought has reduced surface flows in the Salinas River, the concentration of these pollutant loads has increased. To protect these sensitive habitats, the City seeks to reduce pollutant discharges to surface waters to the maximum extent practicable.

Other drought related adverse impacts – Continuation of the drought beyond the end of 2014 may trigger extraordinary measures to curtail water use on the Monterey Peninsula. This could range from increases in the already steeply tiered rate structure to physical limitations to water use (e.g. rationing and meter restrictions). Given the current low level of per capita water usage and the demographics of the community, further rate increases will be a hardship for all water users and will be particularly burdensome on low-income households.

2.2 Water Conservation Measures

Spurred by limited water supplies and the community's vulnerability to drought, the Monterey Peninsula has long been a leader in efforts to conserve and use water efficiently, having developed and implemented successful conservation programs for over 30 years. Conservation is viewed as a means to stretch existing water supplies to reduce stress to the environment and increase community protection from drought. In addition, to controlling current demand for water, the efficient use of water reduces the scale and, hence the capital and operating costs, of water supply projects now planned to replace existing sources of water whose use will be restricted by regulatory actions described earlier in this section.

Monterey Peninsula urban water users are among the stingiest in California at 60 gpcd. This is largely due to water conservation efforts that began in 1980, ramped up during the 1987-1991 drought, and have continued since. The implementation of steeply tiered-rate water pricing has resulted in some of the highest priced urban water in the state. Implementation of the tiered-rate program and other successful Best Management Practices (BMPs), such

as longstanding ordinances requiring water saving devices in homes and businesses and an extensive rebate program encouraging such water saving devices, has resulted in high marginal costs for further demand reduction. As a result of these high marginal costs, water conservation measures are no longer the low-hanging fruit for drought response and preparedness in the Monterey Peninsula. However, water managers on the Peninsula are now tailoring BMP programs to reach segments of the community who are both vulnerable to high water costs and have a limited ability to pay for water saving appliances and fixtures, an example of which is included in this application. In addition to implementation of BMPs encouraging water conservation by residents of the Peninsula, other measures are in place restricting increases in demand driven by growth in the local population. For example, in 2007 a moratorium on new connections to the Cal-Am water system was ordered by the CPUC and the SWRCB[2].

As indicated above, the District has longstanding programs to reduce water use and increase water efficiency, all of which were introduced prior to the drought. They include mandatory requirements for building construction, changes in use or ownership, and efficiency requirements for all non-residential users. Other programs enforce prohibitions on water waste and non-efficient use of water. The District also offers water saving devices and equipment free of charge. Programs recently implemented include mandatory non-residential retrofits, rain sensor installations and requirements for rain sensors at change of ownership, and water audits of commercial/industrial/institutional customers. The Peninsula's aggressive rebate program was resumed at the end of 2012 and has contributed significant savings, as shown in Figure 3. The rebate and conservation programs are funded by local ratepayers and District resources. Enforcement is achieved through site inspections, through permit coordination with the local land use agencies, and by partnerships between the water suppliers and the District.

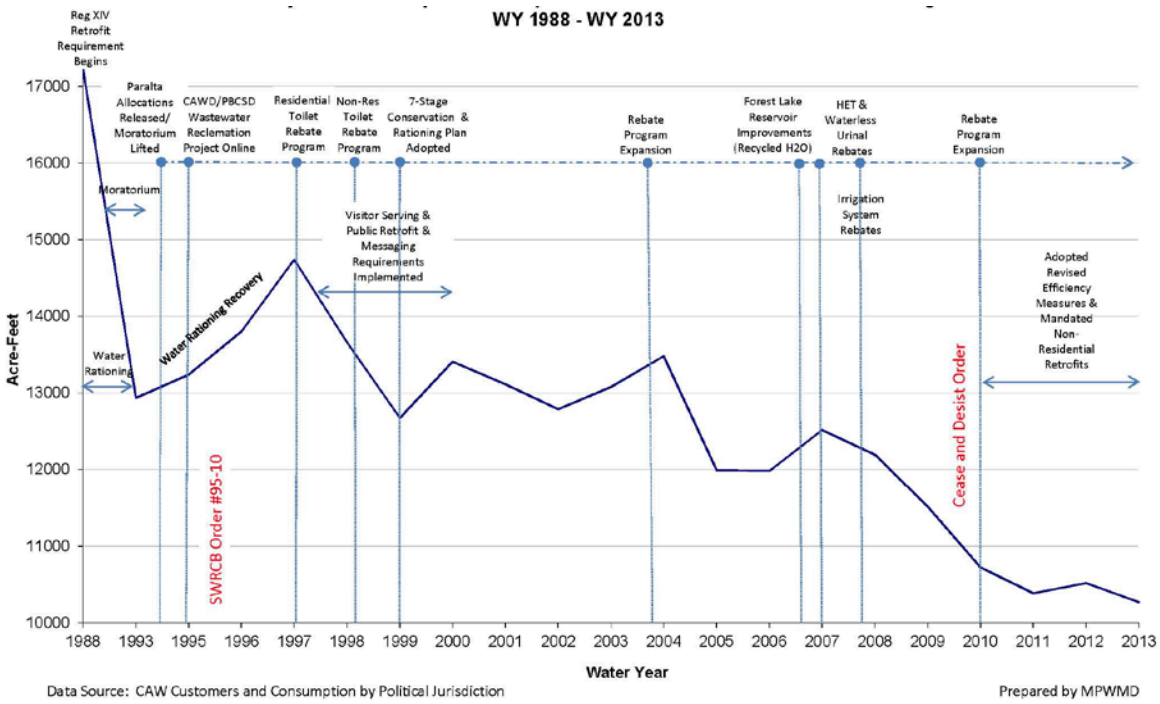

Figure 3 – Cal-AM Main System Consumption and Implementation of MPWMD Conservation Programs

[2] March 24, 2011, a Proposed Decision (dated January 25, 2011) on California American Water's (Cal-Am) request for a moratorium on water service connections was approved by the CPUC.

Programs implemented by the District in partnership with Cal-Am and Seaside Municipal Water District are summarized annually in a report to the California Public Utilities Commission, including descriptions of the programs and associated water savings.

A major contributor to the low per capita water use in the peninsula is the aggressive tiered rate structure. At present, the residential water rate is a modest $1,850 per AF for the lowest tier (not including meter and other charges), but progresses through five tiers to $18,500 per AF for the highest tier. Each customer connection is allotted a basic amount of water at the lowest rate based on the number of residents served at the site, as well as other factors such as lot size and special needs. While it is possible to limit use to only the lowest tier rate, most customers exceed the allotment for the first tier and are billed for some use at Tier 2, or even Tier 3. A residential customer who uses an average amount for many parts of California, such as 200 gpcd in Sacramento or Fresno with two people per residence (i.e., a total of 12,000 gallons per month), could face a bill of over $600 per month if Monterey rates were in place.

Responses within the Peninsula to the on-going drought have included an increase in communication with the public and a higher level of water waste enforcement. The community has been in Stage 1 of its seven stage Expanded Conservation and Standby Rationing Plan, which includes restrictions on water waste, since 1998. Successive stages implement greater levels of conservation and increased rates.

In response to the Governor's drought proclamation in January 2014 the District adopted an urgency ordinance modifying landscape water use. In addition to the ongoing programs, the District and Cal-Am conducted several Laundry-to-Landscape and rainwater catchment workshops, provided free water saving equipment (showerheads, faucet aerators, hose nozzles, leak detector tablets, etc.) at community events, and mailed information about the watering days to all Cal-Am customers. The District is currently preparing a strong conservation outreach campaign in response to the SWRCB emergency regulation for statewide urban water conservation.

During the recent statewide drought response, the District was consulted by the Governor's Drought Task Force, contributed to the Association of California Water Agencies Drought Action Group, and is currently participating on the Monterey County's Interagency Drought Task Force. Many of the conservation actions that the Monterey Peninsula has had in place since 1988 are actions that other agencies and water purveyors are only now beginning to consider. Agencies throughout California have used the District's conservation program as a model for their own programs. For example, the Emergency Regulation for Statewide Urban Water Conservation adopted by the State Water Resources Control Board on July 15, 2014, implements water waste restrictions that have been enforced on the Monterey Peninsula for decades.

Should the drought continue, MPWMD has instituted the "Expanded Water Conservation and Standby Rationing Plan" (MPWMD Rules 160 to 175). This seven-stage rationing plan includes significant increases in the already steeply tiered rate structure and mandates water conservation levels of up to 50% for all water users (Cal-Am and Non-Cal-Am) at the final stage of rationing.

As noted earlier, the Carmel River System is subject to State Water Resources Control Board (SWRCB) Order 95-10 and Water Rights Order No. 2009-0060 (Cease and Desist Order or CDO) significantly limiting Cal-Am's diversions from Carmel River. Also stated earlier, the Seaside Groundwater Basin also has restrictions under an adjudication, where the allocation will be reduced over time until Water Year 2021. Further reductions in legally allowable production are scheduled for the next three years. It now appears likely that, in spite of the drought, the aggressive conservation measures that have been put in place will enable the community to achieve the specified reductions for both water supply sources through Water Year 2014 without instituting water rationing.

The extensive conservation measures implemented on the Peninsula have provided temporary relief from the full impacts of the drought. However, as described above, this has been accomplished at considerable cost and will not protect the community from rate increases, rationing, and other measures should the drought continue. The drought response projects highlighted herein will provide the needed tools to allow the region to be proactive and get ahead of the effects of water scarcity.