

East Bay Water

08

A Status Report on
Local Water Use &
Water Supplies

INTRODUCTION

Like people, communities can't survive without water.

In California, attaining and maintaining safe and reliable water supplies is rarely simple. A century ago, East Bay communities stressed by a dwindling supply of poor quality local water chose a regional solution and formed the East Bay Municipal Utility District. With political will and technical expertise, the new agency acquired rights to a pristine Sierra water supply, then built a first-of-its-kind dam and a gravity-based system to move the water 90 miles. These feats allowed East Bay communities to flourish through the 1900s. The East Bay still relies on EBMUD to deliver a safe and reliable water supply—but today's residents and businesses also view water as a limited natural resource. Customers encouraged EBMUD's evolution from a water supply provider to a water supply manager, responsible for not only delivering water but also for helping the East Bay reduce water use through recycling and conservation, and for protecting environmental resources. Water management begins with estimating potential water demand by predicting how many people and businesses will rely on EBMUD water in the coming decades. The next step is gauging

how far that demand can be lowered by wise water use. Strong community support for conservation and recycling has helped push per capita demand down sharply in the East Bay. With sustained commitment to a growing share of water supplies coming from recycling and conservation, the East Bay's local water needs can be met both now and in the future from existing supplies when winters bring normal precipitation. However, reducing demand alone can't get the East Bay through the natural disaster of a prolonged drought. The resulting extreme rationing could devastate the local economy. In prolonged droughts, after reserving water supplies for environmental and fire-fighting purposes and pressing customers to ration, our reservoirs can fall far short of minimally acceptable water storage. We're making steady progress on solving these problems. This report describes the East Bay's current water supplies, how the water picture will change for our area over the next few years, and how plans are being laid today to ensure water supplies in the future. *B*

THE YEAR AT A GLANCE

Fiscal Year 2008—July 2007 through June 2008—followed an extremely dry winter. As the summer of 2007 started, water agencies throughout the Bay Area asked for voluntary customer water use reductions. Customer actions and a cool summer helped. Through the fall and winter, East Bay residents and businesses were urged to continue voluntary conservation while EBMUD kept a watchful eye on precipitation and snowpack conditions. Together, we stretched existing supplies through conservation and recycling. At the same time, EBMUD worked on building a groundwater project locally and a collaborative regional water project in the Sacramento area, both of which will provide drought relief in the future. EBMUD also partnered with other agencies on short-term water transfers and investigated long-term shared supply projects for additional future drought relief. The immediate water supply picture worsened as the year went on. March and April 2008 together were the second driest on record. In May 2008 the EBMUD Board of Directors declared a water shortage emergency and mandated water rationing to protect against a third dry year.

Although the drought increased attention to short-term water use and supply activities, EBMUD still progressed on long-term issues throughout FY08. Funds were invested for work to protect Delta levees, and EBMUD staff expertise contributed to the statewide look at how the Delta's waters are protected and used. EBMUD also launched a public process evaluating the East Bay's long-term water supply management program for the first time in fifteen years. As that work comes to fruition in FY09, a 2040 time horizon will begin guiding water supply management for the East Bay. EBMUD's water supply programs of the early 20th century focused on capturing and delivering as much supply as possible. Reflecting the evolving East Bay communities it serves, EBMUD's 21st century approach is reinventing water supply management. Working with local industries and major irrigators, recycled water is being used where possible. Working with residents and businesses, new ways of using water in daily life are capturing efficiencies indoors and out. And working with a diverse set of partners, EBMUD is exploring new ways to secure water supplies to minimize the impact of future droughts on the East Bay.

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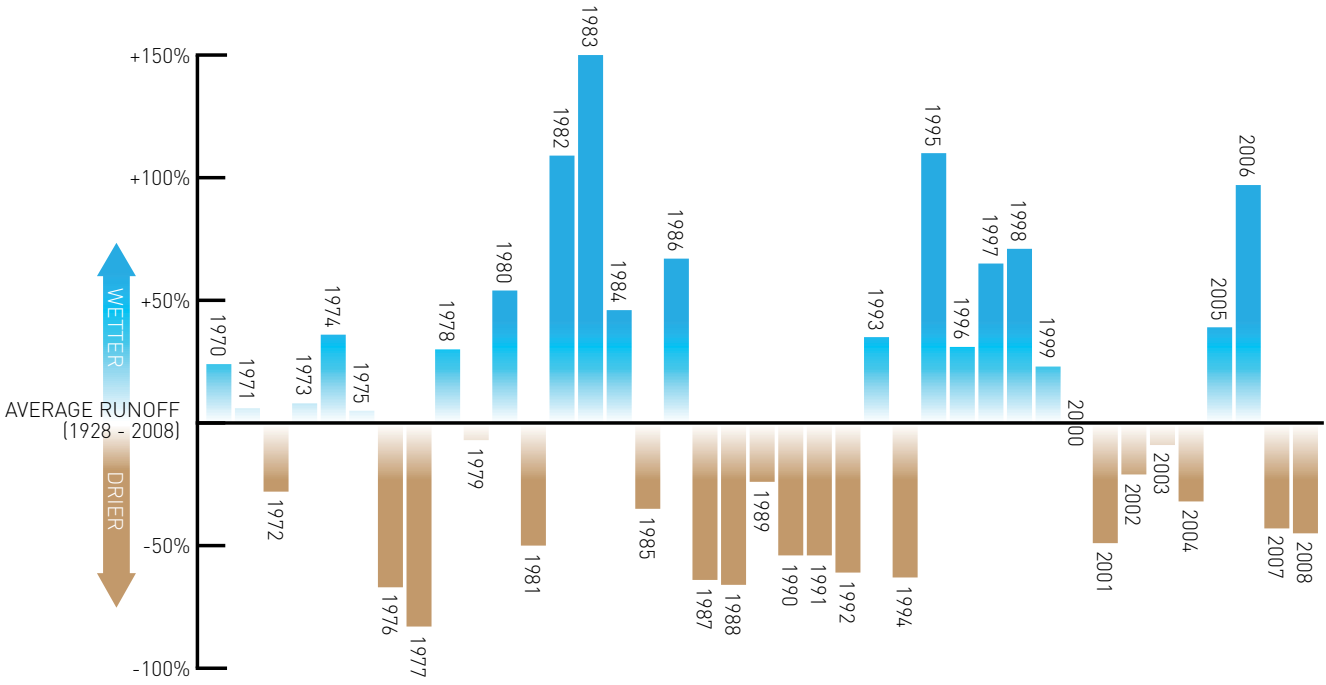
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Variability in Mokelumne Watershed Runoff
1970-2008

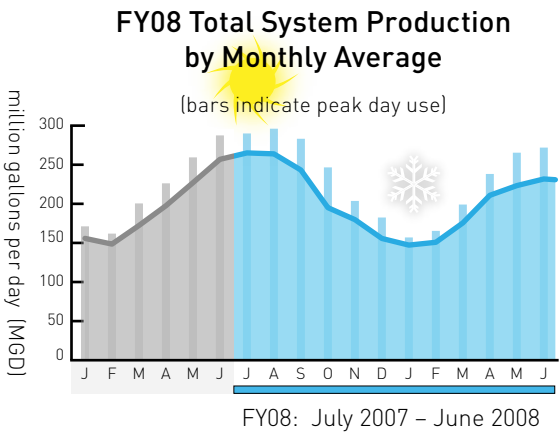


Runoff flowing into the Mokelumne River is closely watched each year. Because fiscal years 2007 and 2008 were both very dry, low projected stored supplies triggered rationing in the East Bay. Camanche Reservoir (pictured at left) dropped to 35 percent of capacity, exposing vast expanses of land normally submerged.

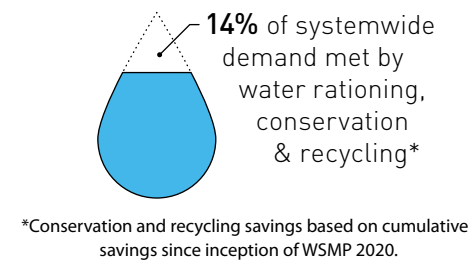
Reviewing the Year's Water Supply

Water Needs and Sources

Most of the East Bay's daily water supplies in FY08 flowed from the Sierra-fed Mokelumne River. EBMUD tracks how conservation and recycling extend the water supply, measuring against goals set fifteen years ago in the Water Supply Management Program 2020. In addition to the WSMP 2020 accounting, we also banked extra water savings this year due to drought-related water rationing. With the combined effects of WSMP 2020 implemented water conservation, recycling savings, and the current year's rationing, FY08 water demand was reduced by 14 percent.



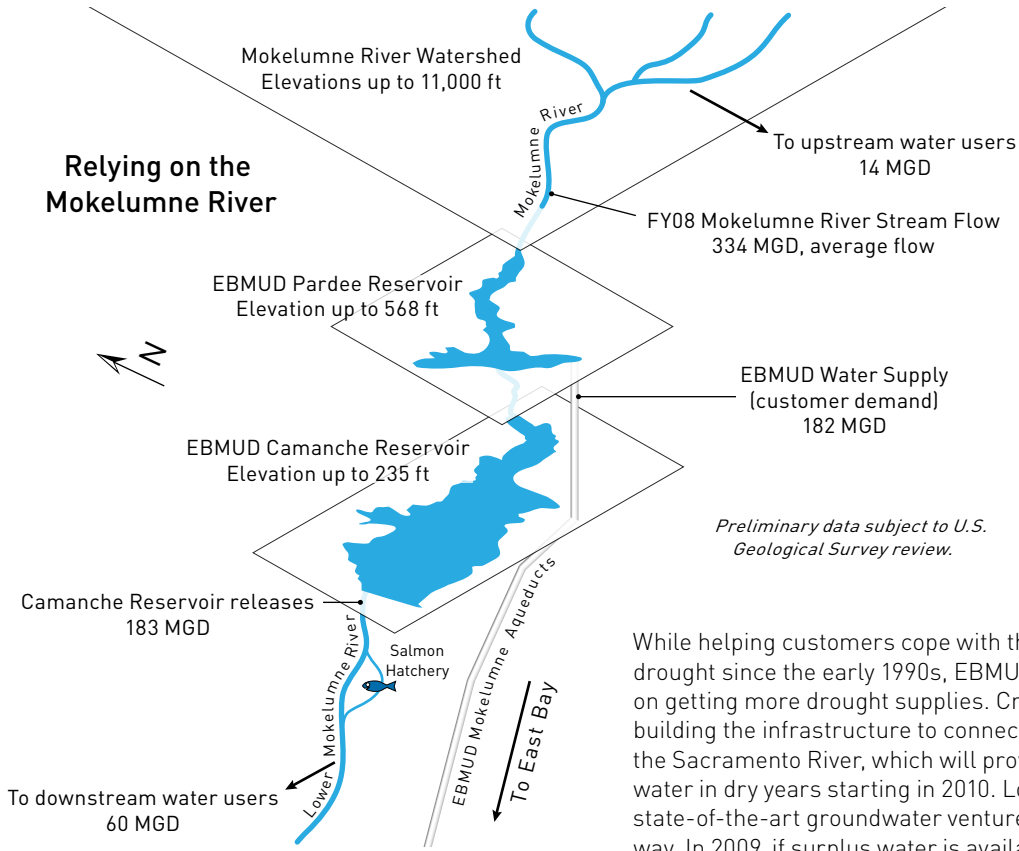
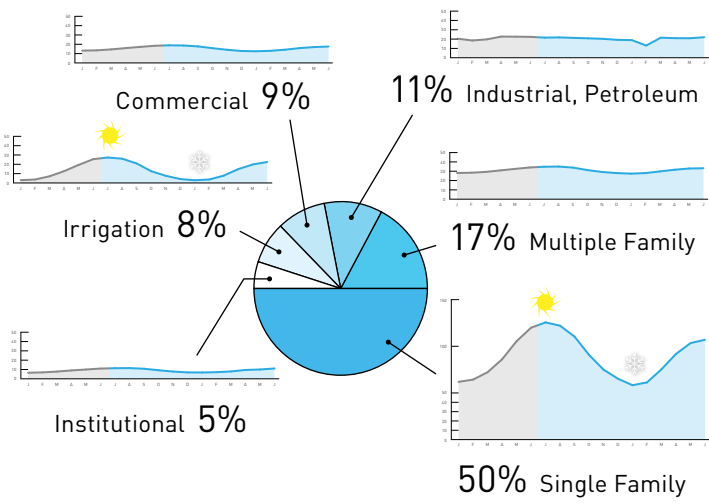
East Bay Water Savings in FY08



of the total supply that was available this year to 1.3 million East Bay customers. The year began with voluntary water rationing and ended with mandatory rationing because a dry winter preceded FY08, and a second one occurred during FY08. Because of the pronounced cyclical nature of water use by mostly single family homes and irrigators, water demand varies throughout the year as the graphs above and below illustrate.

Sierra snowmelt stored in two foothill reservoirs met the needs of the East Bay, and at the same time carefully-timed cold water releases sustained fisheries, and water that belongs to other water rights holders passed through EBMUD's reservoirs into the lower Mokelumne. Because water supplies were low, the additional challenge of managing river levels in the winter and spring to protect San Joaquin Valley communities from flooding did not happen in FY08. Rainfall that coursed through East Bay streams and into local reservoirs contributed less than ten percent

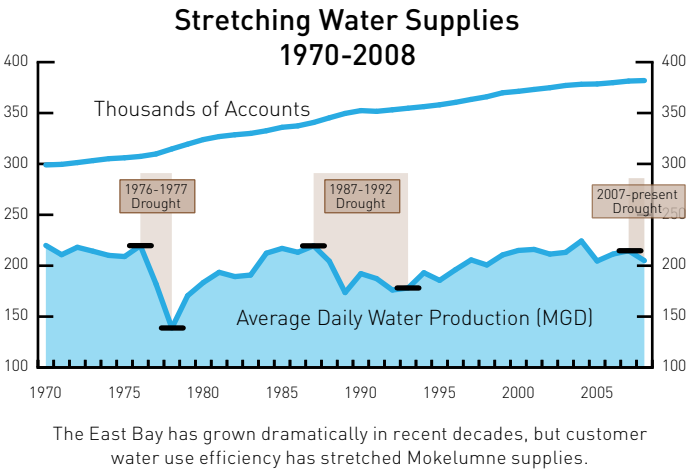
FY08 Water Use by Customer Class



East Bay water needs are one of many essential purposes supported by the Mokelumne River's flows. EBMUD operates its two reservoirs on the river to provide a high quality water supply for 1.3 million East Bay customers while meeting all regulatory requirements and downstream release obligations. EBMUD released an average of 183 million gallons a day for the Lower Mokelumne fishery and other downstream uses. Water rights holders upstream of EBMUD's reservoirs on the Mokelumne took 14 million gallons a day, and those downstream took 60 million gallons a day during FY08.

While helping customers cope with the first drought since the early 1990s, EBMUD also worked on getting more drought supplies. Crews began building the infrastructure to connect EBMUD to the Sacramento River, which will provide some water in dry years starting in 2010. Locally, a state-of-the-art groundwater venture got under way. In 2009, if surplus water is available, EBMUD will begin injecting some water into a deep, pristine aquifer to recover and use in the future.

EBMUD has four water supply scenarios: normal conditions, moderate shortage, severe shortage, and critical shortage. FY08 started as a moderate shortage but moved to severe by the end of the year. If average rainfall returns during the 2008-2009 winter, the drought could moderate or end. If not, EBMUD and customers will manage through a third dry year, with the promise of some relief by 2010. The new Sacramento River source took more than three decades of effort—an experience that sharpens EBMUD's attention on managing today's water uses for a sustainable future.



Conserving: New Ways of Living

Long before it became fashionable, many East Bay residents and businesses began conserving water. As it did for its customers, sustainability became a basic element of EBMUD's water supply management program decades ago. EBMUD championed legislation to require all California water utilities to report regularly on

their conservation efforts and to prove that water supplies are available before municipal planning agencies can approve large new developments. EBMUD's comprehensive water conservation program was one of the first of its kind at a water utility. Teaching youth about water and water conservation also is a long tradition.

In FY08, EBMUD continued to help children and adults learn about water, to provide advice on water efficient models of toilets,

dishwashers and washing machines and to encourage customer conservation by offering free devices and rebates to customers. EBMUD customers use an average of 25 percent less water per day now than they did in 1971.

EBMUD continually studies water use, water-related technology and customer preferences. An innovator in leak detection, EBMUD is using both hard-wired and hand-held leak detectors to search out and fix leaks. A Berkeley-based leak detection research project, the largest of its kind, is using remote sensors to monitor pipes throughout the city for leaks and report findings, enabling leak repairs earlier than ever before.

Water conservation programs emphasize cost-effective behavior changes and technology retrofits to deliver efficiency without undue hardship or loss of functionality. EBMUD landscape management practices help customers slash water use and improve landscape health and appearance. Rebates encourage customers to select high-efficiency toilets and clothes washers that perform as well or better than less water efficient models.

Fiscal Year 2008 Water Conservation Savings

New water savings by EBMUD and customers saved 1.5 million gallons of water per day in FY08 (see below). Savings by program type are detailed on page 7. Customers worked with staff to complete more than 5,000 water use, leak detection and landscape budget projects, accepted more than 11,000 free water saving devices, and received rebates on nearly 12,000 water-efficient fixtures, appliances and irrigation equipment upgrades.

Using Water Wisely at Home. Residential customers saved nearly 388,000 gallons daily of water indoors and out in FY08. Outdoors, households cut water use by improving their irrigation systems and/or adjusting their landscaping to be more drought-tolerant. Inside, customers implemented water saving changes through EBMUD home surveys, installation of free devices, and rebate-

supported purchases of water-efficient toilets, clothes washers and dishwashers.

In FY08, toilet rebates were popular with customers. Households and businesses installed 4,526 high efficiency toilets—an increase of 335 percent over the previous fiscal year. Those toilets save nearly 100,000 gallons of water every day. One measure of marketplace confidence in high efficiency toilet technology is that the list of toilet models eligible for rebates rose from 111 to 173.

Clothes washer rebates were the second most popular rebate program in FY08. This year, Bay Area water utilities worked with Pacific Gas and Electric to offer combined water and energy saving rebates for high-efficiency clothes washers. By completing one rebate application, East Bay residents who purchased qualifying clothes washers could save up to \$200 per clothes washer. Customers installed more than 6,900

residential clothes washers and began saving about 130,000 gallons of water per day.

Using Water Wisely at Work. East Bay businesses helped keep nearly 110,000 gallons of water a day in reservoirs from indoor water savings that resulted from their own actions and by working with EBMUD to install water-efficient appliances, plumbing fixtures and process equipment. Businesses also saved an estimated 378,000 gallons per day outdoors through improvements in irrigation systems and leak repairs.

Education and Outreach

Sustainable water resources result from the personal lifelong commitment of East Bay residents and business owners and employees to use water efficiently. EBMUD tailors information and resources to the audience so children, adults and businesses learn about and conserve water. Conservation ideas are routinely featured in customer newsletters, workshops and events and presented at public events throughout the East Bay. Each year, 41,000 students learn by attending entertaining conservation-themed plays offered at local schools.

This year, EBMUD conservation experts talked with thousands of customers at 27 different local events, including the Pacific Energy Center Water Conservation Showcase, several "green" corporate events, and fairs and festivals sponsored by neighborhoods, cities, towns, business groups and civic groups. At Berkeley's Ecology Center, water conservation exhibits are supported by EBMUD at the EcoHouse, a location that features an innovative graywater demonstration system. In the coming year, EBMUD will be supporting new

signage and a water efficient irrigation system at the center so that visitors can see water efficiency in the context of a completely "green" building.

Supporting Active Learning. Learning by doing is an important part of EBMUD's water conservation education services. At 20 local elementary and middle schools, kids experienced the joy of bringing a water-efficient garden to life. In Berkeley, students participating in a service run by the non-profit Rising Sun Energy Center (supported by EBMUD) retrofitted nearly 1,000 plumbing fixtures for East Bay residents with water and energy conserving devices. This program, now in its sixth year, educates teachers, students and the community about water, EBMUD services and water conservation.

Partnering for Bountiful Low Water Use Gardens. In FY08, EBMUD launched a program to supplement investments by public agencies and non-profit groups in creating gardens open to the

Water efficient gardens can be beautiful, even lush in appearance. EBMUD helps fund public gardens that showcase California native and Mediterranean Zone plants that thrive with little water.



FY08 Estimated Daily Water Savings

	New Savings FY08	Savings FY95 - FY08	WSMP 2020* (25-year goal)
Residential Savings	815,000 gpd	10.7 MGD	20 MGD
Commercial Savings	725,000 gpd	11.8 MGD	15 MGD
Total Savings	1.5 MGD	22.5 MGD	35 MGD

* includes savings from EBMUD programs and from customer actions without direct EBMUD involvement.



Conserving: New Ways of Living

public that demonstrate water efficiency and sustainable design principles. Grants went to gardens in Alameda, Oakland and Walnut Creek.

Encouraging Sustainable Landscape Design. State law requires EBMUD to serve water for all development approved by land-use planning agencies in its service area. EBMUD’s goal is to minimize the impact of every new user on the water supply we all share. EBMUD began encouraging sustainable landscape design more than two decades ago, and has worked with local land-use planning agencies to make it happen. Long-standing programs provide free landscape plan and code review to support water-efficient landscape choices. In more recent years, that same service was made available for building design to encourage water efficiency indoors.

In FY08, EBMUD set a new standard for water-efficiency by requiring new customers to meet rigorous indoor and outdoor water efficiency standards for plumbing, appliances, landscaping and commercial processes—and prove it in their project design and construction—as a condition of receiving water service. More than 70 plans were checked to ensure water-efficient design.

Water Efficiency Research

Two pioneering studies on controlling water loss from leaks began at EBMUD this year. In addition, a guide to water efficiency best practices for new business construction was published, and it will be featured in EBMUD education program offerings next year and distributed at free training seminars for city and county land-use planning agencies and business trade groups.

Finding Leaks in Underground Pipes. Detecting leaks underground has taken advantage of technology advances in recent years, and EBMUD is one of the first in the nation to conduct thorough research on the new technology’s effectiveness. Digging up and fixing leaks on large pipes is very expensive —and those pipes generally are vital for serving thousands if not hundreds of thousands of customers. One of EBMUD’s FY08 research projects involved testing developing robotic technologies for finding leaks, and figuring out how big the leaks are, so cost-effective repairs can be made. Project results will be reported next year.

In FY08 EBMUD began installing 1,000 devices in Berkeley that listen for running water and report

FY08 Water Conservation Program

Program Description	Activity	Incentives (\$)	Savings (gpd)
Residential Services			
Single-Family Surveys	525	—	47,000
Multi-Family Surveys	463	—	82,000
Student-Installed Improvements	994	—	17,000
Home Water Use Do-it-Yourself Survey Kits	141	—	5,000
Leak Detection Advice	26	—	1,000
Residential Incentives			
High-Efficiency Clothes Washer Rebates	6,912	906,475	130,000
High-Efficiency Toilet Rebates	3,421	510,223	77,000
Residential Landscape Rebates	12	10,362	1,000
Free Devices Distributed	11,053	20,000	12,000
Subtotal Residential Programs	23,547	\$1,447,060	372,000
Non-Residential Services			
Commercial Surveys	160	—	32,000
Industrial Surveys	19	—	16,000
Institutional Surveys	37	—	22,000
Leak Detection Advice	6	—	11,000
Non-Residential Incentives			
Commercial Clothes Washer Rebates	66	12,300	7,000
Custom Non-Residential Rebates	2	1,520	1,000
Commercial Dishwashing Spray Valves	18	540	2,000
Toilet/Urinal Rebates	1,105	165,551	18,000
Subtotal Non-Residential Programs	1,413	\$179,911	109,000
Irrigation Services & Incentives			
Irrigation Surveys	200	—	85,000
Irrigation Reduction Information System	134	—	31,000
Landscape Irrigation Upgrade Rebates	25	45,858	29,000
Irrigation Controllers (Res. and Comm.)	484	175,226	233,000
Subtotal Irrigation Programs	843	\$221,084	378,000
Program Totals	25,803	\$1,848,055	859,000
Non-EBMUD Program Savings			680,000
FY08 Total Water Savings		1,539,000 gallons per day	

Conserving: New Ways of Living

their findings via a computer uplink. A federal grant is paying half of the costs for this project because of the benefits expected for water utilities in the western states that serve areas with similar soils and ground movement. It's already helped locate leaks not only on EBMUD pipes in the streets but also on homeowner pipes in neighboring yards. Early detection of leaks saves water, money, and customer aggravation.

Helping Multi-Family Residents Watch their Water Use. A quarter of the East Bay's residents now live in multi-family housing and the percentage is expected to grow. Many multi-family unit residents do not get a water bill, so they have no financial incentive to cut use or fix water leaks. Implementing lessons from FY08 research, EBMUD is testing two ways to give responsibility for water bills to more of these customers.

One project will help existing multi-family property owners install water sub-meters and charge residents for water use directly rather than as part of the rent. This approach can reduce residential water use by 15 percent and often motivates prompt leak reporting that can slash water use by another 20 percent. That could save the East Bay up to two million gallons of water a day.

A second project will require separate water meters in new multi-family dwellings and commercial units of less than four stories, making each unit responsible for its own water use. Since almost two-thirds of the multi-family units being built in the East Bay are three stories or less—and those buildings are ones where the separate plumbing can be done at a reasonable cost—this change will help us maximize water efficiency in new developments.

Case Studies

Rossmoor. Automated irrigation controllers are saving time and money at Rossmoor, a Walnut Creek community with 6,600 residential dwelling units. The homeowner association replaced 374 irrigation controllers with help from EBMUD, putting an end to frequent, unnecessary watering. Residents say the lawn areas are now more usable, and the community has cut irrigation use by 20 percent. The new controllers account for weather changes and automatically adjust the amount of water applied to landscaped areas. Rossmoor's staff can monitor and adjust the irrigation system from any computer. When EBMUD declared mandatory water use restrictions, Rossmoor complied within minutes, reducing the water used by all 374 controllers without even leaving the office.

DoubleTree. Berkeley's DoubleTree Hotel recently replaced 357 toilets—each of the old ones used 3.5 gallons per flush, while the new models use just half that amount (1.28 gallons). The hotel cut their annual water costs by almost \$6,000, saving nearly a million gallons of water annually.

Gatorade. Gatorade took a systemwide approach to review areas at their Oakland facility where they could save water and reduce operation costs. As a result, Gatorade identified cutting-edge water-efficient options for their facility that will save 14 to 15 million gallons of water annually. The first upgrade was completed on the bottle conveyor line where a water-based lubricant was replaced with a dry lubricant. This change is expected to save 600,000 gallons of water annually. The second was in the bottle cooling units. The facility optimized the fluid level controls and evaporative fans, which resulted in an estimated savings of 4 million gallons annually. Future proposed water savings measures include a reverse osmosis recovery system, anticipating a reduction in water use by 10 million gallons annually. The new system would capture the current reverse osmosis concentrate waste stream for further treatment and reuse.



Recycling: New Ways of Working

Recycled water is a drought-proof water supply. In the Bay Area, it's been used for nearly a century to protect investments in landscaping and parks from episodic droughts. EBMUD was an early adopter of this strategy for saving potable water; recycled water has been used at the west Oakland wastewater treatment plant for almost 40 years for industrial processes and irrigation. Recycled water meets stringent standards that protect public health and the environment, and its

treatment plant. A refinery has partnered with EBMUD to use recycled water over the past decade and in FY08 used almost 4.5 MGD of recycled water in cooling towers. Irrigation use grows annually; in FY08 it was almost 1.2 MGD. Since EBMUD's wastewater service area is about a third the size of its water service area, our successful recycled water program depends on partnerships with other public agencies: the West County Wastewater District for Richmond



Sports fields are among the customers receiving clean, "drought proof" recycled water.

FY08 Recycling Program

Program Description	Activity
Average recycled water used (2020 Goal: 14 MGD)	5.6 MGD
Recycled water customers served to date	40
Site evaluation plans completed	9
Recycled water user site supervisor trainees	32
Recycled water education programs presented	14

use is growing. Today EBMUD customers use recycled water for irrigating landscaping, community sports fields, and private and public golf courses. Industrial cooling and processing uses have expanded, and it's also being used for toilet flushing in an office setting. In FY08, about 12 million gallons per day was used. Almost six million gallons per day of recycled water was used by East Bay customers, and EBMUD used another 6.3 million gallons a day at the wastewater



Brought online in FY08, EBMUD's new advanced treatment plant supports growing use of recycled water in the East Bay.



Recycling: New Ways of Working

projects, the City of San Leandro for service in Alameda and southern Oakland, and the Dublin San Ramon Services District in the San Ramon Valley. EBMUD's newest recycled water pipelines, now in Emeryville and Oakland and soon to be expanded into Albany, Berkeley, and Alameda, are served solely by EBMUD.

"The West County Wastewater District has successfully partnered with EBMUD since the 1980s, when the two agencies first cooperated to supply the Richmond Country Club with recycled water for irrigation. We took recycled water to a whole new level for cooling tower use at Chevron's Richmond Refinery. And when EBMUD's Richmond Advanced Recycled Expansion (RARE) Water Project, now under construction, comes online in 2010, expanded use of recycled water will just about max out WCWD's supply of secondary effluent."

E.J. Shalaby
General Manager
West County Wastewater District

"The City of San Leandro is proud to have helped reduce demand on [the] drinking water supply by providing wastewater effluent treated to a secondary level that is used to deliver recycled water to irrigate golf courses in San Leandro, Oakland, and Alameda."

Dean Wilson
Water Pollution Control Manager
City of San Leandro Water Pollution Control Plant

Recycling Progress

EBMUD delivers recycled water to parks, greenbelts, schools, common area landscapes and golf courses in the San Ramon Valley. In FY08 that use offset the need for 527,178 gallons per day of potable water. The ability to serve customers from San Ramon Valley facilities is growing, and by 2010 another 0.54 MGD of recycled water will be delivered to the northern San Ramon area.

FY08 saw the first recycled water deliveries to parks and greenbelts in Oakland. Those deliveries began late in the fiscal year and amounted to 3.1 million gallons of recycled water over fewer than three months, eliminating an equivalent use of potable water. EBMUD is now a project "customer" with recycled water pumped into its administration building for public restroom toilet flushing, landscape irrigation, and street cleaning. When recycled water pipeline installation is complete along the East Bay's shore in 2015, 2.5 million gallons per day of recycled water will go to schools, sports fields, a golf course and industrial cooling towers in the area.

Recycled water is safe and easy to use, but EBMUD takes extra steps to ensure that customers understand it is a different source from drinking water, and the two water systems are always kept separate. EBMUD experts work closely with each customer to help optimize their use of recycled water, and provide training to their employees on how to manage a recycled water system to irrigate for best results. This investment of time helps customers use recycled water efficiently and effectively.

EBMUD also worked with two local oil refineries interested in ways to use more recycled water. Construction began this year on facilities that will increase one refinery's recycled water use from about 4.5 million gallons per day to almost 8 MGD by 2010. Working with another refinery and potential partner agencies, we are investigating similar recycled water uses for their facilities.

With construction of new "purple pipelines" continuing, EBMUD plans to double use of recycled water by the year 2020.



FY08 Recycled Water Use – 5.6 MGD
Recycled water saved enough drinking water to serve about 35,000 people in FY08.



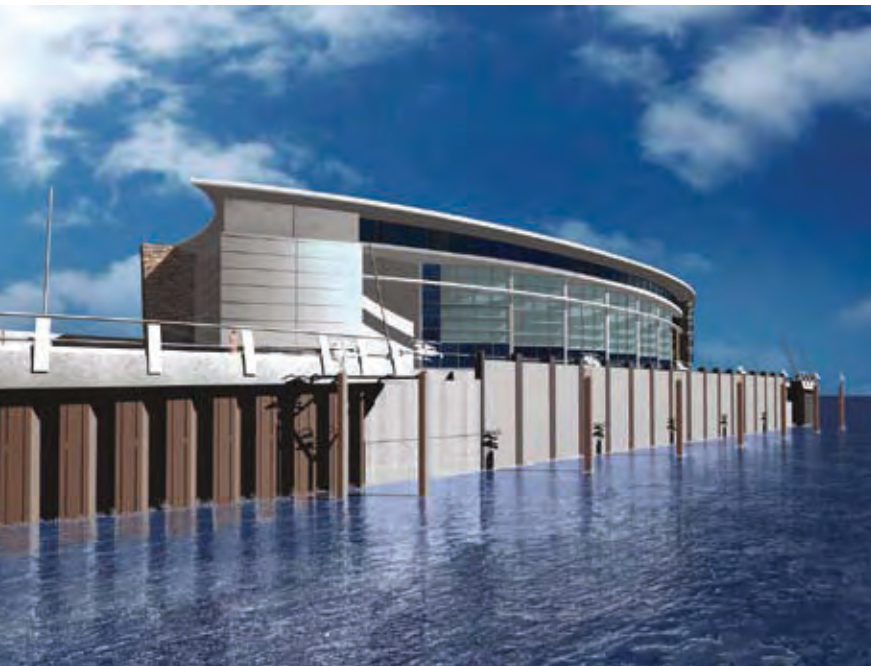
"The partnership between the Dublin San Ramon Services District and EBMUD has greatly benefited both agencies. Our joint project, the multi-phased San Ramon Valley Recycled Water Program, is an important part of a creative regional solution that helps address the challenges of limited water, scarce and costly energy, and global warming."

Dave Requa
Assistant General Manager
Dublin San Ramon Services District



Diversifying: New Ways of Relaxing Drought's Grip

The East Bay needs more water for drought years. Droughts have been a chronic challenge for California throughout time. In years with little Sierra snowfall, the water supply we store in our Sierra reservoirs can end up well short of what would be available in a normal or wet year.



A top priority today is completion of water supply facilities on the Sacramento River at Freeport, shown in the artist's rendering above.

Though the East Bay's population growth is slow, and average water use per customer has dropped dramatically over the decades, droughts mean serious rationing. EBMUD policy calls for cutting use up to 25 percent on average in a prolonged drought—an act that would require as much as a 65 percent reduction by residential customers. While East Bay residents and businesses have always responded when rationing was needed, the changes customers have made to use water efficiently every day are making it harder for them to cope with extreme cutbacks. Diversifying the water supply is important to successfully reducing the East Bay's near-complete reliance on the Mokelumne River.

While diversifying for drought protection is one main concern, an equal if not more important priority is protecting existing water entitlements.

Mokelumne water rights are the core of the East Bay's water supply reliability, and the amount of water the East Bay can rely on from that central Sierra source is declining. As the San Joaquin Valley and central Sierra foothill regions grow, some of that growing region has begun drawing on its senior water rights to Mokelumne River water. In addition, EBMUD has pledged to protect the river environment and fishery conditions and meet specific fishery-related needs with flows to the lower Mokelumne. EBMUD's water supply management strategy is to strive for mutually satisfactory solutions through honest dialogue about the water needs of all involved parties. Through ongoing collaboration, trust is slowly building, and with it, the possibility for breakthrough solutions to water supply challenges.

A New Supply Source: Freeport

Almost four decades ago, EBMUD contracted for more water to reduce the East Bay's precarious situation in prolonged droughts. Long legal battles ended in 2002 when an agreement was reached with the City and County of Sacramento for a joint project. By 2010, the East Bay will be able to rely on up to 100 MGD of water from the Freeport Regional Water Project during dry years. If Freeport water were available now, the East Bay would not have needed mandatory rationing this year.

A New View of the Sea and the Bay: Regional Desalination

Taking the salt out of briny water has always been possible but prohibitively expensive. Fifteen years ago, EBMUD determined that the available technology was not cost-effective. Today, the costs are much lower, but many questions remain about the environmental impacts. Because of the ready supply to the Bay Area it could create, however, investigation into this supply option continues. EBMUD has been working with other Bay Area water agencies to explore ways to add desalinated water to the local water supply. In FY08, pilot testing was under way in eastern Contra Costa County.

A New Local Storage Approach: Groundwater

In FY08, EBMUD began constructing a state-of-the-art groundwater injection well that will move some water deep underground, into a clean aquifer beneath San Leandro. That work will finish next year. Then water can be injected when it is available in wet years and up to one million gallons of water per day can be drawn out as needed from this locally-stored supply. If successful, the project could potentially grow to a maximum of ten million gallons per day in the future.

A New Set of Partners: Transfers and Storage

Since FY08 was a second consecutive dry year, EBMUD stepped up efforts to acquire and store supplemental water in case a third dry year follows. In FY09, having supplemental supplies in place could help reduce drought rationing to sustainable levels for residents and businesses.

EBMUD will add about 10,000 acre feet of water to supplies next year. Some of the amount is being purchased from a lower Mokelumne River agency, Woodbridge Irrigation District. Some will come from an extended test of a recently-completed emergency supply connection at the southeastern end of the water service area. The emergency connection was built in collaboration with the San Francisco Public Utilities Commission and the City of Hayward to make it easy to share water in emergencies.

The Sacramento River water pumping facilities being built at Freeport offer a new way to move water, not only to EBMUD but also to Sacramento Valley agencies. Since those facilities are now in construction, in FY08 EBMUD explored water transfer and exchange possibilities throughout Northern California. The range of transfer ideas is shown on the map on pages 14 & 15.



The Mokelumne Watershed provides the East Bay with high-quality drinking water. EBMUD is investing in new water sources to reduce the severity of customer rationing during droughts.



EBMUD is exploring desalination of San Francisco Bay water along with other Bay Area agencies. Effective environmental protections must be included.

21st Century Explorers:

SEEKING WATER SECURITY THROUGH DIVERSE REGIONAL PARTNERSHIPS

Conservation & Recycling.

Water conservation and recycling are critical elements of EBMUD's current Water Supply Management Program calls for conserving 35 million gallons a day by 2020, and for recycling 14 million gallons a day by that same year. A new water supply plan now in development will raise the bar for these water demand reduction strategies to the year 2040.

- Existing water supply
- Additional supply projects under construction
- Temporary water supply transfers
- Regional interties
- Future supply options

Desalination.

Long-range investments in desalination may enable the District to augment supply as technology is developed and improved.

Freeport Regional Water Project.

Upon completion by 2010, FRWP will connect the Sacramento River at Freeport to EBMUD's Mokelumne Aqueducts, enabling regional transfers and providing an additional dry year water supply to EBMUD customers.

Supply Transfers.

Sharing water through transfers with other water agencies enables supply to go where it is most needed.

Bayside Groundwater Project.

This project will help the District store additional supply in wet years.

Sacramento County Groundwater.

EBMUD began exploring a possible partnership in FY08 for groundwater banking in Sacramento County, and met with stakeholders and discussed concepts including storing surplus water in the groundwater basin in wet years, in-lieu recharge, and injection wells. Groundwater banking in that region would use the new Sacramento River connection to bring water to the East Bay in dry years.

Lower Bear Reservoir.

Amador Water Agency is investigating its ability to store more water in an expanded Lower Bear Reservoir, located several miles above EBMUD's two Mokelumne River reservoirs. EBMUD, Calaveras County Water District and San Joaquin County Water and Conservation District are partnering on this water storage idea, in coordination with Lower Bear Reservoir's owner, Pacific Gas and Electric (which operates it for hydroelectric power).

Mokelumne River.

EBMUD's Mokelumne River watershed funnels melting snow from high in the Sierra Nevada downhill into Pardee Reservoir, our primary municipal water supply. The water is then transported 90 miles to the East Bay, crossing the Delta through our Mokelumne Aqueducts, and is stored in reservoirs where it awaits treatment and delivery to customers.

San Joaquin Groundwater Project Ideas.

The Mokelumne River Forum, with EBMUD as a founding partner, is exploring how some Mokelumne River supply could be moved through EBMUD's system and stored in the groundwater basin in eastern San Joaquin County. The ideas being talked about vary widely in size, partners and water use. The selected project could increase water storage in EBMUD's Pardee Reservoir in conjunction with mutual investments in groundwater banking in San Joaquin County.

Forecasting: East Bay Water as Mid-Century Nears

For many years EBMUD has been exploring several water supply options in parallel because that is the surest path to water reliability in an uncertain future. Periodically, it is important to step back to thoroughly re-evaluate needs, options and projects. In FY08, EBMUD began updating water supply planning assumptions that guided the last comprehensive study in 1993. The new effort takes the planning horizon from 2020 to 2040, and will reflect the changing demand for water locally and

statewide, the addition of a Sacramento River dry year supply beginning in 2010 and the effects of climate change. It will examine what EBMUD has accomplished, and it will build on those achievements to optimize use of existing water supplies. To date, the research has helped determine that during normal water supply conditions conservation and recycled water activities will allow EBMUD to serve the daily needs of new home developments that service-area cities and counties anticipate through 2040.

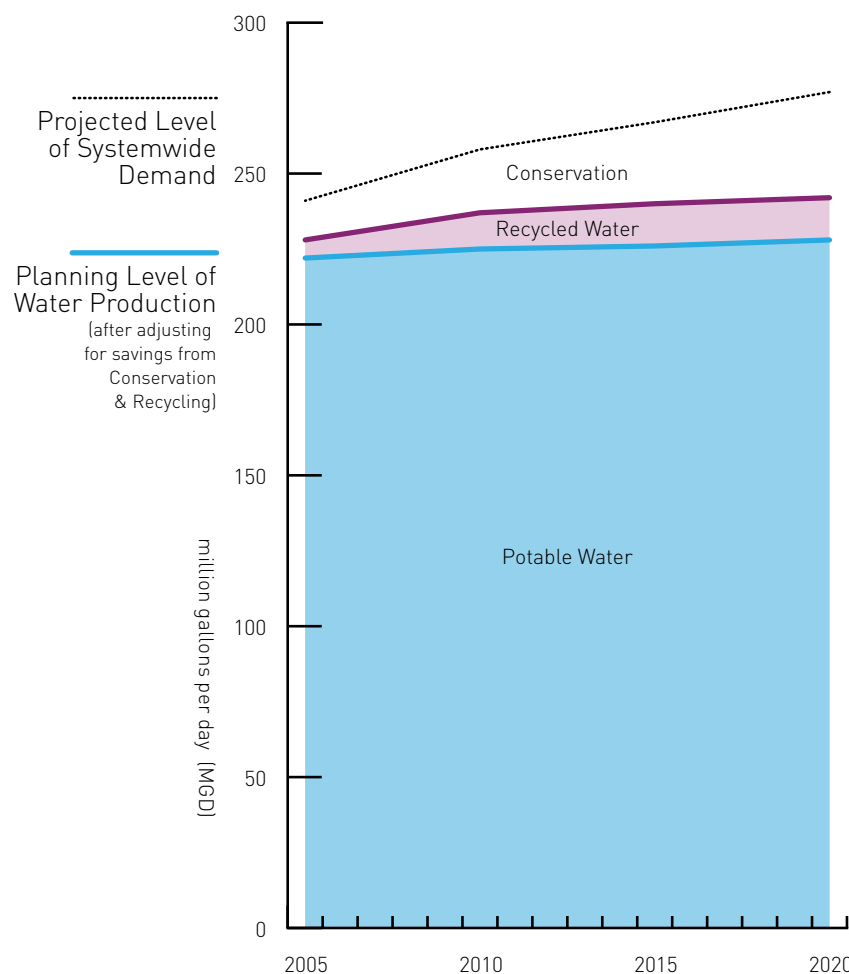
FY08 research, the first step toward creating EBMUD's Water Supply Management Program 2040 (WSMP 2040), uncovered three significant changes that will guide the long-range planning approach:

1. Changing water habits will affect how much East Bay customers can cut back in droughts. With the Bay Area's prevalent "green" philosophy, East Bay customers have been early adopters of more efficient hardware. Many customers are saving so much water that it is hard for them to cut their use even further during droughts, although some customers can still learn ways to do more.

2. Growth in the Central Sierra will put new constraints on EBMUD's daily supply source, the Mokelumne River. The Central Sierra foothill communities located near EBMUD's water supplies face growth pressures. EBMUD's elected officials have been working with their peers in the foothill region to adopt land management programs that will protect water quality. While these steps may help manage growth, it is inevitable that senior water rights holders along the Mokelumne will use more of their allotted water in the coming decades.

3. Global climate change will create even greater uncertainty in the future, requiring robust, flexible water supply solutions. The long-term impacts of climate change on water supplies are unpredictable from today's vantage point. EBMUD's efforts to assess and monitor this emerging issue are discussed at the end of this report.

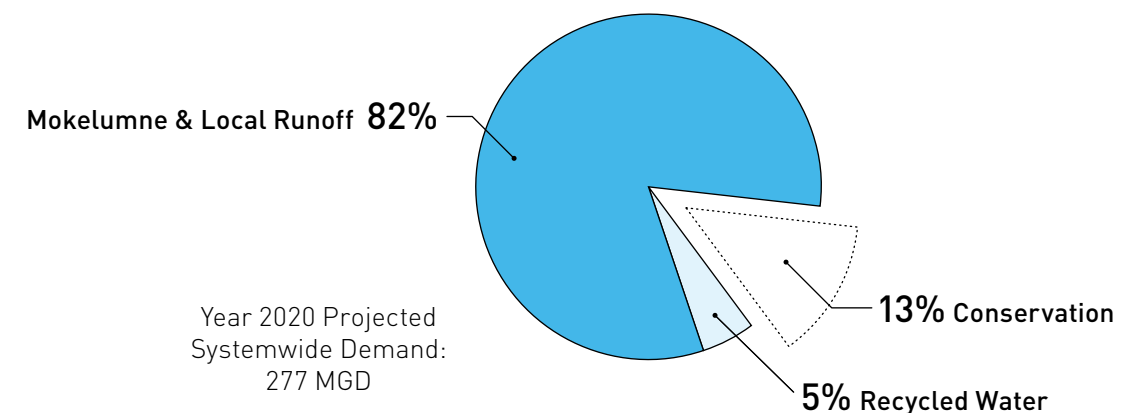
**Projected Water Production
2005-2020**



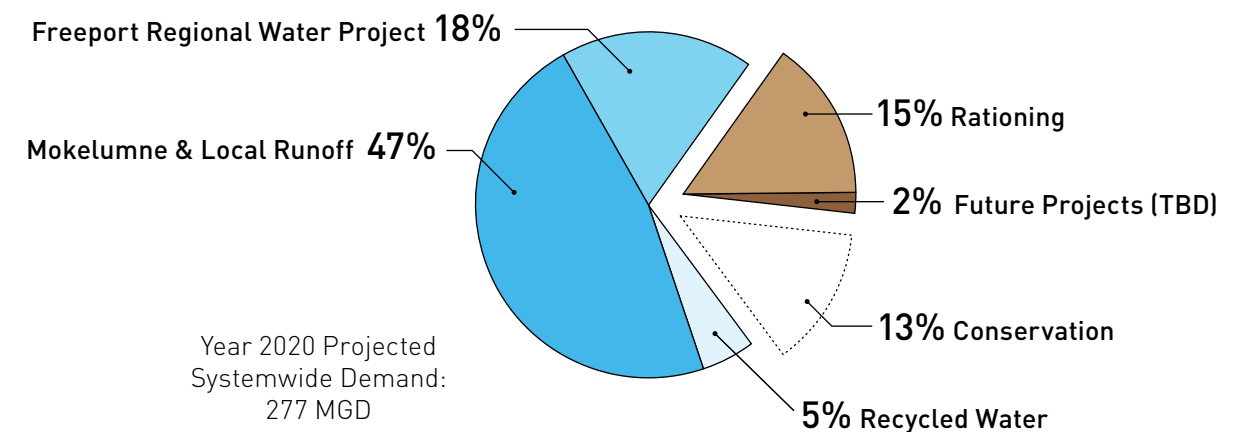
By early 2009, an environmental impact report on EBMUD's findings will be available. The EBMUD Board of Directors will consider adopting WSMP

2040 in spring 2009, establishing a water supply policy and supplemental supply portfolio plan to take the East Bay forward toward mid-century.

**Projected (2020) Water Supply Sources
Normal Conditions**



**Projected (2020) Water Supply Sources
Three Year Drought Conditions**



Preparing: New Ways of Protecting the Delta

California's Delta has been ground zero for some of the state's most impassioned water battles.

The statewide drought is spotlighting the urgency of striking an enduring agreement to sustain the



EBMUD's interest in the Delta includes protecting both wildlife (such as spawning Mokelumne River steelhead and salmon, who pass through the Delta, *above*) and infrastructure (the Mokelumne Aqueducts, *right*, continue to be threatened by Delta levee breaks and flooded Delta islands).

Delta's vital ecosystem and its equally vital contributions to water supply reliability for people and agriculture. EBMUD does not deliver Delta water to the East Bay, but decisions about the Delta could affect the cost of the East Bay's water and the reliability of its water supply. The huge uncertainties shaping the future of the Delta may affect EBMUD in other ways. Pressures to increase fresh-water inflows to the Delta may lead to new limits on upstream diversions, including from the Mokelumne River. Mandatory water conservation by the state could have the same result. Projects to improve the conveyance of water through the Delta export pumps may have adverse impacts on the migration of the steelhead and salmon

that EBMUD has invested so heavily to restore. And the severe constraints on state finances could result in reduced funding to maintain and improve the levees that protect EBMUD's aqueducts.

EBMUD has been steadily building an exemplary record in water use efficiency and stewardship of natural resources.

Ten years ago, working with the Department of Fish and Game and the U.S. Fish and Wildlife Service, EBMUD adopted a modern, comprehensive ecosystem protection program for the Mokelumne River that tailors water flows to the life stages of migrating fish. EBMUD developed staff expertise in fishery issues and increased dry year water releases for fishery protection. In the last decade, \$20 million has been invested in fish hatchery rebuilding and operations. Mokelumne River salmon returns have surpassed the long-term historic average, an indicator that our stewardship program is working. The river's health and resource management program deserves full consideration before unilateral changes are made that could ultimately harm the East Bay's economic health and vitality.

In addition to the potential effects a new Delta accord could have on water supplies, it also could affect water costs dramatically. Some options would make the East Bay responsible for a share of the



costs for new water pipes it doesn't want or need. Other options would abandon century-old agreements to have the state help protect levees that carry the East Bay's water supply across the Delta. In FY08, EBMUD actively participated in Delta discussions, both to protect this vital ecosystem and to protect East Bay customers. EBMUD worked to

educate business and community leaders about how decisions in the Delta could affect them, and to urge continued attention to this critical issue in the coming year. And, at the same time, EBMUD continued investing in levee improvements to protect our water supply.



Regular investments to maintain the Mokelumne Aqueducts – and the Delta levees that protect them – help ensure water reliability for the East Bay.



Preparing: New Ways of Understanding Climate Change

Will global ^{climate change} affect the East Bay's water supplies in the near future?

Most East Bay residents think it will.

Despite the uncertainties of the global predictions, climate change is almost sure to pose new challenges for providing safe and reliable water supplies. In FY08, EBMUD identified key vulnerabilities that could result from a changing climate. These include changes to how customers use water, to our water supply and to flooding risks.

Changing Customer Water Use. A warming climate could extend the growing season, reduce natural soil moisture content, and mean more heat waves. All could increase customer water use.


Changing Storm Patterns. Climate change models predict that future storms in our region will shift north and to higher latitudes. That could decrease the average precipitation for the Mokelumne watershed and raise the frequency of dry years. EBMUD considered climate change as part of the work this year on water supply plans to the year 2040.

Changing Environments. Warmer Mokelumne River water temperatures could have detrimental effects on salmon, whose eggs need cool water to survive. Warmer ocean temperatures also could distress migrating Mokelumne steelhead and salmon by disrupting the oceanic food chain. EBMUD may have to modify its water system operations to protect aquatic habitats by maximizing the amount of cold water releases to the lower Mokelumne.

Increasing Flood Risks. State law mandates reductions in reservoir water storage each fall for flood control, increasing reliance on spring runoff to refill reservoirs. In a changing climate, balancing between flood control and water supply could be

increasingly difficult if storms no longer follow historical patterns that established the flood control plans we now follow. A rise in sea level could pose additional flood-related risks. It could mean a greater risk of flooding in the San Francisco Bay communities we serve and also could affect the Delta's aging levees. EBMUD water delivery aqueducts cross the Delta, and levee failures could damage pipes and potentially interrupt water deliveries to the East Bay. In FY08, EBMUD began studying building a tunnel beneath the Delta as a long-term protection, identified short-term improvements to protect the aqueducts, and sought state and federal support for those improvements.

Adapting to a Changing Climate. In FY08, EBMUD stepped up efforts to mitigate greenhouse gas emissions in the work to treat, move, store and deliver water. A strategy for monitoring climate change research was adopted, and climate change began to be factored into capital investment plans so that infrastructure priorities will be cost-effective under a variety of climate change scenarios. While no one can predict how climate change will affect water supplies in future decades, EBMUD is doing everything possible to lessen contributions to greenhouse gases and minimize the amount of water the East Bay uses daily.

The chapter on climate change's effect on the East Bay's water supply cannot yet be written, but EBMUD is working today to increase the chance of a positive story by supporting new ways of conserving and recycling, protecting existing water rights, and simultaneously exploring many water supply options with multiple partners. It's a 21st century water supply management strategy designed to position the East Bay for the 22nd century and beyond. 

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Board meetings are open to the public and held the second and fourth Tuesdays of each month at 1:15pm in the Board Room, 2nd fl, 375 11th Street, Oakland, California.

East Bay Municipal Utility District publishes a variety of reports, newsletters, and fact sheets. Please visit www.ebmud.com, or call 1-866-40-EBMUD to request a copy of any of our publications.

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