EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: August 18, 2016

MEMO TO: Board of Directors

THROUGH: Alexander R. Coate, General Manager

FROM: Sherri A. Hong, Manager of Customer and Community Services

SUBJECT: 2014-2016 Drought Report Executive Summary

At the August 9, 2016 Board of Directors meeting, the Board requested staff to develop an abbreviated Executive Summary of the Drought Report to post online for the public and media. The document will be added under the "Drought" section of our website as part of the District's drought efforts.

The attached document summarizes the key initiatives deployed and the approach, actions, and insights captured from our experience, plus key challenges associated with this drought in comparison to previous droughts.

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Attachment

I:\SEC\2016 Board Related Items\Info Memos 2016\081816_Info Memos\CCS - 2014-2016 Drought Report Executive Summary

Drought Report

2014–2016

Executive Summary

EBMUD

Acknowledgements

This report was prepared by the EBMUD Drought Committee with the assistance and expertise from many departments throughout the organization.

A special thank you to the Graphics Division for their work to prepare the graphics and to all employees who contributed efforts to support the drought.

Drought Committee:

Customer and Community Services Department

Finance Department

Information System Department

Office of General Counsel

Office of the General Manager – Communications

Operations and Maintenance Department

Water and Natural Resources Department

General Manager

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General Manager's Statement

California is subject to periodic drought and climate scientists generally agree that the severity of drought in the state is likely to increase in the future. The increased probability of drought and its effects on California will continue to challenge and impact the state's water supply. EBMUD's decades of proactive and strategic planning for long-term and dry-year water supplies have proven that even in drought, the District can provide reliable water supply and responsive service to its customers and community, while also achieving our environmental stewardship goals.

The current drought of 2014-2016, and previous droughts of 2007-2010, 1987-1993, and 1976-1978, posed varying and unprecedented challenges. Most recently, these challenges included dramatically reduced federal and state water project allocations, state conservation mandates and water use restrictions, water quality deterioration, environmental risks, difficult financial and operational considerations, and strained customer and community relations. Each drought period, with its different conditions, required a tailored approach and response to address unique situations as there is no "one-size fits all" strategy.

To address a broad range of dry year conditions, the District maintains an Urban Water Management Plan with Water Shortage Contingency and Drought Management Guidelines which outline various options for drought and dry-year response. Reduced water supply conditions require significant coordination and combined efforts from all EBMUD departments.

With statewide focus on drought, came heightened customer and media interest. The state's unprecedented actions on reporting, allocations, diversion and water rights required constant staff adjustment. During this period, EBMUD delivered Sacramento River water supply though the Freeport Regional Water Project (Freeport) facilities. The delivery of those additional dry-year supplies and substantial conservation initiatives were critical to ensure water delivery to our customers, while protecting our aquatic environments. The deployment of new initiatives, along with customer response and input, provided many learning opportunities for EBMUD to enhance and improve upon our drought response.

This report captures critical knowledge from the 2014-2016 drought, including our response strategy, actions taken, and lessons learned throughout. It is hoped that by capturing the details of our drought actions, this report will help instruct and guide future drought response and initiatives. This report is not intended to be a step-by-step procedural guide, but a summary of the approach and initiatives pursued along with recommendations to build upon our successes.

I want to commend and thank the community for their efforts to reduce water use and for their support during this drought emergency. I also want to thank the Board and staff for their hard work and efforts to tackle the challenges from the drought while continuing to serve and represent the organization, customers, and community admirably.

Alexander R. Coate
General Manager

Executive Summary

In May 2013, following months of continued low precipitation and reduced snow pack levels for the state, Governor Edmund G. Brown, Jr. issued an Executive Order to direct state water officials to expedite the review and processing of voluntary transfers of water and water rights. In December, the Governor formed a Drought Task Force to review expected State Water Project water allocations, California's preparedness for water scarcity and whether conditions prevailing at the time merited a drought declaration. The Drought Task Force worked with federal and local agencies to begin preparations for a statewide drought.

By late 2013, it was clear EBMUD's water supply was also impacted by one of the driest years on record in the East Bay and Mokelumne watersheds. The District's total system storage was projected to be less than 500,000 acre-feet (AF) (median capacity is 630,000 AF) by the end of September 2014, the end of the water year 2014. In January 2014, the District began planning for a water shortage.

Also in January, with California facing water storage shortfalls and diminishing water supplies in the state's major rivers and reservoirs, Governor Brown proclaimed a State of Emergency and directed state officials to take all necessary actions to prepare for drought conditions. The Governor's Drought State of Emergency was followed by statewide requests for 20 percent water use reductions, as well as the implementation by local water suppliers and municipalities of their water shortage contingency plans.

To address the District's water supply conditions and support the Governor's State of Emergency declaration, the EBMUD Board of Directors (Board) adopted a Preliminary Dry Year Response Plan in February 2014, seeking a district-wide voluntary 10 percent reduction in customer water use. This marked the beginning of EBMUD's 2014 drought efforts. In April 2014, in response to a confirmed deficiency of water supply in the District's Water Supply Availability and Deficiency Report, the Board took action to utilize Freeport to deliver additional water supply.

In April, the Board elected not to implement a FY14 drought surcharge. When implemented, the surcharge funds the additional costs of the Freeport facility operation, including purchases of water from the Bureau and/or other water agencies, and related costs to deliver and treat the water. Due to the short time frame that Freeport would be operated and available proceeds from the sale of District property, costs for operating Freeport were funded in the FY14 budget. The Board also reaffirmed the 2014 preliminary dry-year response plan for voluntary 10 percent customer reductions. As dry conditions continued, in August 2014, the Board declared a Water Shortage Emergency within the District's service area and adopted regulations to impose temporary water use prohibitions and restrictions. The district-wide voluntary 10 percent reduction in customer water use advanced to 15 percent in December 2014. Customer reductions became a mandatory 20 percent in April 2015, with the Board's declaration of a Stage 4 Critical Drought.

Throughout this dry period, the District implemented many initiatives to provide for and protect our water supply for health and safety, as well as environmental stewardship. This included the transfer and acquisition of additional dry-year water supplies, defense of our water rights, active management of environmental issues, initiation of a water shortage action plan, creation of a staged drought system with applicable drought surcharges, revision of the Drought Management Program Guidelines to reflect EBMUD's use of the Freeport facility and statewide drought response requirements, creation of a drought budget for financing and tracking drought-related expenses, revision of Water Use regulations Sections 28 and 29, and development of new conservation tools and services including an Excessive Water Use Penalty Ordinance and Water Theft Ordinance.

The 2014 drought emergency continued throughout 2015, and was finally suspended, following significant conservation achievements and normal precipitation, on June 30, 2016. The state's key actions and the District's actions are outlined in the following Drought Actions Timeline Chart A.

During the 2014-2016 drought, the District and the community responded well, resulting in sufficient water supply to serve customers and environmental goals.

State and EBMUD Drought Action Highlights

State Mandates
January 1, 2013–December 31, 2014

2/8/2013
Governor Brown, State Legislative Leaders Announce Emergency Drought Legislation

5/1/2013
Executive Order– Expedite Review/Processing Voluntary Transfers of Water and Rights

12/1/2013
DWR Drought Task Force formed

1/17/2014
DWR declares Drought State of Emergency

1/27/14
Final State Water Action Plan Released

1/31/14
DWR drops State Water Project Allocation to Zero

3/1/14
Governor signs Drought Legislation

3/19/2014
State Water Board Approves $800 Million in Financial Incentives for Recycled Water Projects to Provide Drought Relief

4/25/2014
Governor Brown Issues Executive Order to Redouble State Drought Actions

5/1/14
Year's Final Snow Survey Comes Up Dry

5/3/2014
Governor Brown Proclamation Continued State of Emergency

5/14/14
State Water Board Takes First Step towards Curtailments for Sacramento River Tributaries

CA Dept. Fish & Game and National Oceanic and Atmospheric Administration Introduce Voluntary Drought Initiative to Protect Salmon and Steelhead

7/2/14
State Water Board Approves Emergency Regulation to Assure Compliance with Water Rights Curtailment Orders

7/3/2014
Executive Order B-26-14

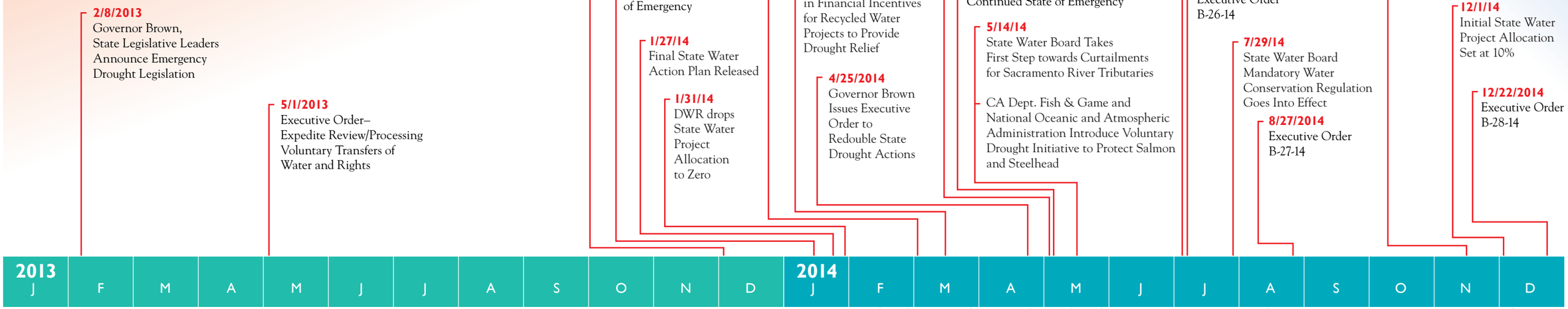
7/29/14
State Water Board Mandatory Water Conservation Regulation Goes Into Effect

8/27/2014
Executive Order B-27-14

11/12/2014
State Water Board lifted the curtailment for pre-1954 water rights holders on Sacramento and San Joaquin River watersheds.

12/1/14
Initial State Water Project Allocation Set at 10%

12/22/2014
Executive Order B-28-14



EBMUD Board Actions
January 1, 2013–December 31, 2014

2/11/14
Item 09 - 2014 Preliminary Dry Year Response Plan - Voluntary 10% reduction in water use

2/25/14
Item 11 - Water Consumption Reporting & Customer Engagement Service

2/25/14
Item 12-1 - 12-3 - One-Year Water Purchase Agreement with Placer County Water Agency (PCWA)

3/25/2014
Item 14 - Water purchase with PCWA

4/22/14
Item 17A - Water Supply Availability and Deficiency Report 2014

4/22/14
Item 17B - Declare Need to Use Freeport Project, Suspend Supplemental Surcharge FY14, Reaffirm 2014 Preliminary Dry Year Response Plan

5/13/14
Item 16.1 - Water Shortage Action Plan

5/13/14
Item 16.2 - Report to Department of Water Resources and the State Water Resources Control Board on the District's 2014 Water Shortage Plan

5/13/14
Item 16.3 - Authorize Preparatory Actions for Drought and Water Shortage Action Plan

5/27/14
Item 15 - Bay Area Water Supply Regional Reliability Principles

8/12/14
Item 16 - Declare a Water Shortage Emergency within the District's Service Area and Adopt Section 28 - Water Use During Water Shortage Emergency Condition

8/12/14
Item 17 - Approve a Water Shortage Emergency Action Plan

12/9/14
Item 18 - Declare the Need to Use Supplemental Supplies, Implement the Supplemental Supply Surcharge, and Increase Voluntary Customer Water Use Reduction to 15 Percent

12/9/14
Item 19 - Approve Staged System of Drought Rates - Voluntary 15% Reduction in Water Use

State and EBMUD Drought Action Highlights

State Mandates
January 1, 2015–June 30, 2016

1/15/15
DWR Increases 2015 Allocation to Water Contractors

3/17/15
State Water Board Expands and Extends Emergency Water Conservation Regulations

3/27/15
Governor Brown Signs $1 Billion Emergency Drought Package

4/1/2015
Continue State of Emergency Executive Order B-29-15

5/1/15
State Water Board Curtails Sacramento River, Delta Junior Water Rights

5/5/15
State Water Board Adopts 25% Mandatory Water Conservation Regulation

6/12/2015
State Water Board issues curtailment orders to pre-1914 water rights holders

7/15/2015
Superior Court Ruling—SWB partially rescinds April 27 curtailment notice

8/12/2015
$30M in rebates to help replace old toilets and turf

8/27/15
California Water Use Drops 31.3 Percent, Exceeds 25 Percent Mandate for July 26, 2016

11/13/15
Governor Brown Issues Executive Order to Bolster State's Drought Response

1/19/16
Final 2016 Drought Contingency Plan Released

2/2/2016
State Water Board Adopts Extended Emergency Water Conservation Regulation

5/9/16
Governor Brown Issues Order to Continue Water Savings as Drought Persists

5/18/16
State Water Board Adopts "Stress Test" Approach to Water Conservation Regulation

6/6/16
State Water Board Stresses Need to Continue Water Savings As Drought Persists

4/2/2015
Freeport starts operating through July 16, 2015 deliver 18,600 AF of CVP water and 4,750 AF of transfers to EBMUD customers

4/14/15
Items 17 & 18 - First Reading of Excessive Water Use and Water Theft Penalty Ordinances

4/14/15
Item 11 - Adopt the Revised Drought Management Program Guidelines

4/14/15
Item 12-1 & 12-2 - Water Supply Availability and Deficiency Report 2015

4/14/15
Item 13-1 & 13-3 - Declaration of Stage 4 Drought & Drought Response Actions- (Mandatory 20% Water Use Reduction & Affirm Need to Use Freeport Supply)

4/14/15
Item 16-1 & 16-2 - Declare Confirmed Water Shortage Emergency & Adopt Revised Sect. 28 Water Use During Water Shortage Emergency Condition

4/28/15
Item 29 - Approve Transfers from Sacramento River Settlement Contractors and Authorize One-Year Water Purchase and Forbearance Agreement

4/28/15
Item 21 - Adopt Excessive Water Use Penalty Ordinance for Drought Stages 3 and 4

4/28/15
Item 22 - Adopt a Water Theft Penalty Ordinance

4/28/15
Item 23 - Approve a Critical Drought Action Plan

5/26/15
Item 05 - One Year Water Purchase Agreement with Placer County Water Agency

6/9/15
Item 10 - Ratify Water Transfer Agreement with Reclamation District 1004 for up to 9,000 AF

6/23/15
Item 18-1 & 18-2 - Bay Area Regional Reliability Plan MOA and WaterSmart Grant Application

6/28/2015
Section 29: Prohibiting Wasteful Use of Water

11/10/15
Item 04 - Consulting Agreement for Environmental Documentation for a Potential 2016 Yuba County Water Agency Transfer

12/8/15
Item 06 - Authorize Negotiation and Execution of 2016 Option Agreements for Potential 2016 Sacramento Valley Transfers

2/9/16
Item 14 - Approve 2016 Transfer from Yuba County Water Agency and Authorize One-Year Transfer and Warren Act Agreements

4/26/16
Item 14 - Suspend the Implementation of the Excessive Water Use Penalty Ordinance Effective May 3, 2016

5/10/16
Item 13 - Rescind Water Shortage Emergency Declaration Section 28 of EBMUD Regulations Governing Water Service to Customers Effective June 30, 2016

5/10/16
Item 12 - Declare Stage 0 Drought Effective July 1, 2016 and Suspend Drought Surcharge Effective June 30, 2016

5/24/2016
Adopt Revised Section 29 Prohibiting Wasteful Use of Water

5/24/16
Item 16 - Adopt Revised Regulation Section 29 Prohibiting Wasteful Use of Water

6/30/16
Stage 0 Drought Suspend Drought Surcharge

EBMUD Board Actions
January 1, 2015–June 30, 2016

Challenges which distinguish this drought from prior drought experiences included:

1) Curtailments of water from the Mokelumne River by the State Water Resources Control Board,
2) Unprecedented reductions in water allocations from the Central Valley Water Project (CVP),
3) First time use of dry year supply from the Freeport Regional Water Project (Freeport),
4) Operational issues and impacts from the new supply source,
5) A new staged system of drought rates and surcharges,
6) Statewide mandatory conservation actions for individuals and water agencies, and
7) Creation, implementation and enforcement of Excessive Water Use and Water Theft Ordinances and associated penalties.

The experience gained by staff and the lessons learned in addressing and managing these complex issues will be helpful in managing future droughts. This report documents the key initiatives (summarized below) deployed during this drought and serves as a resource for future drought emergencies.

Declaring Drought

Historically, EBMUD plans for and implements drought response in accordance with its Water Shortage Contingency Plan which includes Drought Management Program (DMP) Guidelines, as outlined in the District's Urban Water Management Plan (UWMP). EBMUD drought declarations have been typically driven by local conditions, relying on the District's Total System Storage (TSS). Under a TSS scenario, declaration of a drought and its associated severity – or drought stage – is tied to the total volume of water in EBMUD reservoirs. As TSS decreases, the severity of the drought increases, with a corresponding "ramp up" in drought actions, including the acquisition of water supplies and increasing levels of customer demand reduction.

Staff updated the DMP Guidelines twice during the recent drought: 1) in 2015, to reflect EBMUD's successful experiences using the Freeport facilities and to incorporate the needed drought rate structure and 2) again in 2016, to allow flexibility in the first year of a drought to account for customer demand reduction levels, availability of CVP water, and State Water Resources Control Board's (State Water Board) mandatory conservation requirements.

Water Rights Curtailments

In May 2015, following continued critically dry conditions and the Governor's emergency declarations, the State Water Board informed all post-1914 water rights holders in the Sacramento and San Joaquin River watersheds, including EBMUD, of the unavailability of water supply and directed the immediate stop of river flow diversions.

In June 2015, releases from Camanche Reservoir were increased to bypass all true natural flow. The District requested to delay the natural flow releases until the fall to ensure cold water for the fall salmon run. The State Water Board denied EBMUD's request due to critical drought conditions affecting the CVP and State Water Project (SWP) operations and Delta outflow.

During this curtailment period, the District relied on water stored in Pardee Reservoir, water previously stored in Pacific Gas and Electric's (PG&E's) reservoirs under the Lodi Decrees and the supplemental supplies conveyed through the Freeport facilities to serve customers' needs.

Water Supply Acquisition, Operations, and Water Quality

The 2014-2016 drought highlighted the need to pursue multiple avenues for dry-year water supply purchases, given the reduced reliability of CVP water supply. EBMUD's pursuit of long-term water transfer arrangements, including maintaining relationships, and ongoing communication and coordination during non-drought years with the U.S Bureau of Reclamation (USBR) proved essential. These effective relationships protected EBMUD's interests and minimized learning curves by both parties when EBMUD's CVP contract was triggered.

EBMUD has a contract with the USBR that allows EBMUD to deliver CVP supplies during dry years when EBMUD's total reservoir storage is expected to be less than 500,000 acre-feet (AF) by October 1. EBMUD, like all Municipal & Industrial (M&I) CVP contractors, is subject to USBR's M&I Water Shortage Policy (WSP),

which outlines how USBR will distribute water during years when there is not enough water to meet all CVP contractor requests.

Due to the severity of the 2014-2015 drought and reduced levels of storage in federal reservoirs, the USBR reduced allocations for most agricultural water service contractors to a zero percent allocation. Most M&I water contractors, including EBMUD, were given a 50 percent allocation.

In 2014, EBMUD requested and received 18,641 AF of CVP supplies through the Freeport facility. EBMUD also purchased 5,000 AF of transfer water from other sources. In 2015, USBR announced that most agricultural contractors would again receive a zero percent allocation. USBR said it would provide M&I contractors with only the greater of a 25 percent allocation or enough water to meet the contractor's unmet public health and safety needs. EBMUD's 25 percent allocation amounted to 33,250 AF. Given the low level of storage in its system, EBMUD sought a Public Health and Safety adjustment from USBR, but was denied. EBMUD received only 33,250 AF of CVP water in 2015, leading the Board to seek a high level of customer demand reduction (20 percent) and to purchase an additional 25,000 AF of transfer water from several agencies. Purchasing the additional transfer water later during the peak of the drought resulted in significantly higher market prices.

In 2015, staff successfully increased annual water supply delivery capacity from 65 thousand acre-feet (TAF) in 2014 to 100 TAF through the use of Walnut Creek Water Treatment Plant (WTP), Briones Reservoir, and maximized production at Sobrante and Upper San Leandro WTPs. Following this first delivery of Freeport facility water supply, issues associated with operations and water quality were identified. The Sacramento River water has higher concentrations of particulate material, nutrients, and organic matter and therefore, customers experienced different taste and smell from the delivered water.

Beyond the CVP contract, the 2013 Placer County Water Agency – EBMUD Memorandum of Understanding (MOU), which allows EBMUD to purchase dry year water, proved essential. In both 2014 and 2015, EBMUD exercised its right of first refusal under this MOU to purchase transfer water.

EBMUD will continue to work with the USBR to explore strategies to maximize deliveries under EBMUD's CVP contract, including maximizing CVP deliveries at the beginning of a drought or rescheduling allocated CVP water to the next year to ensure adequate water supplies during multi-year droughts. Taking water earlier-on in the drought will help to secure the additional water at reasonable rates and allow phasing-in the new supply which will allow more effective storage management at the local reservoirs. EBMUD and other M&I contractors will also work with USBR on implementation guidelines and procedures that incorporate lessons learned from 2014 and 2015. EBMUD is interested in ensuring that the M&I WSP guidelines and procedures recognize the efforts of contractors to responsibly manage water supplies and plan for multi-year droughts.

Looking ahead, EBMUD should pursue similar long-term arrangements with additional sellers that provide certainty and flexibility to purchase transfer water in dry years. Advance completion of environmental reviews and approvals should be secured to provide long-term coverage for water transfers under a broad range of water supply conditions. Future single-year transfers should incorporate early planning processes, and procurement of specialized expertise to assist with technical and environmental reviews.

The delivery quantity of dry year water supply can be improved and maximized when the treatment rate matches the delivery rate. When the dry year supply was delivered at a greater rate than it could be treated, it increased the storage levels in the Upper San Leandro and San Pablo reservoirs. This limited the reservoirs' ability to store runoff, and increased the risk of spill. Maximizing production at the West of the Hills water treatment plants and completing the improvements currently in progress at the in-line plants will help to support these efforts. In the future, when supply changes occur, additional monitoring of water quality and advance notification to customers will assist in addressing taste and smell concerns.

Water Use Reduction Goals

For the first time starting in 2014, the state mandated water use reduction goals for consumers and water agencies and prohibitions on certain types of water use. Statewide mandates required staff to closely monitor

and quickly respond to state proposals to ensure District interests and local conditions were taken into consideration. These state actions did not always align with the District's standard schedule for water supply or drought actions, however statewide actions kept the media and the community focused on reducing use.

In response to local conditions, the District-wide 20 percent water use reduction goal was set appropriately, and resulted in actual customer water savings exceeding state and EBMUD water saving goals. This District-wide reduction did not cause substantial customer inquiries or appeals as compared to water allocation methodologies used in previous droughts. Consumers across all business classes reduced their water use and this savings was an important component in stretching our water supply.

Efforts are currently underway for the District to provide additional tools and services to help customers better understand and monitor their water use. The Supersaver Bill Insert Program put into place to recognize low water users was well received as customers appreciated acknowledgment of their efforts. Due to the short time frame required to implement a program, limited customer household data available, and information system modifications, a customer who used eight units or less of water during a bi-monthly billing period was defined a supersaver. As a result, this only recognized customers who used a low number of units. A more robust program is needed to determine actual overall percentage savings reductions for all customers.

Water Use Restrictions and Ordinances

In response to both state action and local conditions, the District adopted several water use restrictions and ordinances to achieve mandated water saving goals. This included shorter-term water shortage emergency regulations (Section 28 of EBMUD's Regulations) and long-term water waste prohibitions (Section 29) to address required rationing reductions by customer class.

An Excessive Use Ordinance, penalizing single family residential accounts using more than 80 units of water per billing cycle, caused considerable Board discussion and media attention. Though approximately 5,600 customers were penalized under the Excessive Use Ordinance, very few complaints required direct Board or General Manager attention. However, significant media attention focused on those customers, as well as the District's billing cycle and usage calculations. Prior to re-instituting this Ordinance, the District should consider the methodology and criteria for how and when the EU penalty is assessed including overall water savings, leaks, and penalty amount. A program of proactive outreach to affected customers should be developed, and the penalty appeals process extended to allow meter and billing issues to be resolved, customers to review their bills and when necessary, address leaks. The District should be very conscious of the potential for media focus on these customers, and adjust media response and customer outreach accordingly.

A Water Theft Penalty Ordinance was also adopted and successful in reducing service line tampering and unmetered water theft. Water theft mainly occurred on single family residential (SFR) services and by renters where it was difficult to identify the perpetrator.

Communication/Outreach

Internal and external communication is critical during droughts and requires proactive planning and coordination among all stakeholders. The media attention provided by statewide actions was beneficial, but sometimes confusing to customers. The added media attention sometimes presented conflicting messages, resulting in staff needing to ensure the District's message was communicated and explained clearly.

The state' actions also required staff to be watching activities not only within our local service area, and the Bay Area, but at the state level. This level of attention meant staff across the organization needed to be prepared to adjust to new information, new requirements, and a new system of reporting that could complicate customer messaging.

When responding to media, it is important for staff to provide consistent and accurate information and data. In the future, staff should proactively alert media of the lead time for data, and clarify what is required at the onset to avoid reworking requests. This is important when staffing resources are already constrained.

For media response, information must be accurate, timely, and presented clearly, so that it is easily understood. If EBMUD is not a prominent and timely expert on local water supply, water use, water supply planning, conservation program participation, customer response,

and other related drought topics, the media will move on and the District will lose opportunities to reach customers. With a 24-hour per day news cycle, and a public that is hyper-focused on drought, the District must be prepared to rapidly respond to media inquiries.

Lastly, during a prolonged drought, stakeholders become active and sometimes aggressive in viewing others' conservation or water use actions. Staff needs to be prepared to assist individuals in redirecting this frustration and anger into productive, community-based solutions. The District should build a framework for customer communication that continually supports the community effort (EBMUD and our users, you and your neighbors) of addressing a drought.

Financial Considerations & Budget

A Drought Surcharge was adopted by EBMUD's Board of Directors on December 9, 2014 to offset the expected expenses of water supply purchases and delivery. It is clear the most challenging aspect of calculating an affective drought surcharge is estimating the reduction in water sales and water revenue. Water revenues reductions are difficult to estimate due to tiered SFR water rates, differences in customer class water rates, and timing of reduced water sales throughout the year.

The original drought surcharge revenue analysis was done on an annual basis. In hindsight, a month-by-month analysis would have provided better estimates of single family residential water use by tier, lost water sales revenue and drought surcharge revenue.

Further, Fiscal Year (FY) 16/17 budget and rates were based on 151 MGD, a very low use figure from a historical perspective. EBMUD's Drought Stage 4 implementation assumed water use at 137 MGD – only about 10 percent lower than the baseline, secured a drought surcharge of only 25 percent, and in the end, still required use of $30 million in Rate Stabilization Funds (RSF) to make coverage goals. In future years, achieving a large reduction in customer use, and buying significant quantities of water would trigger much larger drought surcharges and potentially larger required use of RSF funds.

Thankfully, in FY16, the $30 million in RSF use was not required for several reasons. As a result of strong conservation and good rains in spring 2016, EBMUD did not need to purchase as much water as anticipated, so costs for purchase, pumping and treatment were lower than budgeted. However, strong conservation meant more losses in revenue than projected. In the end, only about $6 million of reserves were needed to meet debt coverage. The experience of all subsequent droughts will be unique and will likely require the use of RSF funds to make coverage goals. It is important that the current RSF is sufficient to meet severe and prolonged drought and will need to be reviewed and increased.

Following the experiences of the 2014-2016 drought period, it is believed that the District will want to update drought surcharge rates as part of each biennial budget regardless of whether a drought is anticipated. In order to achieve updated drought rates as a part of the biennial budget process, the District should develop a drought management expense budget to ensure coverage of anticipated expenditures. Should the Board wish to implement a drought surcharge, implementation and recovery should be discussed early on to allow preparation time before the start of a fiscal year.

A special drought budget unit is also a good approach to setting, tracking and managing drought-related expenses. Unfortunately the timing of budget preparation and adoption does not always match the water supply situation and need for drought resources.

System Support

Actions undertaken during the 2014-2016 drought period frequently impacted customer billing and database tracking systems. The customer billing system is complex and modifications require sufficient time to program, implement and test. Changes to the billing system necessary to support drought surcharges and initiatives, sometimes resulted in unanticipated billing-related issues which required time to resolve. Manual processes were sometimes deployed to resolve billing issues to ensure accurate and timely bills, but manual processes are resource intense. A clear strategy – well in advance of changes – in the rates structure and billing processes is needed to allow the time required to perform the necessary changes and testing.

During droughts, the increased external and internal need for water consumption and other data collection, customer service and other related monitoring and reporting efforts requires numerous data sets and

Information Technology (IT) applications. Often these applications (i.e. Billing System, Water Conservation Database, production data, workforce management, account groupings, etc.) do not lend themselves to pre-formatted data queries, shared terminology, and related data collection and reporting. An integrated application is needed to ensure consistency and availability of water consumption data.

Ease of and timeliness in obtaining data and having the appropriate tools to support initiatives are critical to be able to manage and respond effectively and efficiently.

Conclusion

The many decades of planning and preparing for the drought proved essential in the District's successful response to the 2014-2016 Drought. Although faced with significant challenges from this drought, EBMUD was able to meet and/or exceeded the District's main key goals and objectives while providing customers' with a reliable supply of water, complying with state mandates, protecting the environment, providing responsive service, and fiscal stewardship. Droughts are dynamic and complex and are disruptive and costly for EBMUD, our customers, and the community.

The District will continue to plan for and invest in long-term water supply and conservation to meet our current and future water needs.