

## Meeting Minutes

### Meeting of the California Water Commission

Wednesday, November 19, 2014

State of California, Resources Building  
1416 Ninth Street, First Floor Auditorium  
Sacramento, California 95814  
Beginning at 9:30 a.m.

#### 1. Call to Order

The meeting was called to order at 9:34 a.m.

#### 2. Roll Call

Executive Officer Sue Sims called roll. Commission members Joe Byrne, Danny Curtin, Joe Del Bosque, Kim Delfino, Lu Hintz, David Orth, Armando Quintero, and Anthony Saracino were present, constituting a quorum. Commission member Andy Ball was absent.

#### 3. Approval of October 2014 Meeting Minutes

A motion was made and seconded to approve the October 15, 2014 meeting minutes. A vote was taken and the motion passed unanimously.

#### 4. Executive Officer's Report

Sue Sims provided the Executive Officer's Report. Commission staff is working closely with the Department of Water Resources (DWR) on the groundwater sustainability legislation enacted earlier this year. The Commission will approve the required regulations and Ms. Sims advised DWR that it would be advantageous for the Commission to be involved early in the regulation development process. The Commission will also have responsibilities regarding amendments to groundwater basin boundaries. Dave Gutierrez, who is managing the implementation for DWR will brief the Commission early in 2015. Staff is drafting the Commission's statutorily required Annual Report on the State Water Project (SWP) and will provide it to the Commission for approval in January.

#### 5. Informational Presentation by CWC Staff on Development of Proposed Workplan to Implement the Water Storage Grant Program (Water Bond)

Ms. Sims briefed the Commission on the Water Storage Investment Program resulting from voter approval of the water bond (Proposition 1). Ms. Sims requested that the Commission members review the legislation and current draft regulations and guidelines for quantifying public benefits, to identify questions and issues that need to be addressed as part of the workplan. Staff is working on an implementation plan, project charter, and project management plan that will be brought to the Commission in January. Commission staff is planning for an open public process

and robust stakeholder involvement. Involving stakeholders will be beneficial. It is important to develop a program with clear metrics so project proponents can submit proposals with information that is complete and can be properly evaluated by the Commission. Staff is coordinating with the State Water Resources Control Board (State Board) and California Department of Fish and Wildlife (CDFW) to provide support for their important role in the bond program. Commission staff will develop a program to ensure that decisions are based on sound science and proper economic models. The staff workplan will also include coordination with local, state, and federal agencies. The Commission will receive information from the Association of California Water Agencies (ACWA) water storage task force. Prior to the January 2015 meeting, Commission staff will continue its work on the project management plans, timelines, and program components for the Water Storage Investment Program and work closely with DWR, the California Natural Resources Agency, legislative staff, and the Governor's Office.

Commissioner Delfino agreed that it is important to have a highly transparent and public process. She also suggested further coordination with the State Board and CDFW. Ms. Sims said staff is in the process of drafting interagency agreements with both of those agencies to coordinate activities and expectations. Ms. Delfino also noted since there are so many issues and questions, it would be helpful to break them into topic areas and have Commission meetings to address specific topics. She requested that staff distribute any comment letters received on the draft regulations and guidelines. Ms. Sims said staff will provide those comments to the Commission and post them to the Commission's website. Discussion at the January 2015 meeting will include how to address particular topics, and proposals for issues to discuss at upcoming meetings. Ms. Delfino asked when staff would like to receive input from the Commission members. Ms. Sims said that sooner is preferable so staff can identify questions and work toward addressing gaps.

#### **6. Consideration of Items for Next California Water Commission Meeting**

Mr. Byrne suggested it may be best to use the time in December to identify questions and issues in the regulations and guidelines and allow staff to prepare additional work products. Staff can then present the workplan and timeline at the January 2015 meeting.

If the Commission assumes that an entire year will be necessary for the Office of Administrative Law (OAL) process, a final draft of the regulations should be sent to OAL in fall 2015. Ms. Sims said that in January, the Commission can discuss the schedule for the stakeholder process and official rulemaking process. Commissioner Saracino reminded the Commission that the regulations must include priorities and relative environmental values from the State Board and CDFW and receiving those as soon as possible would be useful. Ms. Delfino added that their assistance would be helpful because the Commission must also make findings about benefits to the Delta ecosystem. Ms. Sims noted that Rachel Ballanti, the Commission's Assistant Executive Officer, has developed a draft Project Management Plan that includes many of the proposed timelines and tasks. Commission staff takes very seriously that this process must be strategic and comprehensive. Mr. Byrne pointed out that the Commission may need to have full day meetings and more than one meeting per month to accomplish all of the necessary tasks. He asked staff to let Commission

members know of additional meetings of other scheduling issues as soon as possible so they may plan accordingly.

**7. Public Comments**

There were no public comments at this time.

**8. Water Use Efficiency and Conservation Workshop**

Mr. Byrne provided a brief introduction to the workshop. This workshop is relevant and timely given the passage of the water bond, the drought, and the California Water Action Plan. It will be helpful for the Commission to understand the interaction of water storage with water use efficiency and conservation. Ms. Sims added that several of the Commissioners have raised questions about water conservation. The morning panel will discuss success stories in the urban and agricultural sectors. The afternoon panel will discuss how to advance current efforts, policy issues, the role of technology, and lessons learned.

Manucher Alemi, DWR's Water Use Efficiency Policy Advisor, provided an overview of water use efficiency and conservation and the current state of water conservation in California. Many important things have happened this year, including the release California Water Action Plan, two drought proclamations, State Board conservation regulations, community drought response, and the passage of Proposition 1. All of these events had a profound effect on water conservation. Mr. Alemi began by discussing the distinction between conservation and efficiency. Water conservation means reducing the total amount of water used. Water use efficiency means accomplishing more benefits with the same amount of water. Mr. Saracino asked Mr. Alemi to specify what he meant by water used. Mr. Alemi said he meant the total amount of water consumed. Assembly Bill 797 in 1983 was the first major legislative action to promote water conservation, but there have been many legislative and administrative actions since that time which have increased conservation. There have also been many ballot measures to provide funding for water conservation incentives, including the Proposition 1 water bond that was passed earlier this month. Water conservation advancements have occurred primarily because of the involvement of water users, including growers and urban water users. Conservation is supported by water agencies, government agencies, environmental organizations, and the irrigation industry.

The total population of California in 2010 was about 38 million, and 94% of the population was served by urban water suppliers. From 1998 to 2012, roughly 40% of urban water use occurred outdoors. That outdoor use has great potential for water conservation. If California reduced urban water use by 20%, up to 1.3 million acre feet (AF) could be conserved per year. Progress in urban water conservation has been made because of plumbing code changes, water meter requirements, water agency efforts, legislative requirements, export limitations, public awareness, and grant eligibility requirements. SB X7-7 required urban agencies to reduce per capita water use 20% by 2020 and submit Urban Water Management Plans. In 2016, those agencies will report their 2015 water use to see if they have achieved their goals. The State Board

conservation regulations have resulted in reduced water use compared to usage in 2013. Major opportunities for urban water conservation are in landscape, conservation based rates, utility technology updates, and leak repair. Challenges include reduced water agency revenue, customers' inadequate awareness of their own water use, aging infrastructure, and variable funding sources. According to the Alliance for Water Use Efficiency, the cost of urban water conservation is \$333-\$500 per acre foot.

In 2010, California had 8.13 million irrigated crop acres. Roughly 34 million acre feet of water is applied to cropland in a typical year. There has been progress toward conservation in agriculture as a result of increased crop production, advances in irrigation methods, improved irrigation management, state and federal requirements, and limited supply. Central Valley Project Improvement Act and Agricultural Water Management Plan requirements have helped agricultural water agencies more effectively plan and manage water use. Mr. Alemi described methods and components for quantifying agricultural water use efficiency. Over the years, there have been changes in irrigation methods resulting in improved efficiency. Between 1967 and 2007, applied water decreased and gross farm income and production increased. Opportunities for improvement lie in hardware irrigation systems and irrigation management. Implementation issues include cost, education, and energy impacts. There is a potential to reduce irrecoverable flows from agriculture. To move forward, the state wants to promote the resource management strategies as outlined in California Water Plan Update 2013, implementation of SB X7-7, Proposition 1, and the California Water Action Plan. Making conservation a California way of life is the first action in the Water Action Plan. DWR and other agencies have a significant role in the implementation of that action. The specific outcomes expected are to expand conservation and efficiency to exceed SB X7-7 targets. This could be achieved by providing funding and technical assistance. It could include consideration of extending the 20x2020 target, which would be a roughly 30% reduction in water use by 2030. California's increasing population, climate change, and providing for economic growth necessitate a sustainable water management strategy, of which water conservation is an important element.

#### **Panel 1 – Urban Representatives**

Tim Anderson, who oversees the water efficiency, water education, and public affairs programs for the Sonoma County Water Agency (SCWA), discussed SCWA's efficiency activities. Mr. Anderson said that SCWA views efficiency is an important part of water supply that will only increase in importance in the future. Over the long term, water use is decreasing or remaining static despite a growing population and expanding economy. Average water deliveries in Sonoma County and Marin County in the past five years decreased by 22% compared to the prior five years. This decrease is even more pronounced when comparing peak demand. Peak demand per capita in August 2014 was down 41% from the 10-year average, excluding drought years. Those reductions decreased energy use and allowed for cancellation of a water supply enhancement project. Water use efficiency programs are an essential part of what SCWA is doing to meet urban demand. SCWA is taking actions they believe will continue to save more water, including direct installation of high efficiency fixtures. New fixtures can reduce water use for toilet flushing by

more than 50%. SCWA deployed local contractors to go door to door to install high efficiency toilets for customers. The agency installed 6,200 high efficiency toilets to save 300 acre feet of water at a cost of roughly \$704 per acre foot, which is less than the wholesale cost of water in the region. SCWA received a grant from DWR to expand its direct install programs.

SCWA has also employed a new program called PAYS, which is an on-bill financing program. The water utility pays for water efficiency and energy efficiency upgrades at no upfront cost to the customer, and is repaid through a surcharge on the customer's bill. A unique aspect of PAYS is that customers are guaranteed that their overall utility costs will be reduced by more than the surcharge. The Town of Windsor tied this approach and, in the first year of Windsor's program, 36% of eligible multi-family units participated. Multi-family units are typically difficult to target with efficiency programs. The program saved 6.2 million gallons per year with an average water savings of 15%. SCWA believes the PAYS program has great potential. The agency previously implemented a property tax program to fund energy upgrades and it has since become a statewide program. The PAYS concept could also be expanded statewide. Mr. Anderson added that 70% of energy in water use occurs on the customer side, and PAYS is one of the few programs to address that aspect. Mr. Anderson also showed a water storage curve for Lake Mendocino for water years 2012-2014. Water is required to be released in the winter when it rains, which sometimes causes water supply shortages later. In order to preserve some of that water, reservoir reoperation should be considered as a way to achieve water supply reliability. SCWA is working with several agencies and institutions to use advanced precipitation forecasting to reoperate reservoirs.

Jason Foster, Director for Public Outreach and Conservation for the San Diego County Water Authority (SDCWA), provided an overview of his agency's programs. SDCWA is a wholesale water supplier that provides water to 24 agencies. The Water Authority has taken a diversified approach to efficiency and conservation. Efforts have included landscape ordinances, education programs, technical assistance programs, and incentives. There is a continuum of conservation programs in the area. SDCWA is part of the Metropolitan Water District of Southern California, so some programs are implemented by them, some are implemented by SDCWA on regional basis, and some are locally implemented by SDCWA's member agencies. Per capita water use in the region has been reduced from 211 to 161 gallons per capita per day (GPCD) despite increases in economic activity and a return to hotter and drier weather. SDCWA has worked with San Diego Gas and Electric for over 20 years to generate water and energy savings. The agencies have implemented a variety of successful water saving opportunities including detention facility retrofits, commercial water-energy audits, appliance rebates, pre-rinse valve installations in restaurants, and a leak-loss detection program.

In 2008, SDCWA piloted the WaterSmart Landscape Efficiency Program, which is a direct install program to increase efficiency on properties with large landscapes. Landscapers work with customers to provide irrigation system and water management upgrades. The program targets a 20% water use reduction at sites with at least four acres of landscape. In the pilot phase,

properties in the program reduced landscape water use by 25-49%. The program saved 11 to 12 acre feet per year per site. SDCWA and their partners are expanding the program to homeowners' association sites, municipal parks, and industrial parks with large landscapes. There are nine contractors working to retrofit the sites that are currently the least efficient. San Diego Gas and Electric supports the program based on the assumption that there will be less energy used for pumping and treatment. SDCWA has had a turf replacement program since 2012. Lawns are replaced by living landscapes that use water efficient plants. The demand for that program has increased greatly. Residential customers and large-scale commercial customers are taking advantage of the program. Participants have achieved water savings between 20-40%. The program is part of a multi-pronged effort to increase sustainability through large scale outdoor landscape transformation. Such a transformation requires rebates from water agencies, customer knowledge, and a supply chain to provide the necessary plants and services. In Southern California there are partnerships with retailers, such as the Home Depot, to offer discounts and ensure water efficient plants are stocked. This allows water agency programs to be more effective.

John Woodling, Executive Director of the Regional Water Authority, briefed the Commission on conservation and efficiency in the Sacramento region. The Regional Water Authority is a Joint Powers Agency comprised of 21 water suppliers serving urban and suburban customers in the Sacramento area. The Sacramento region receives its water from a variety of sources: the upper tributaries of the American River, the lower American River, the Sacramento River, groundwater, and recycled water. Efficiency and conservation overlap, but they are different. Efficiency is typically more long-term and conservation is typically a response to water shortages. The Water Forum Agreement was a collaborative process to resolve conflict over future water supply and the environment of the American River. Water conservation is one piece of an overall water management portfolio laid out in that agreement. The region also expanded conjunctive use and initiated groundwater management institutions for conjunctive use. Per capita use declined more than 20% between 2001 and 2010 despite steady population increase. Reductions in per capita use have translated to stable overall use for the region. The Sacramento region will continue reductions in order to achieve SB X7-7 requirements.

A large portion of water conservation has resulted from installing water meters in the region. In 2001, roughly one-third of homes in the region were metered; that level is now 83%. Meters allow for better management of the water system. Water utilities' efficiency actions focus on water loss control, recycled water, educating the public, and customer incentives. In the Sacramento region, about 60% of water use is outdoors due to large lots and a warm, dry climate, so water agencies' efforts focus on outdoor water use. Indoor water use in the region mostly returns to the Sacramento River watershed, so indoor conservation does not really create new water in the system. Because the region's water sources are in close proximity, the cost of water is lower than many parts of the state. The economics of direct install programs make it more difficult to charge ratepayers for those upgrades. The recent low levels of Folsom Lake have resulted in greater public attention to drought and contributed to the region's success in water

conservation. Throughout 2014, the region achieved nearly 20% reduction in water use. As per capita use decreases, it is imperative to make water supplies more reliable because it becomes more difficult to decrease water use. Reductions this year were achieved through regional public outreach, enforcement programs, media attention, expanded state attention and programs, and water shortage contingencies. Conservation and efficiency are part of the toolbox of water management, but should not be considered in a vacuum. There should be more rigor in examining how to invest in water conservation for the most benefit.

Commissioner Del Bosque asked for more detail on leak-loss detection. Mr. Woodling said water can be saved through capital improvements to infrastructure. The installation of water meters in Sacramento is reducing leakage by replacing old water mains. It is important to tighten up system management. Mr. Anderson said SCWA is concerned about system losses. SCWA is considering automated metering because lost water is wasted energy, an unnecessary expense, and results in a loss of water that is needed for users.

Mr. Saracino said that it is important to consider how conservation provides benefits. For example, conservation in San Diego has a more profound impact than conservation in Sacramento. He asked what Mr. Woodling recommends be done to address that issue. Mr. Woodling said we understand how the system works, but we must treat conservation and efficiency the way we treat the rest of the system. Water utilities examine costs and benefits when considering other types of projects, but that is not typically the case with efficiency and conservation. Regulations and grant programs for conservation and efficiency are not conducive to funding benefits that are external to ratepayers. Water conservation programs are often in customer service departments, which separates the programs from the regular operations of water utilities. More science should be employed in water efficiency.

Commissioner Orth agreed with the need to think more comprehensively about management actions. He also asked the panelists for their thoughts about how increased efficiency is impacting groundwater management operations. In some areas of the state, inefficiency is an effective tool for groundwater recharge. Mr. Woodling said it is difficult to connect the two in a largely urbanized area. Two of the main actions in response to drought are to conserve and use more groundwater. Despite that, groundwater pumping in Sacramento has been reduced because of overall conservation. Mr. Foster said San Diego County does not face many groundwater issues. Water efficiency and conservation in San Diego are part of a diversified water supply portfolio. There are many investments necessary to increase supply reliability. Mr. Anderson said groundwater is important in Sonoma County. Conservation has not had an apparent impact on groundwater recharge. He added that it is important to evaluate cost effectiveness when water supply is ample, but economic considerations become less important when there are supply shortages.

Ms. Delfino asked if it is possible to retain the water savings that have been achieved during the drought. She also asked how water agencies finance the upfront costs of programs. Mr. Anderson

said there will likely be some rebound in water use, but many current actions will result in permanent reductions. In order to finance upfront costs, water agencies actively pursue grant funding, particularly through the Integrated Regional Water Management (IRWM) program. There is funding in Proposition 1 that will allow many of those programs to continue. Banks and cities sometimes finance upfront costs. Mr. Woodling added that grants are particularly important for conservation. Direct install programs often rely on grant funding. These programs are particularly important because it is difficult to reach disadvantaged communities with rebate programs, so agencies employ direct install in disadvantaged areas. Water use will rebound some after the drought ends, but the overall downward trend will continue.

Commissioner Curtin said governance and the water-energy nexus will need to be revisited on a large scale because conservation generates less revenue. He asked how the state can help balance the need to conserve while preserving revenue for local utilities. Mr. Woodling said that may not be possible without Proposition 218 reform. Penalties for inefficiency must be tied to the cost of serving water. In Sacramento, there are high fixed costs, but low variable costs, so it is difficult to pursue aggressive tiered rates. Mr. Foster said that it can be tempting to think that there is a one-size-fits-all solution. Instead, water utilities need more flexibility to adapt and implement locally viable solutions. Mr. Anderson added that water rates increase when utilities sell less water, but water efficiency programs can prevent rates from increasing as drastically as they could.

#### **Panel 1 – Agriculture Representatives**

Peter Canessa, Agricultural Pumping Efficiency Program Manager at the Center for Irrigation Technology (CIT) at California State University, Fresno, discussed CIT's work on agricultural water efficiency. CIT is involved in a number of initiatives addressing water management and energy efficiency. Through the Advanced Pumping Efficiency Program, CIT provided over 6,900 pump efficiency tests and 382 pump retrofit projects in 2013 and 2014. The original budget was for only 5,400 pump tests, but funding was increased in light of the drought. In order to improve pumping efficiency, CIT uses education, subsidized pump tests, and incentives. Water efficiency programs can be implemented to achieve energy conservation, so the California Public Utilities Commission has provided funding to the Agricultural Water/Energy Center. The response from the agricultural community has been robust. Water management involves many different activities and options. Farmers want unbiased information to identify solutions and implement them correctly.

Some of CIT's activities focus on identification and evaluation of new technology. One technology CIT is investigating is improved audit tools for irrigation systems. Audit protocols should be reevaluated and expanded. CIT implemented a pilot project in 2013 in which they conducted pump efficiency tests in conjunction with standard irrigation system evaluations to identify all opportunities for energy and water conservation. CIT performed 45 evaluations and the average cost savings was 23%. This indicates that there may be significant savings available statewide. CIT is also examining the use of 'big data.' Technology can now provide continuous data streams on various facets of operations, such as water flow, pipeline pressure, energy use, soil moisture, and

plant moisture. This generates a lot of data, but that data must be consolidated in an appropriate time frame to be useful. CIT is investigating a pump monitor that uses water meter data to detect anomalies in operations, and closed loop irrigation scheduling, which can be done in real time due to advancements in data.

Additionally, CIT has worked on the development of effective water management strategies. There are many ways to develop sustainable Water Management Plans. The Institute is assisting in the development of groundwater ordinances in areas facing subsidence. CIT can provide an unbiased assessment of technology, but local politics ultimately determine how groundwater sustainability is handled. Simplistic solutions to water management problems are not effective and water use patterns should not be modified haphazardly. California must continue to be aware of the long-term interrelationships among various resource management problems.

Chris Kapheim, General Manager of Alta Irrigation District (Alta ID) and chair of ACWA's Region 6, discussed the district's management efforts. Alta Irrigation District is the third oldest district in California, which presents many challenges. One of the key elements of efficiency is planning. In the 1990s, Alta ID began encountering water quality issues and wanted to improve water management. The district filed water management plans under AB 3616 and SB X7-7 and both processes were helpful. The AB 3616 plan development involved identifying goals and objectives, measurement and pricing criteria, and regional solutions to water issues. Alta ID implemented volumetric pricing in 2000 to improve efficiency and reliability. This increased control over water and was funded by water rate increases that had widespread support.

While engaging in SB X7-7 planning, Alta ID implemented two groundwater banking projects. The district also improved efficiency, which allowed conserved water to be used to solve water quality issues. Alta ID also developed a concept for a surface water treatment plant. During planning, the district concluded that water supply and water quality must be co-equal goals. Groundwater is a challenge for Alta ID. Groundwater in the area is unreliable and has water quality issues. In particular, disadvantaged communities are struggling with groundwater. The district's two groundwater banking projects were designed to yield water to support the drinking water program. Those projects have been implemented and Alta ID plans to build a new surface water treatment plant. The district also attempts to find regional solutions to local issues. Alta ID is in the process of developing a drinking water authority to deliver surface water to seven disadvantaged communities. Mr. Kapheim concluded his presentation by reiterating the importance of planning and a holistic approach to water management.

Chase Hurley, General Manager of the San Luis Canal Company (SLCC), discussed water use efficiency practices. SLCC is a member of the San Joaquin River Exchange Contractors Water Authority. Water is delivered from Lake Shasta to the Mendota Pool through the Central Valley Project (CVP). The district was built in the early 1900s and has good historic water rights. Until recently, most water was conveyed by SLCC's original infrastructure. SLCC delivers water to agricultural users and to state and federal wildlife refuges. One issue faced by water agencies is

what to do with excess water once efficiency improves. SLCC transfers conserved water to neighboring agencies seeking to purchase additional supplies. In order to achieve savings, SLCC had to alter its management practices. Farming practices have changed and individual farmers now request less water than they did historically. SLCC decided to reevaluate their system in order to better meet landowner needs. To achieve this, SLCC developed a 10-year master plan and has since completed 90% of the plan's projects.

The SLCC system has one diversion from the San Joaquin River that feeds into a gravity flow system. There are 1,350 meter gates on a mostly unlined canal system. SLCC has begun updating many canals with different weir structures to better manage flow and pressure in the system. Some of the system's canals have been overhauled and turnouts have been modernized. SLCC also installed reservoirs to improve control. The goal of the upgrades was to conserve 30,000 AF of water. In the first year of operation, SLCC documented 9,000 acre feet of spill reduction. When the program is completed there will be four reservoirs. SLCC has also increased monitoring of water quality and flow rate in the system. That information is available online in real time. Some revenue from the water transfer program is used to offer water conservation incentives. Most crops in the district are row crops primarily because groundwater in the region is not far below the surface and is not high quality. The district engages in conjunctive use but typically does not pump much groundwater. This year, SLCC had to pump more groundwater than normal, but less than expected. Approximately 35% of the district is now using subsurface drip irrigation. That number will likely increase to 80–90% in the next five years. The conversion is primarily market-driven and water savings is a secondary benefit.

Alan Sano, co-owner of Sano Farms in western Fresno County, discussed the water use efficiency practices employed on his farm. Mr. Sano's farm is located in Firebaugh and serviced by Westlands Water District. Prior to cutbacks in surface water deliveries from the Delta, Mr. Sano's utilized furrow irrigation. In response to cutbacks, the farm transitioned to subsurface drip irrigation. Mr. Sano implemented the technique in phases to determine the best method to increase the uniformity of water distribution. The ditches on the farm were also lined with concrete to conserve water. The subsurface drip system has produced water savings and improved crops. Mr. Sano is now employing moisture sensors in the soil to improve irrigation monitoring. There was a steep learning curve when Mr. Sano began implementing water use efficiency techniques and technology, but the farm reduced water use by 25–30% on row crops.

Mr. Saracino agreed with Mr. Kapheim that there are many benefits to improved measurement. He noted that California has been reluctant to implement groundwater measurement and asked if Alta ID will be as enthusiastic about groundwater measurement as it was about surface water measurement. Mr. Kapheim said determining where water in the district goes was important for volumetric pricing. Alta ID is examining groundwater measurement for safe yield and how it will be sustainably balanced with surface water.

Commissioner Hintz asked if SLCC was able to blend groundwater with surface water to improve water quality. Mr. Hurley said SLCC has a unique situation because there are company-owned and have private landowner wells, but all wells are metered and connected to the SLCC system. All the wells are monitored and managed to benefit SLCC. Farmers are often less concerned by water quality in drought years, but quality is becoming increasingly important with drip irrigation.

Mr. Del Bosque asked if crop patterns in the SLCC district have changed over time. Mr. Hurley said the district has historically been driven by cotton, alfalfa, and cannery tomatoes. Those are still the top three crops, but in recent years there has been an increase in fresh market tomatoes.

Mr. Curtin asked if Mr. Sano's decision to line canals was cost effective. Mr. Sano said his water district assisted in lining ditches on his farm. The process saved a significant amount of water and took about five years to be cost effective.

Commissioner Quintero asked Mr. Kapheim how much Alta ID was able to increase water rates. Mr. Kapheim said they made significant increases. The charges began incrementally because the district did not previously have volumetric pricing. Accurate measurement is costly and time consuming, so the district had to recover those costs. Mr. Quintero asked what the range of increases was. Mr. Kapheim said there was a 30–40% cost increase.

Ms. Delfino asked if the transition to drip irrigation includes some of the technologies Mr. Canessa discussed. Mr. Hurley said SLCC and individual landowners employ many technologies. The company has integrated new products and is continuing to overhaul the system. Mr. Sano said his farm utilizes moisture probes that send moisture readings every 24 hours. In-line water sensors can also be used to determine soil's moisture content. Mr. Kapheim that Alta ID will evolve to increase low-volume irrigation. The district is examining how to provide incentives to motivate that transition.

Mr. Saracino was interested in the concept of operating private wells for the benefit of the district and asked if SLCC has written anything about how the district operates in that regard. Mr. Hurley said SLCC has not written anything on the topic but that conjunctive use programs work better with a reliable surface water supply.

Mr. Orth pointed out that there are many practical approaches to the measurement and pricing of groundwater. Groundwater regulation will necessitate some type of accurate measurement. He asked how the trend of low-volume irrigation will impact groundwater recharge operations. Mr. Canessa said energy flow can be measured to determine groundwater extractions. He also pointed out there is a second port on smart meters, so farmers will soon have access to data in real time. Flow meters are useful for measurement, but have to be maintained. The timeline of recharge should be considered in determining the most effective actions. Mr. Kapheim said Alta ID will operate differently as the district continues to evolve. The district is considering year-round operation and adding more recharge sites in areas most in need. There is also a trend to install

sensors to detect water quality. The focus will be on how much water the crops need and making up the difference to focus on recharge and reduce groundwater pumping. Mr. Hurley said SLCC does not believe there will be significant impacts to groundwater recharge from the transition to low-volume irrigation. There may be concerns if permanent crops increase. Conversely, one action frequently taken to conserve water is to reduce canal seepage, but seepage helps to recharge aquifers. SLCC will soon line portions of canal with the largest seepage issues, but groundwater impacts must be considered.

Mr. Byrne asked if Mr. Sano's practices are an example of trends in farming statewide. Mr. Sano said the current drought is impacting the whole state, so conservation is necessary statewide. Mr. Hurley said farmers in many other districts are ahead of growers served by SLCC. Those farmers were driven mainly by unreliable surface water supplies. Other areas are now taking steps to enact similar reforms. Mr. Kapheim said particular circumstances east of the Kings River have dictated why Alta ID has taken particular actions. Mr. Canessa said he was the first water conservation coordinator in the San Joaquin River Exchange Contractors Water Authority region. Different regions and districts have many different conditions which produce different solutions. Increased water use is often an issue of demand rather than efficiency. It is important to acknowledge that actions in one district can impact other areas.

## **Panel 2**

Tom Philp, from the Metropolitan Water District of Southern California (MWD), served as the moderator for the panel. Mr. Philp noted that conservation was not an official part of MWD's portfolio until 1996. With all of its efforts this year, MWD is probably conserving more than 100 million acre feet. If conservation is considered a source of supply, it will be the largest source of supply in the next generation.

Dr. Jay Lund, Director of the UC Davis Center for Watershed Sciences, discussed how to achieve the most benefits from conservation. Dr. Lund showed a schematic of California's water system. The water system holds the state together in a pragmatic way. Net use of water is the amount applied. Water that is applied and runs off or percolates into groundwater is part of gross use, but not net use because it will likely be used again. Water use balances vary by region. The predominant use on the North Coast is gross environmental use. The predominant use on the South Coast is gross urban use. The Tulare Lake region predominantly uses water for agriculture.

California can be compared to Australia to approximate how much water urban users could conserve. Urban Californians could likely reduce gross use by 2.1 million acre feet (MAF), which would provide water savings. There are different types of benefits of water conservation, including increased control, reduced gross use, and saved water. Reduced use does not necessarily equal water savings because water that goes unused is often already claimed by other users. The value and benefits of conservation vary locally. Conservation activities are a mix of behavior, technology, and economics. Methods of conservation that save water include anything that reduces evapotranspiration and that reduces wastewater outflow in coastal areas. There are

also conservation actions that do not save much water, but may be useful anyway. These include improving irrigation efficiency and inland indoor water conservation. Some types of conservation actually increase net water use. A study was done to examine the “Paradox of the Plains” in which farmers expanded water use when they increased efficiency because it allowed them to expand production. The current water rights system is particularly susceptible to this problem. California is increasingly utilizing portfolios of water management, both locally and statewide. All water management actions must be brought together cohesively. Water conservation reductions are needed to save water and manage water quality, but reductions do not always save water. There will be many changes in California and water management must be used to respond to changes. Dr. Lund closed by noting that there is a high probability that next year will be critically dry.

Claire O’Connor, attorney for the Natural Resources Defense Council (NRDC), addressed water system resiliency. Ms. O’Connor pointed out that there is an assumption that Californians should conserve water, but questioned the goals of conservation and efficiency. The goal could be simply to create new water, but there could be a broader aim to create a more resilient and reliable water system. NRDC and the Pacific Institute conducted a study to examine California’s potential to become more resilient to future drought. The study considered a variety of practices across sectors and found potential in water reuse, expanded stormwater capture, urban efficiency, and agricultural efficiency. The study found that the greatest potential lies in increased agricultural water efficiency. The goal was to find opportunities to build resiliency, not just create new water. The study’s estimates of potential agricultural water savings are similar to estimates that UC Davis released regarding water shortages this year. Agricultural efficiency also offers a host of benefits, which may be why many farmers are switching to more efficient practices. Far more farmers are using scientific irrigation scheduling than in 2008. Increasing conservation can reduce a potential source of groundwater recharge, but reducing use can also reduce demand on groundwater basins. Rather than relying on incidental recharge, California should recharge groundwater more purposefully during wet years. Efficiency and conservation investments also tend to be cost-effective when compared with new surface storage.

Larry McKenney, Executive Counsel for the Santa Ana Watershed Project Authority (SAWPA), discussed the use of policies to achieve efficiency and conservation goals. SAWPA is a Joint Powers Authority comprised of the five largest water agencies in the Santa Ana River Watershed. Water use efficiency is one part of SAWPA’s plan for water management in the watershed. Water quality is also a primary concern in the region. SAWPA has concluded that water use efficiency is one of the most effective methods to achieve multiple benefits. Agencies in the region employ the same techniques as other urban agencies, including landscape programs, education, and rebates. Mr. McKenney noted that although many people use the terms water use efficiency and conservation interchangeably, they are quite different. In order to make policy choices about reducing water use, water agencies must focus on efficiency.

Policy choices about conservation and efficiency must be made with specific goals in mind. Conservation is a relative term, whereas water use efficiency allows water agencies to examine

measured benefits per use in order to make investments and achieve benefits. Considering the Commission's role in water storage, Mr. McKenney noted that if water use efficiency is doubled, the value of existing storage will also be doubled. Water storage should not only be thought of in terms of volume, but also the value that volume can provide over time. One of the most effective tools for water use efficiency is pricing. Agencies in the Santa Ana region have worked with a professor at UC Riverside to determine which water use efficiency best management practices provide the most returns. Those studies found that pricing measures are the most effective. There has been a lot of turf removal in Southern California. Turf removal is not seen as very cost effective, but a more useful metric is the increase in rebate applications due to drought awareness. The ultimate goal of the turf removal program is to convince people of a new aesthetic. SAWPA developed a watershed-wide project that is a suite of management practices to improve water use efficiency. That plan includes turf removal, funding for tools that will be helpful to agencies moving toward budget-based rates, and funding to use social learning tools and targeted communication.

Peter Yolles, co-founder and CEO of WaterSmart Software, discussed behavioral water efficiency. WaterSmart was founded in 2009, and now has over 10% of California's residential water meters in their platform. Behavioral water efficiency involves educating and engaging consumers in their water meter data and how they compare to other users like them. Many people have misperceptions of their water use and do not know where their water comes from. Water bills are not the best tool for engagement or conservation because customers often do not understand the units of consumption used. Group behavior and social norms are a powerful force for most individuals. WaterSmart is attempting to create social awareness regarding how much water people use compared to those around them. The aim is to provide information that is easy, attractive, social, and timely. WaterSmart performed a one year study with the East Bay Municipal Utility District that examined the use of WaterSmart technology by 10,000 households. Those households achieved an average reduction of 5%. There was also a tripling of customer engagement in water conservation programs. Customers using the technology were also far more satisfied with their water utility.

One method to apply behavioral water efficiency is to send users reports that are separate from their bill. These reports are unique to each household every billing period. About 80% of people who receive the reports read them. Utilities can use this information for targeted communication. WaterSmart can also be used to identify potential leaks at locations with smart meters. The state has recognized some of the advancements in behavioral water efficiency in the State Board's drought regulations and the California Water Plan Update 2013.

Dr. Jacqueline Peel, a professor at Melbourne Law School and visiting scholar at the Woods Institute for the Environment at Stanford University, provided an overview of Australia's experience with drought. Australia experiences droughts on a regular basis and has extreme rainfall variability. The Millennium Drought, which lasted from 1995 to 2009, was the most severe in Australia's recorded history. That drought created an urban water crisis, particularly in

southeastern Australia. There were also severe reductions in agricultural production due to large reductions in river flows and allocations. Water management in Australia is largely handled at the state level, but the drought was a major impetus for national water reforms. A series of water reforms culminated in the National Water Initiative in 2004. The reforms consolidated role of water markets, made changes to the water allocation system, separated water rights from property rights, and made water rights a share of overall water availability. New legislation was introduced at the federal level to create sustainable diversion limits in the Murray-Darling Basin, Australia's major agricultural region. There were also water pricing reforms to promote economic efficiency and water use efficiency.

Australia also implemented a range of water conservation measures that functioned as a portfolio of drought responses. Most of these measures were behavioral changes. Each state introduced water use restrictions and daily use targets, which were generally achieved. Urban conservation programs and rebates included dual flush toilets, low flow showerheads, and rainwater tanks. One-third of Australian households now have rainwater tanks. It is common to only treat water to the standard necessary for its intended end use. Funding was provided for sustainable rural water use. Farmers received grants for activities such as drip irrigation and concrete lining of channels. Australia also invested in new water supply, including desalination, water recycling, and leak reduction. The Millennium Drought profoundly changed community attitudes toward water, but the behavioral response has not been sustained since the drought ended. Summer water use in 2013 was much higher than during the drought. Long term decreases are most effectively driven by urban water pricing and rural water trading. Water pricing was part of the overall reforms that were introduced at the national level. The three main elements were consumption based pricing, full cost recovery for water services, and subsidies being removed or made transparent. The implementation has been difficult and inconsistent. There is still reliance on non-price methods to achieve efficiency. Australians pay approximately twice as much for water as their Californian counterparts. There have been massive increases in water prices in some cities, but those increases are mainly associated with needing to pay back the cost of building desalination plants. The potential for reducing water consumption is substantial. Non-price conservation measures can be most effective during droughts, but behavioral changes may not stick in the long term. Long-term conservation depends on pricing.

Mr. Saracino asked the panelists if they had recommendations for how the Commission should consider water storage investments in relation to the concepts discussed. Dr. Lund said the best way to invest in water storage will need to fit with existing systems for recreation, the environment, and other benefits. Investments must also consider interactions with water supply and flood control systems. Ms. O'Connor suggested that the Commission take a comprehensive and holistic look at water storage. This may include revitalizing groundwater as a source of storage to create a secure water future. Mr. Saracino agreed, but added that it may be difficult for project proponents to best characterize the public benefits of groundwater storage projects, so the Commission will seek advice on that topic. Mr. Yolles noted that it is important to consider water storage in terms of local needs, and efficiency can be thought of as "virtual storage."

Mr. Curtin asked why Australia is not using the desalination plants that were built during the Millennium Drought. Dr. Peel said most of the desalination plants were commissioned around 2007 and came online just as the drought ended. The timing meant there was no need to use them because reservoirs were full again and desalinated water was more costly. Despite them generally being unused, water users are being charged for the facilities on their water bills. If the drought had continued, the desalination plant would have supplied about 50% of Melbourne's water after 2009. Mr. Curtin asked how many plants were built. Dr. Peel said there are six major plants. Some are currently operating in Western Australia. Those are viewed as more of a success, but there have been environmental problems, particularly with saline discharge. Desalination plants in the eastern states with major urban centers are not being used. There are concerns about whether or not the facilities could be easily revitalized for future droughts. Mr. McKenney said it seems that Australia built desalination plants instead of dams and is storing the water in the ocean. Dr. Peel said the usefulness of the plants depends on whether they are viewed from a long term or short term perspective. They could be incredibly useful in the next drought, which is inevitable. Mr. Curtin added that they will be more useful as the price of other water increases.

Ms. Delfino asked Dr. Peel what she thinks could have been done to overcome barriers to appropriate pricing. Dr. Peel said that is a difficult question to answer. The primary concern was how volumetric pricing would impact lower socioeconomic groups. Governments instead preferred to use big technical measures, which led to the decision to build desalination plants. There was also a lot of scientific advice that the drought could have continued for much longer. Mr. McKenney added that water budget-based rates promote efficiency while protecting low income water users, and provide funds for efficiency measures. The Eastern Municipal Water District transitioned to budget based rates and achieved a 16% reduction in water use.

Mr. Curtin asked if there is potential for city councils and planning agencies to create incentives for new buildings and developments to be designed without lawns. Mr. Byrne said those exist in some places, but the politics are difficult. Mr. McKenney said that changing local codes is a long term process. The current need is for water supply assessments for new developments. It is in developers' interest to show that new developers will use less water if supply is in question.

Mr. Byrne adjourned the meeting at 2:46 p.m.