



# **Regional Reliability and Desalination in the Bay Area**

**NBWA Conference  
April 11, 2014**

Novato, CA

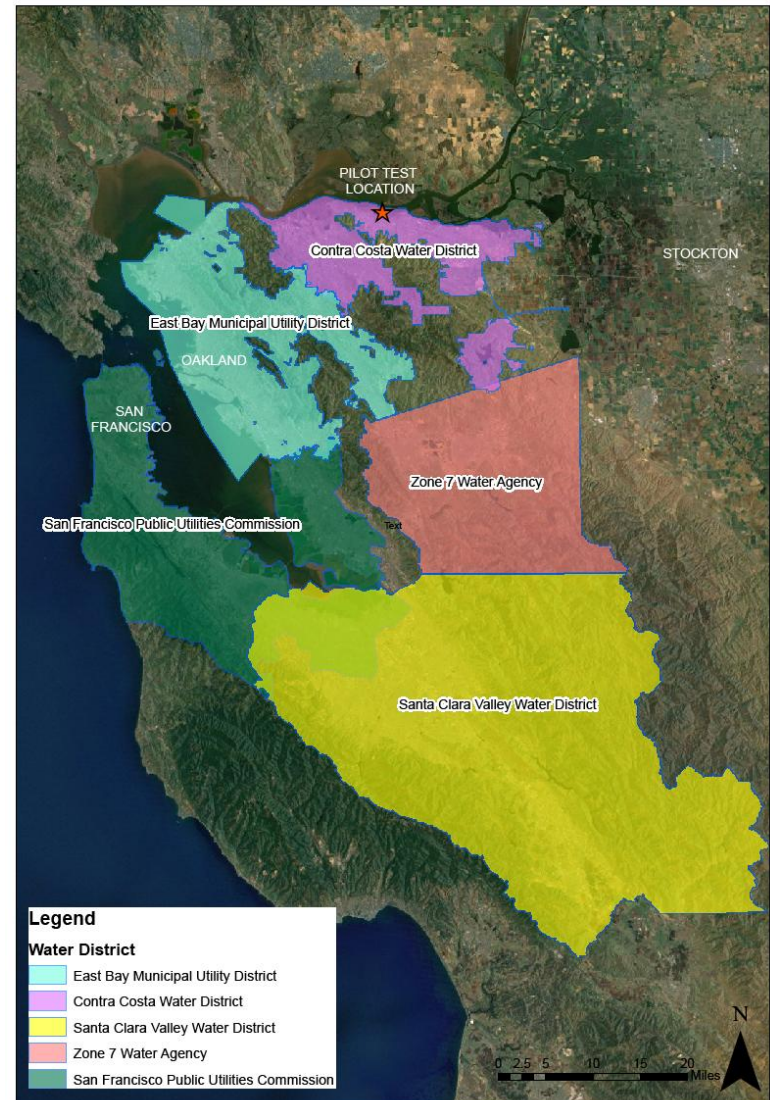
# OVERVIEW

5 partner agencies,  
5.6 million customers,  
over 2,500 square miles

## Project Objectives

- ✓ Long-term reliability
- ✓ Drought & emergency relief
- ✓ Minimize need for new infrastructure, project footprint, costs

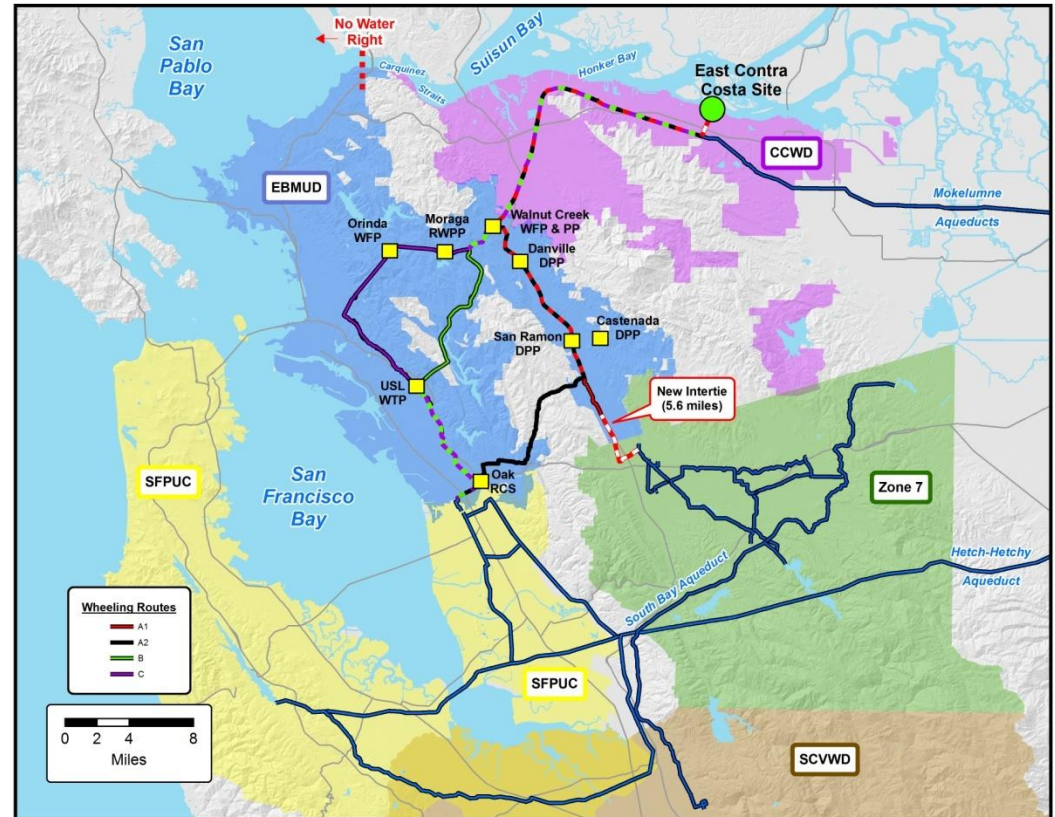
### Project Partners



# BAY AREA REGIONAL DESALINATION PROJECT FEATURES

- **Facility**

- 20 mgd desalination facility at Mallard Slough (total identified needs of 46)
- Use of existing facilities, except treatment plant, new intertie with Zone 7, and tie-ins
- Two potential wastewater outfalls for blending brine (DDSD and Central Sans)



- **Operations**

- Year-round operations at full capacity (with no April diversions); (SFPUC- 9 mgd and Zone 7 5 mgd every year)
- Storage available at Los Vaqueros via exchange with CCWD
- Water wheeled through EBMUD, except CCWD

## REMAINING QUESTIONS AFTER TECHNICAL FEASIBILITY

- What are the **potential Delta water quality and water supply impacts?**
- What are the potential **impacts to fisheries?**
- Are there opportunities to optimize the project by using **storage in Los Vaqueros?**
- What are the **greenhouse gas emissions and what can we do to mitigate them?**
- Does EBMUD have the **capacity to deliver water** to partner agencies?
- What are the **full costs to each agency?**




**Delta  
Modeling**



**Storage  
Optimization**



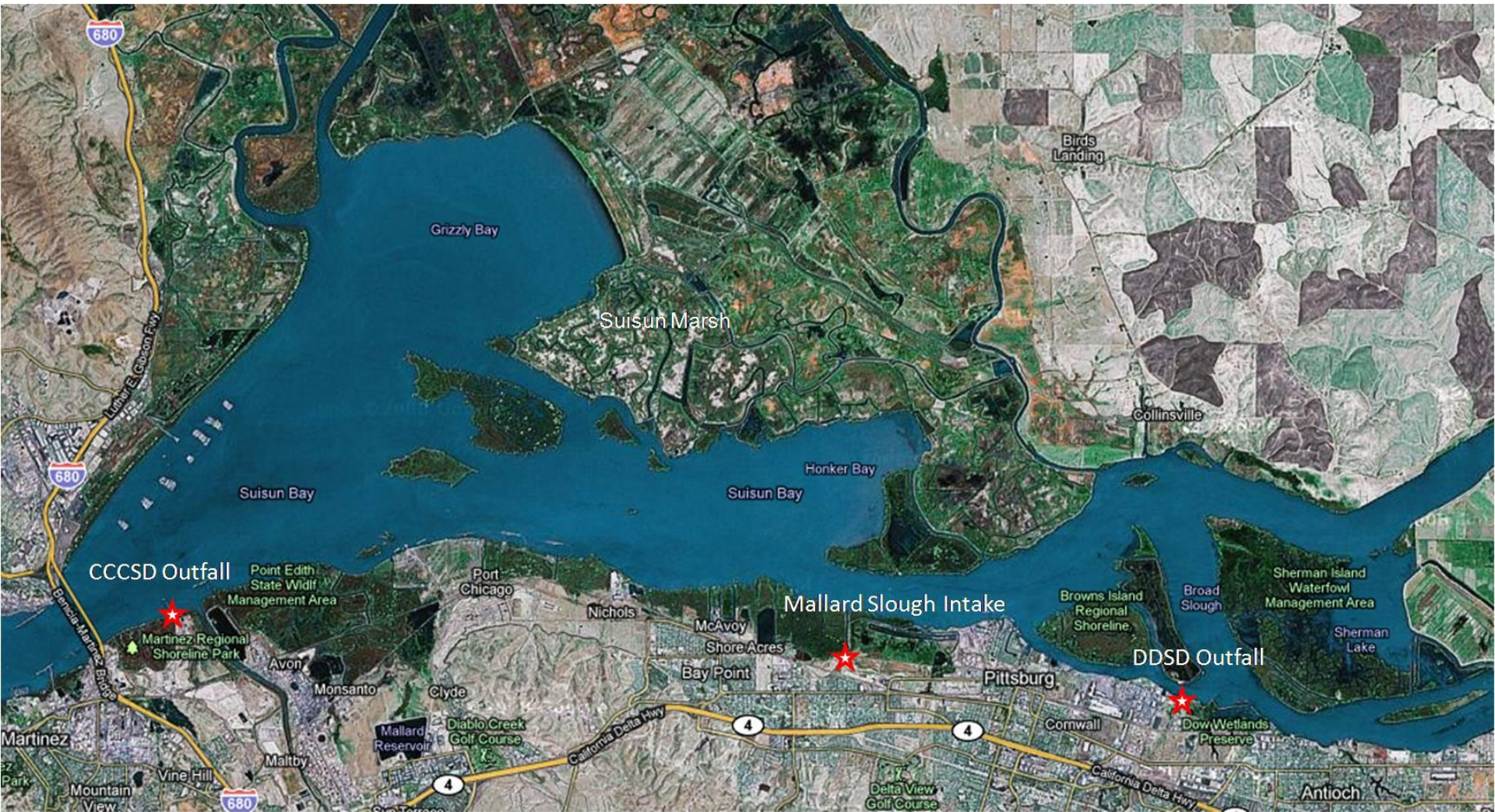
**Greenhouse  
Gas Analysis**



**Hydraulic  
Computer  
Modeling**



# DELTA MODELING: SETTING





## DELTA MODELING RESULTS

- **Water Quality**

- Modeled ambient water quality changes are **<0.25% EC** in existing and future conditions
- Brine, blended with CCCSD Outflows, **does not exceed** ambient salinity concentrations.

- **Fisheries**

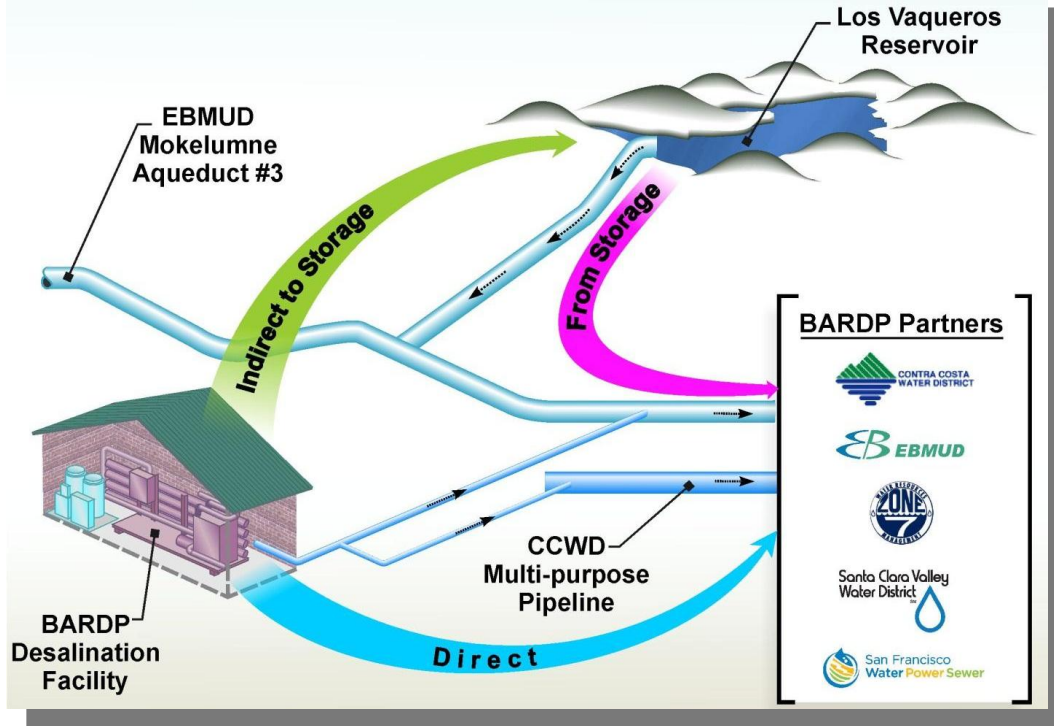
- Particle entrainment at BARDP was **less than 0.5%** of total particles released
- Sensitive species are present in the Spring



### Findings:

- Storage **increases** reliability and dry year supplies
- With Storage, the project delivers **84%** of drought year partner demands
- Estimated rental costs: \$70-105/AF per yr

# GREENHOUSE GAS ANALYSIS



Partner	Projected Annual Indirect Emissions (MT CO <sub>2</sub> e/year) 30-Yr Average
CCWD	470
EBMUD	1,060
SCVWD	1,070
SFPUC	4,280
Zone 7	2,360
<b>Total Indirect Emissions</b>	<b>9,240</b>

**Carbon-Free:** offset all GHG emissions (**9,240** MT CO<sub>2</sub>e/yr)

**No Net Increase:** offset the difference between GHG emissions with and without the BARDP (**5,810** MT CO<sub>2</sub>e/yr)

→ **Estimated Costs for GHG reduction: \$10 to \$50/AF**



# HYDRAULIC MODELING

EBMUD can deliver (normal years, 2040 conditions):

- 10 mgd to Zone 7: **95%+** of the time (peak day is exceeded 20 days in a year)
- 20 mgd to SFPUC/SCVWD: **90%** of the time

	Peak Day	Average Summer	Average Spring/Fall	Average Winter
EBMUD would wheel up to 20 MGD to SFPUC and 10 MGD to Zone 7	384	303	234	169
EBMUD would wheel up to 20 MGD to SFPUC and 10 MGD to Zone 7	10	<div style="border: 1px solid black; border-radius: 15px; padding: 5px;"> <p>Annual Delivery Rates (Average):</p> <ul style="list-style-type: none"> <li>- ~20 days of the year: 0-10 MGD</li> <li>- Remaining 345 days: Full 10 MGD</li> <li>- <b>Full delivery: 95%+ of the time</b></li> </ul> </div>		10
EBMUD would wheel up to 20 MGD to SFPUC and 10 MGD to Zone 7	10	20	20	20

# DELIVERED WATER COSTS

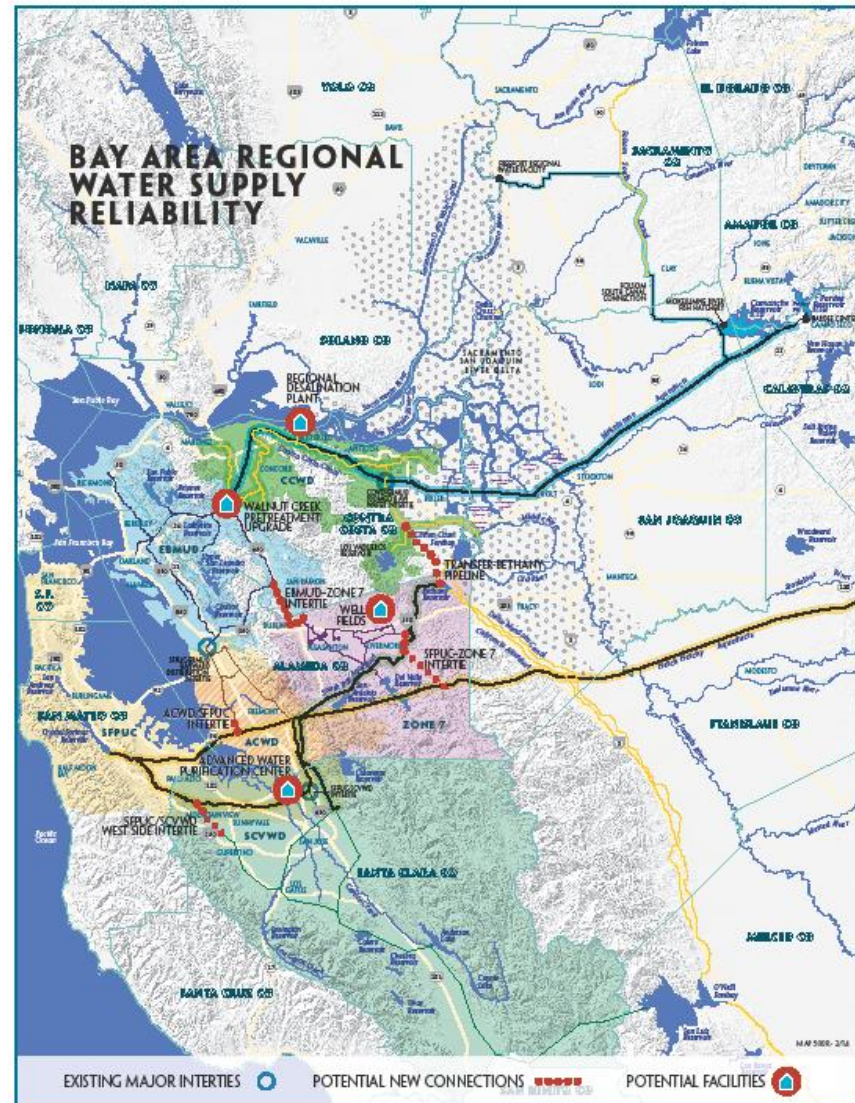
## 20 MGD Desalination Facility at MSPS - (2013 \$/AF)

PRELIMINARY	SFPUC	Zone 7	SCVWD	EBMUD	CCWD
Mallard Slough Pump Station	\$125	\$125	\$125	\$125	\$125
Desalination Facility	\$900	\$900	\$900	\$900	\$900
Wheeling (EBMUD)	\$390	\$360	\$390	--	--
Hayward Intertie Costs	\$60	--	\$60	--	--
GHG Reduction	\$50	\$50	\$50	\$50	\$50
<b>Total (\$/AF)</b>	<b>\$1,525</b>	<b>\$1,435</b>	<b>\$1,525</b>	<b>\$1,075</b>	<b>\$1,075</b>

**Note:** Does not include cost of fisheries mitigation, or storage in LV (\$100/AF)

# ANOTHER LOOK AT REGIONAL RELIABILITY

- Many Bay Area agencies have recently completed major investments in water supply projects
- Unassigned capacities are available
- Regional interties provide opportunities to partner on future water supply projects via exchanges/transfers



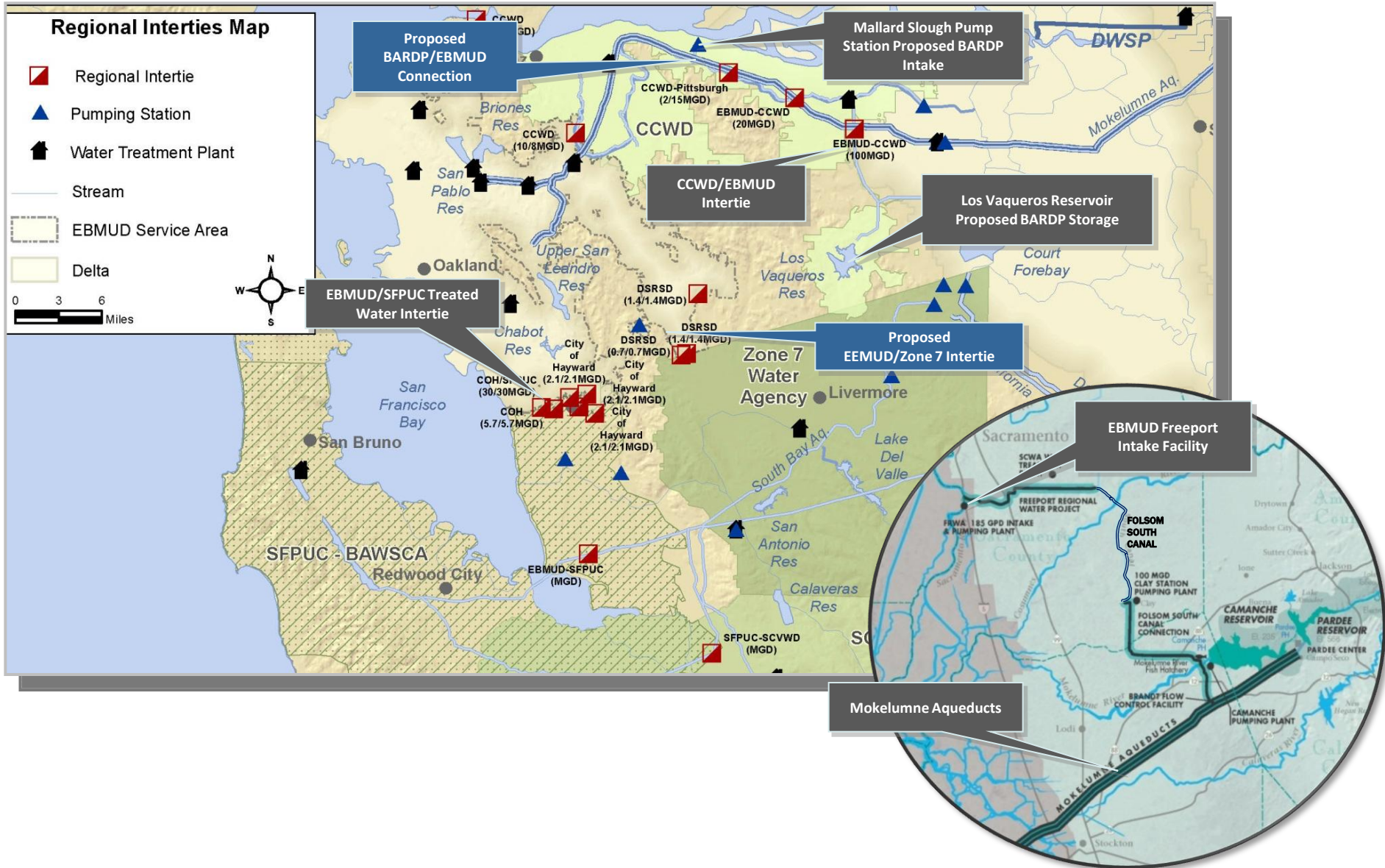




## REGIONAL GOALS

- Improve Bay Area's water supply reliability using a “low-cost” approach
- Develop opportunities for linkages with other water supply initiatives
  - Los Vaqueros Storage
  - Future EBMUD-Zone 7 Intertie
  - Water Transfers/Exchanges
  - Unassigned Freeport Capacity
  - Others

# REGIONAL OPPORTUNITIES





**THANK YOU**

For more information, visit  
[www.regionaldesal.com](http://www.regionaldesal.com)



# DELTA MODELING RESULTS: BRINE BLENDING

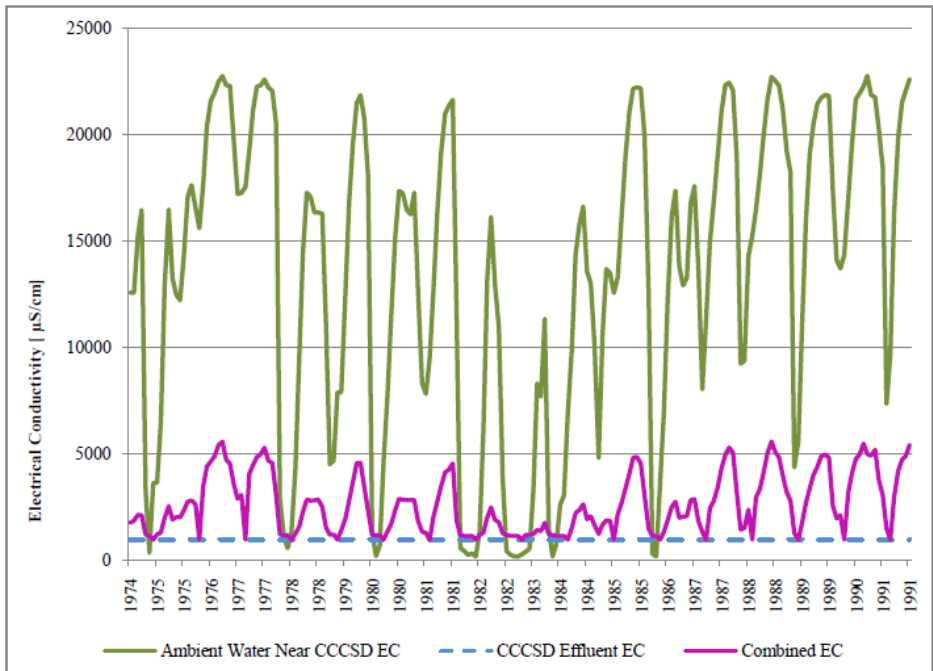


Figure 1-5 Timeseries of brine from CCCSD with and without brine.

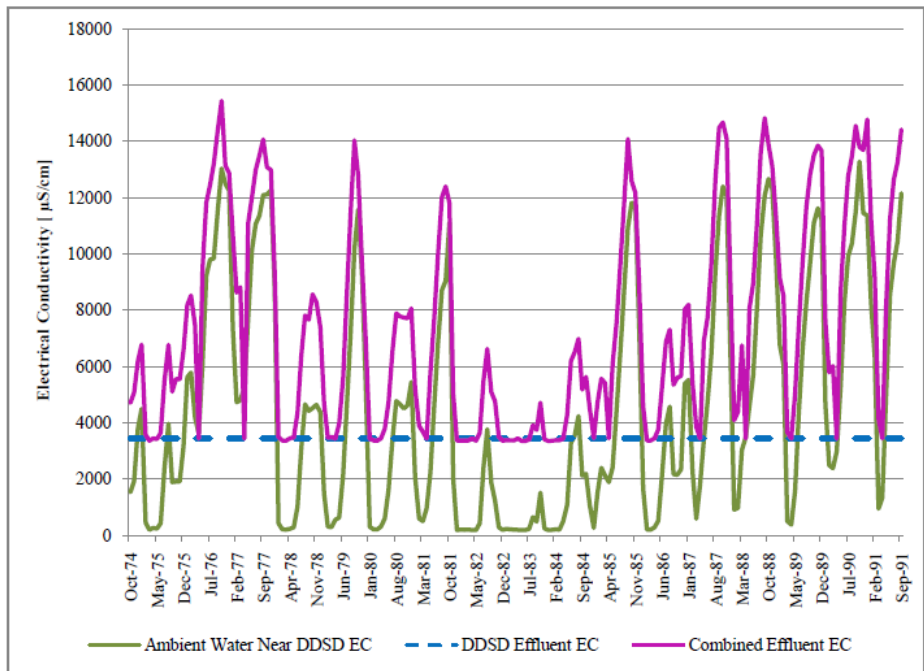


Figure 1-4 Timeseries of DDSD effluent with and without brine from BARDP

RESULTS FOR CCCSD

RESULTS FOR DDSD

# DELTA MODELING RESULTS: FISHERIES

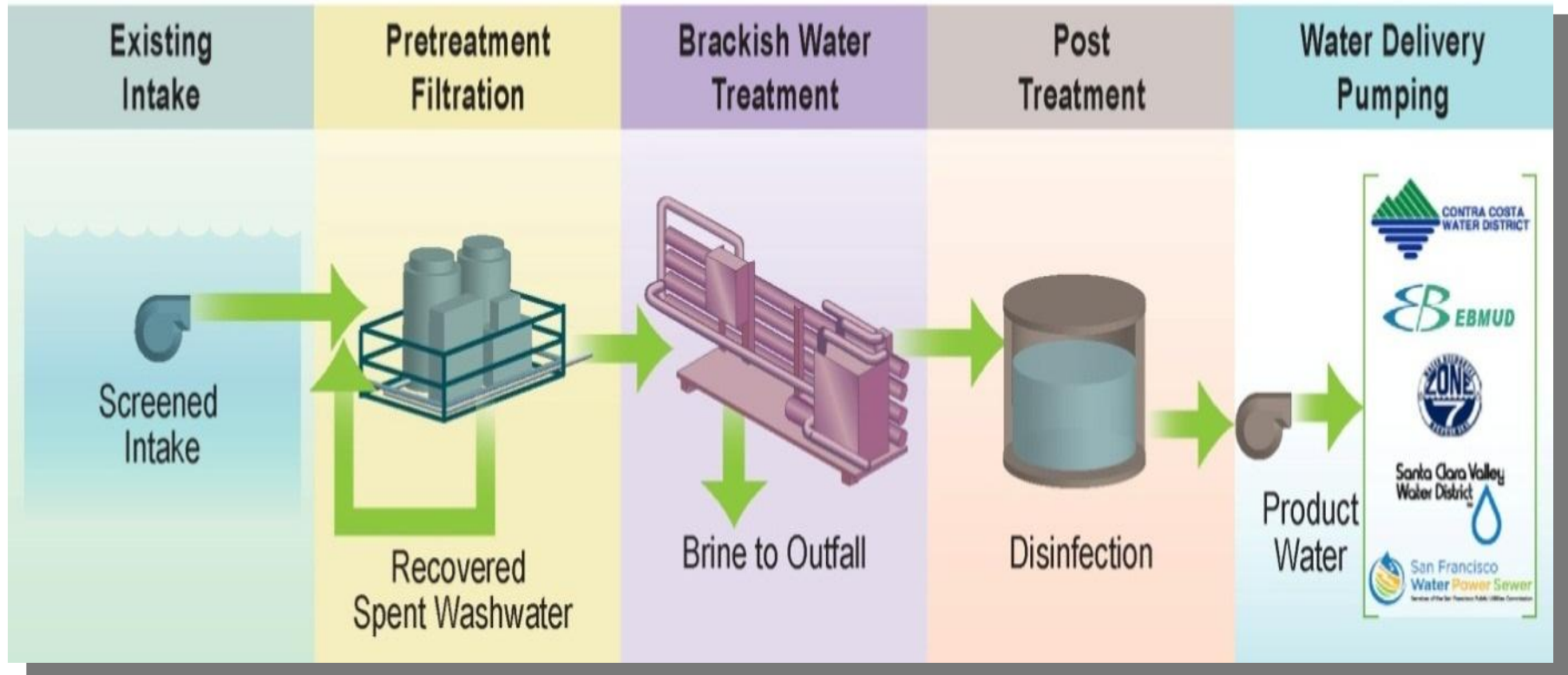
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
<b>Delta Smelt (Larval)</b>												
DFW Survey				< 15 mm								
Entrained during CCWD Normal Ops			5.6 – 20 mm									
Entrained during BARDP Pilot Plant		4.1 – 10 mm										
<b>Longfin Smelt (Larval)</b>												
DFW Survey			< 15 mm									
Entrained during CCWD Normal Ops			3.8 – 15 mm									
Entrained during BARDP Pilot Plant		4.1 – 10 mm										
<b>Splittail (Larval)</b>												
DFW Survey			< 15 mm									
Entrained during CCWD Normal Ops				6 – 7.5 mm								



## Strategies to Avoid Impacts

- Operational modifications
- Physical or engineering improvements
- Other minimization strategies also possible

# DESAL ENERGY USE



220  
kWh/AF

80

1,300 - 1,800

90

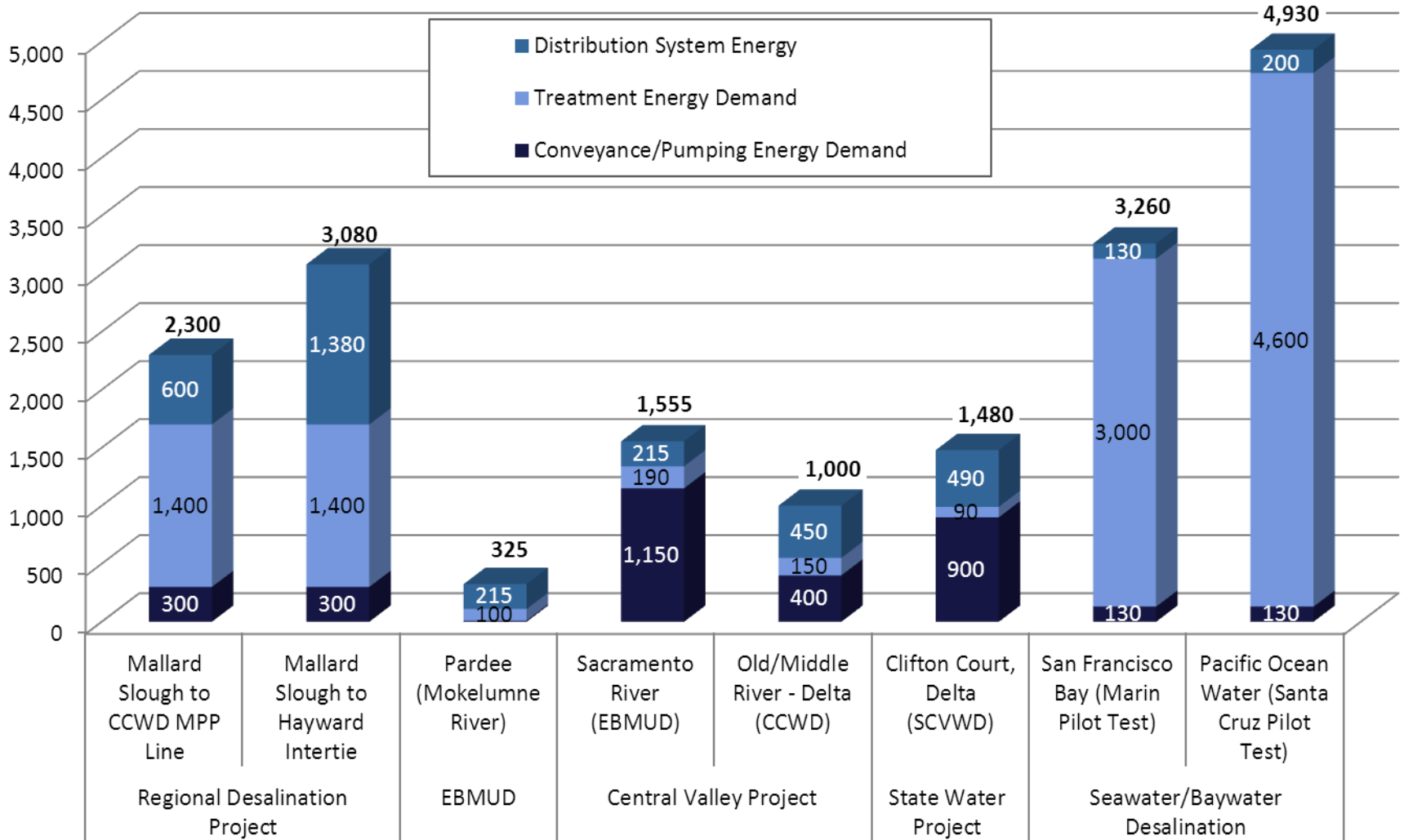
600-1,400

**2,300 - 3,600 kWh/AF**

(Normal Year: 1,700 kWh/AF without conveyance pumping)



# ENERGY COMPARISON OF BAY AREA SUPPLY OPTIONS



# WHEELING COSTS

## ZONE 7 (10 MGD)

	Normal Years (7 in 10 Years)			DRY YEARS (3 in 10 Years)		
	Total Cost	Unit Cost (\$/AF)	% Total Cost	Total Cost	Unit Cost (\$/AF)	% Total Cost
Variable Costs	\$2,400,000	\$214	62%	\$2,807,000	\$250	66%
Labor & Maintenance Costs	\$1,040,000	\$93	27%	\$1,187,000	\$110	28%
Depreciation Costs	\$130,000	\$10	3%	\$100,000	\$10	2%
Projected Future Rehabilitation & Financing Costs	\$300,000	\$30	8%	\$187,500	\$20	4%
<b>Total Wheeling Costs</b>	<b>\$3,900,000</b>	<b>\$350</b>		<b>\$4,300,000</b>	<b>\$390</b>	

## HAYWARD INTERTIE (20 MGD)

	Normal Years (7 in 10 Years)			DRY YEARS (3 in 10 Years)		
	Total Cost	Unit Cost (\$/AF)	% Total Cost	Total Cost	Unit Cost (\$/AF)	% Total Cost
Variable Costs	\$4,180,000	\$190	47%	\$2,368,000	\$110	55%
Labor & Maintenance Costs	\$3,550,000	\$160	40%	\$1,375,000	\$60	32%
Depreciation Costs	\$580,000	\$30	7%	\$287,000	\$10	7%
Projected Future Rehabilitation & Financing Costs	\$510,000	\$20	6%	\$341,000	\$20	8%
<b>Total Wheeling Costs</b>	<b>\$8,800,000</b>	<b>\$390</b>		<b>\$4,400,000</b>	<b>\$200</b>	

# PUBLIC OUTREACH

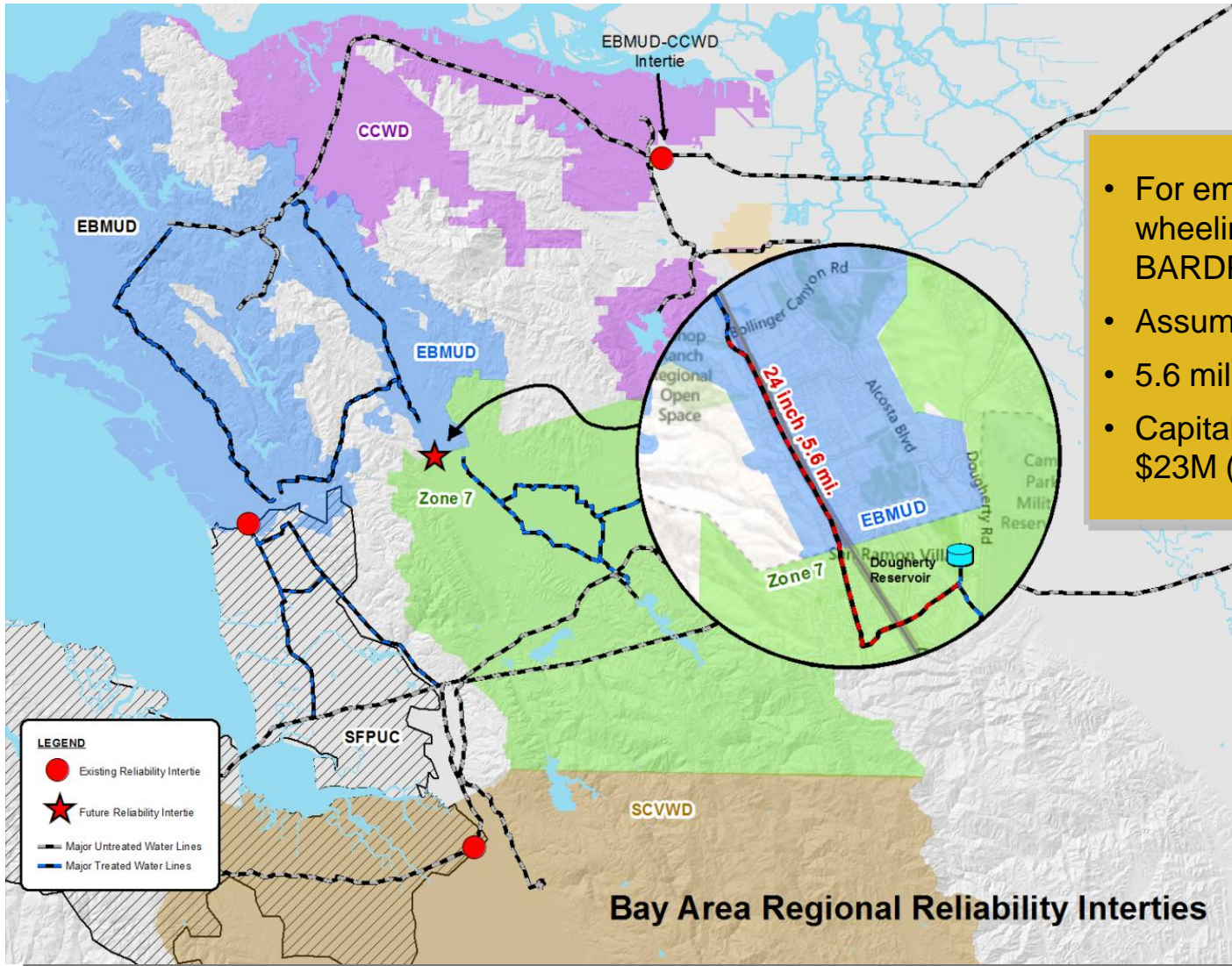
## Objective:

Share project information on planning and analyses

- 3 presentations in the East Bay
- 3 presentations in the West Bay
- *Informational meetings with regulatory agencies*

Venue	Geographic Region	Date
<b>BAWS, San Francisco</b>	West Bay	August 24, 2011
<b>SPUR, San Francisco</b>	West Bay	August 29, 2011
<b>Sierra Club Bay Chapter Workshop</b>	East Bay	March 31, 2012
<b>Redwood City – Council Chambers</b>	West Bay	May 29, 2012
<b>AWWA Desal Workshop, Foster City</b>	West Bay	August 21, 2012
<b>Sierra Club Delta Group Chapter Meeting</b>	East Bay	September 18, 2012
<b>San Jose State University, Green Talk Brown Bag</b>	West Bay	September 26, 2012
<b>CalDesal Conference, Sacramento</b>	General	October 25, 2012
<b>CCWD Presentations to Antioch, DDSD, and CCCSD</b>	East Bay agencies with project nexus	March 2013
<b>Army Corps of Engineers - SF</b>	Regulatory agencies	April 10, 2013
<b>San Francisco Public Library</b>	West Bay	April 20, 2013
<b>EBMUD</b>	East Bay	April 24, 2013
<b>League of Women Voters</b>	East Bay	August 12, 2013

# EBMUD – ZONE 7 INTERTIE - FUTURE



- For emergencies and for wheeling water from the BARDP or transfer water
- Assumed 24-inch pipeline
- 5.6 miles in length
- Capital cost estimated at \$23M (2012 \$)