



Session 3

Bay Area Regional Desalination Project

A joint project by:



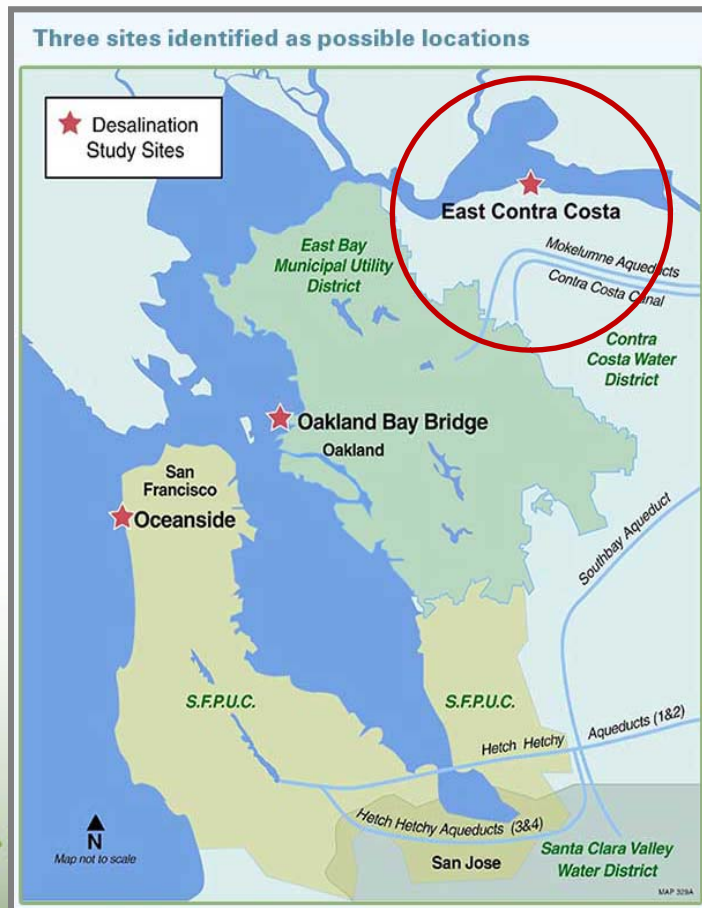
March 31, 2012

Session 3 Outline

- **Pilot Test**
 - Setup
 - Results and Findings:
 - Energy use, brine discharge, fisheries sampling results

- **Site-Specific Studies (Ongoing)**
 - Hydraulic modeling
 - Brine Discharge modeling
 - Fisheries modeling

Site Selection for Pilot Testing



- East Contra Costa selected
- *Benefits:*
 - Opportunity to add to body of research: testing of brackish water desalination
 - Permitted CCWD water intake (Mallard Slough Pump Station)
 - Existing facilities with state- of-the-art fish screen

Pilot Plant Location Oct 08 – April 09





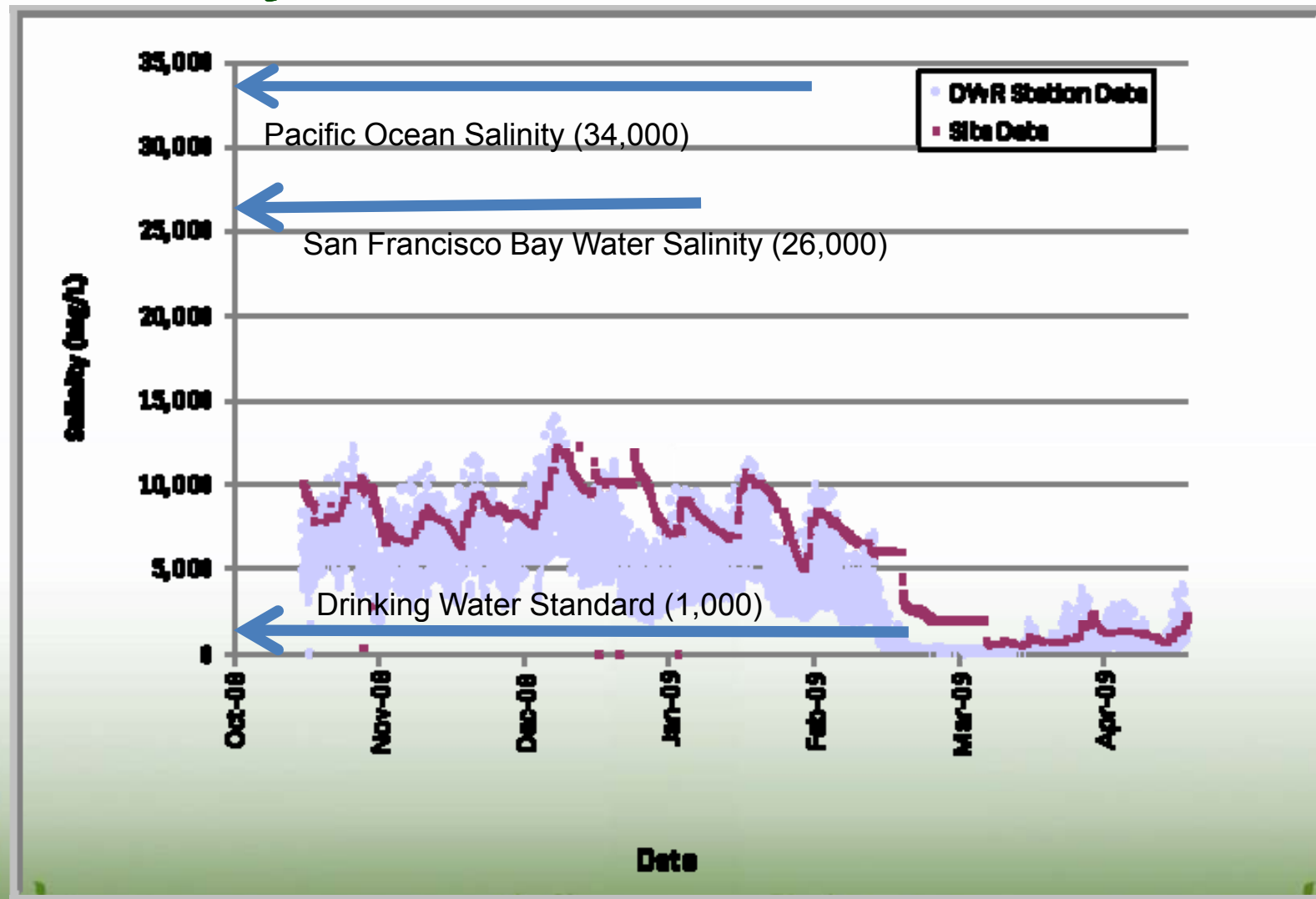
Pilot Plant Pictures



State-of-the-Art
Fish Screen



Salinity Variation at Pilot Test Site



Unit Water Cost Estimate

| Cost Item | Millions of \$ |
|----------------------------|---------------------------|
| Capital Costs | \$150 - \$175 |
| Fixed O&M Costs (\$/yr) | \$2 - \$3 |
| Variable O&M Costs (\$/yr) | \$8 - \$11 |
| Unit Cost (\$/AF) | ~\$900 - \$1000/AF |

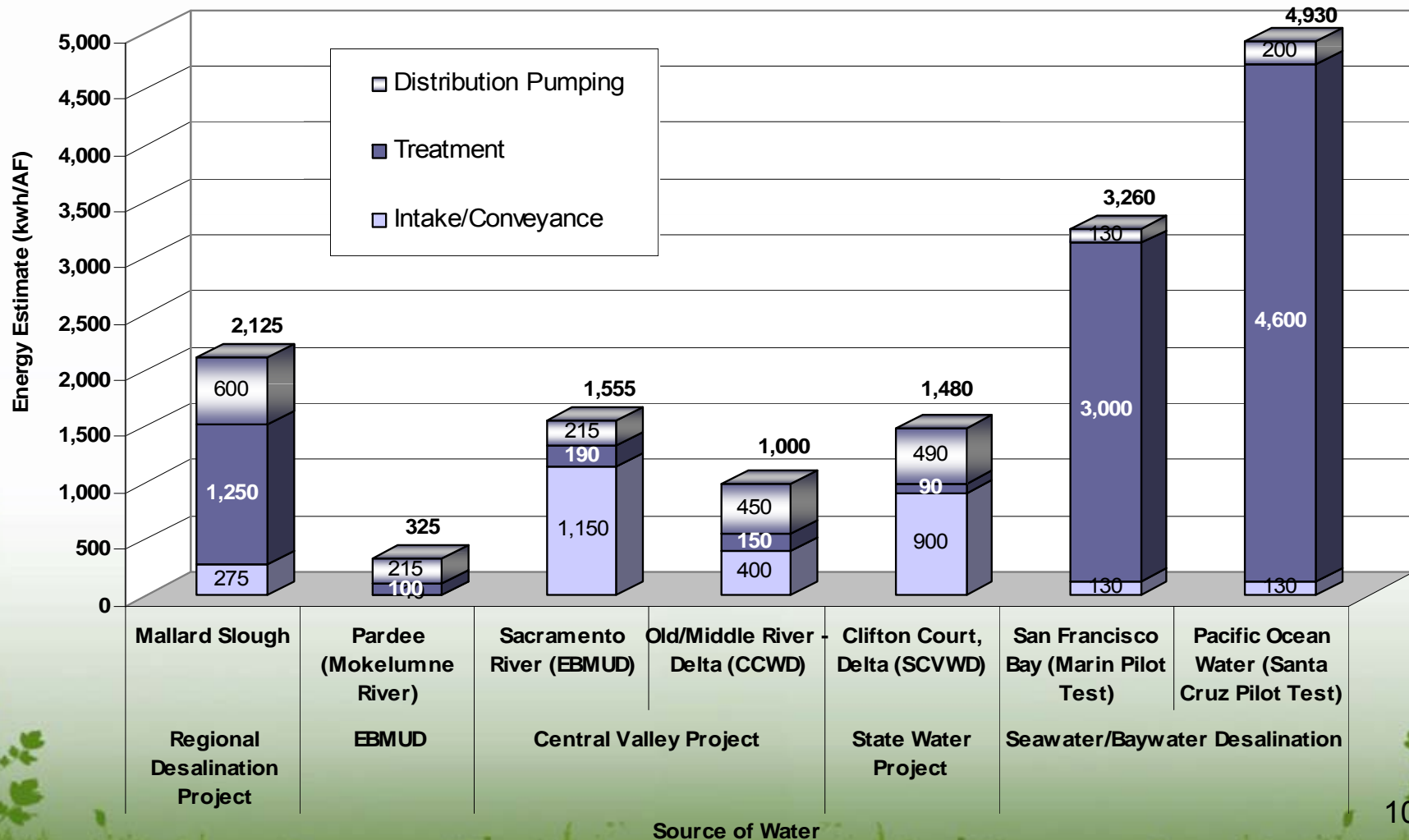
■ Cost Assumptions:

- 2009 dollars
- 20 mgd facility uses membrane treatment using existing facilities
- Costs include delivery to CCWD's customers

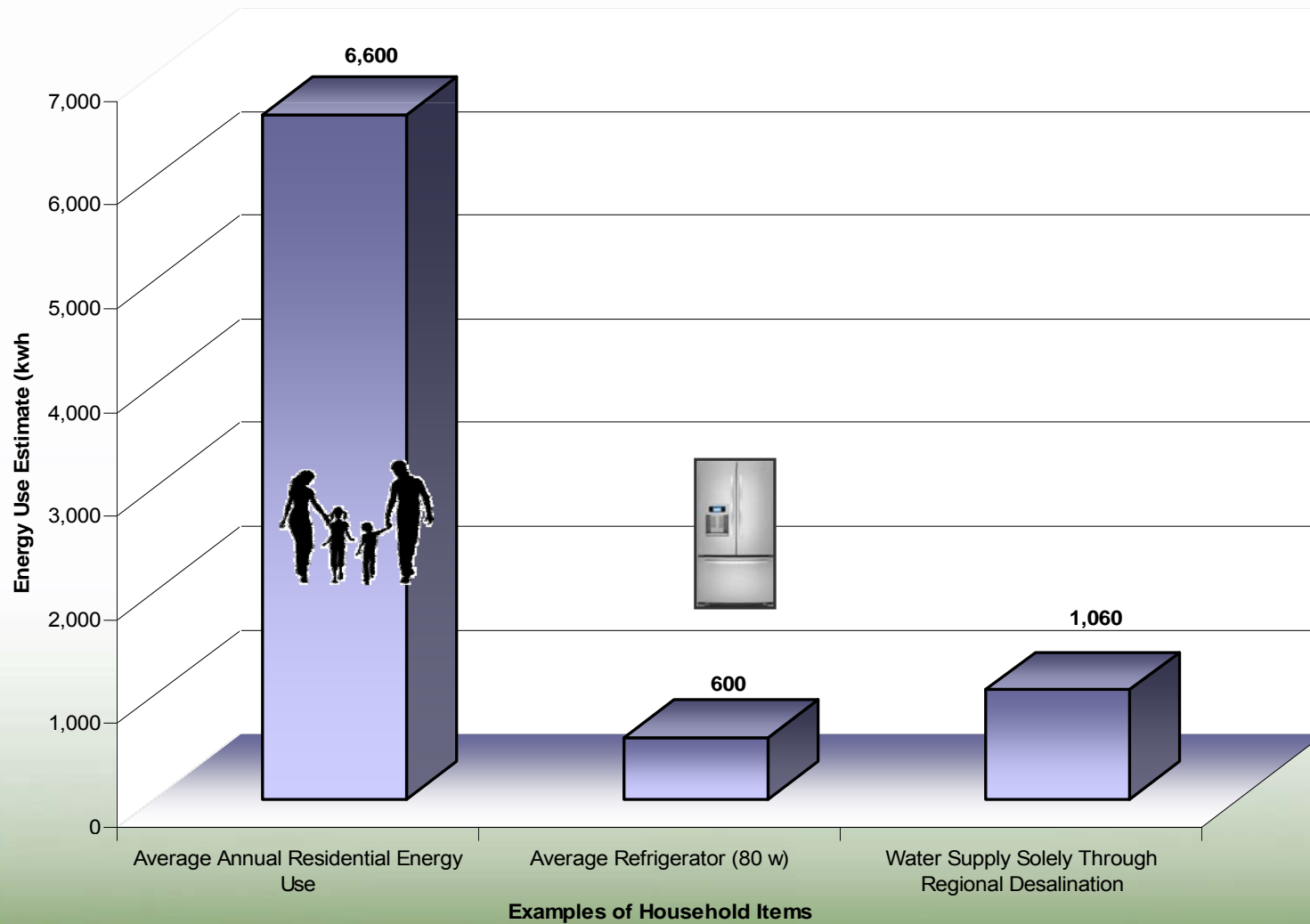
Mallard Slough Desalination Energy Estimate

| Season / Time | Energy Estimate (kwh/AF) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Intake | 275 |
| Annual Average Typical Year | 1,250 |
| Wet Season (May: 1,000 Salinity) : 900 kwh/AF Dry Season (December: 4,800 Salinity) : 1,500 kwh/AF Very Dry Period (Summer: 11,600 Salinity) :2,700 kwh/AF | |
| Energy to Pump to CCWD's Customers (MPP Line) | 600 |
| Total Energy Needed (kwh/AF) | 2,125 |
| Energy Needed Per Household Per Year | 1,060 |

Energy Comparison of Bay Area Water Supply Options

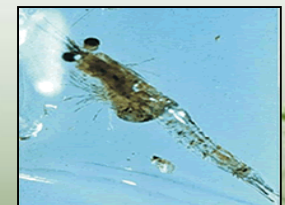
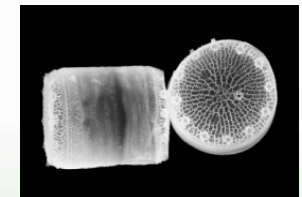


Comparison of Energy Consumption of Household Items



Brine Discharge: No Toxicity

- Two separate seasons:
 - Dry season (High salinity season, Nov 08)
 - Wet season (Low salinity season, Feb 09)
 - 6 Dilution samples tested (2.5%, 5%, 10%, 25%, 50% and 100% brine)
- Tests conducted on three representative organisms:
 - Algal growth toxicity
 - Crustacean (invertebrate) survival & growth toxicity
 - Fish larvae survival & growth toxicity
- Results:
 - No significant reduction – algal growth, invertebrate growth/survival, fish growth/survival



Biological Sampling Results

- Sampling dates

- November 2008
- December 2008
- February 2009
- March 2009
- July 2009
- October 2009



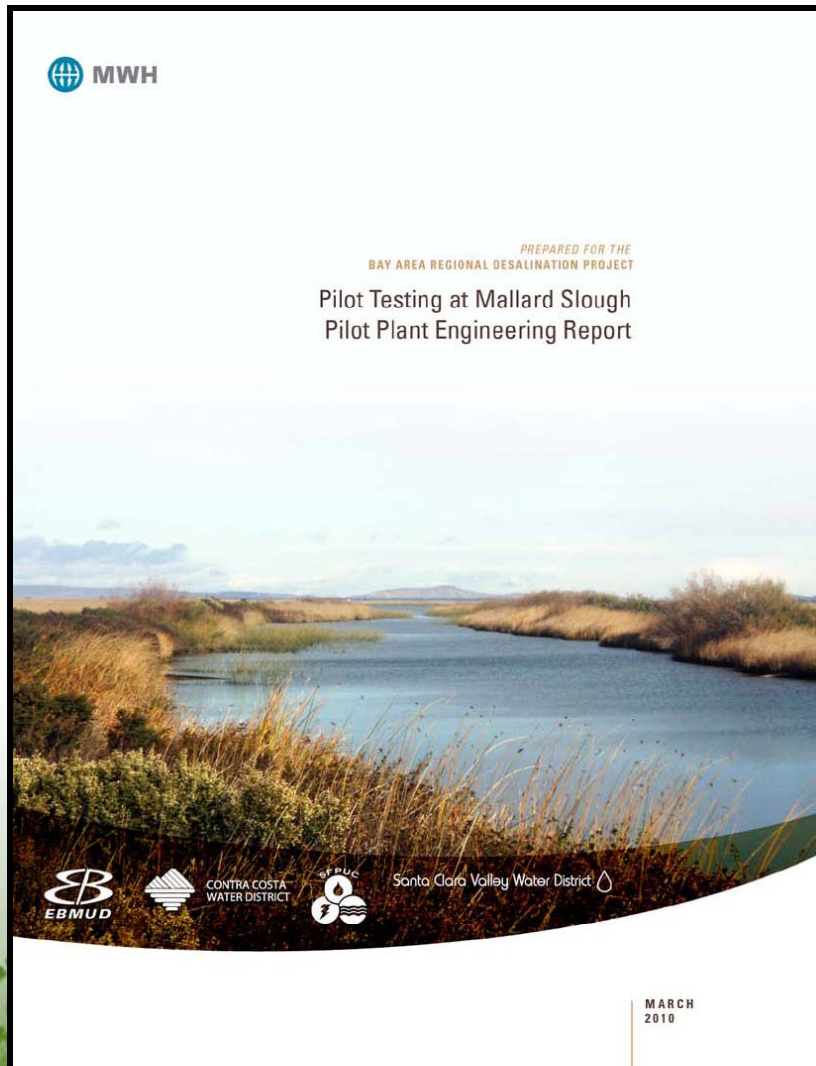
- Sensitive Fish (Smelt) Present

- February 2009
- March 2009

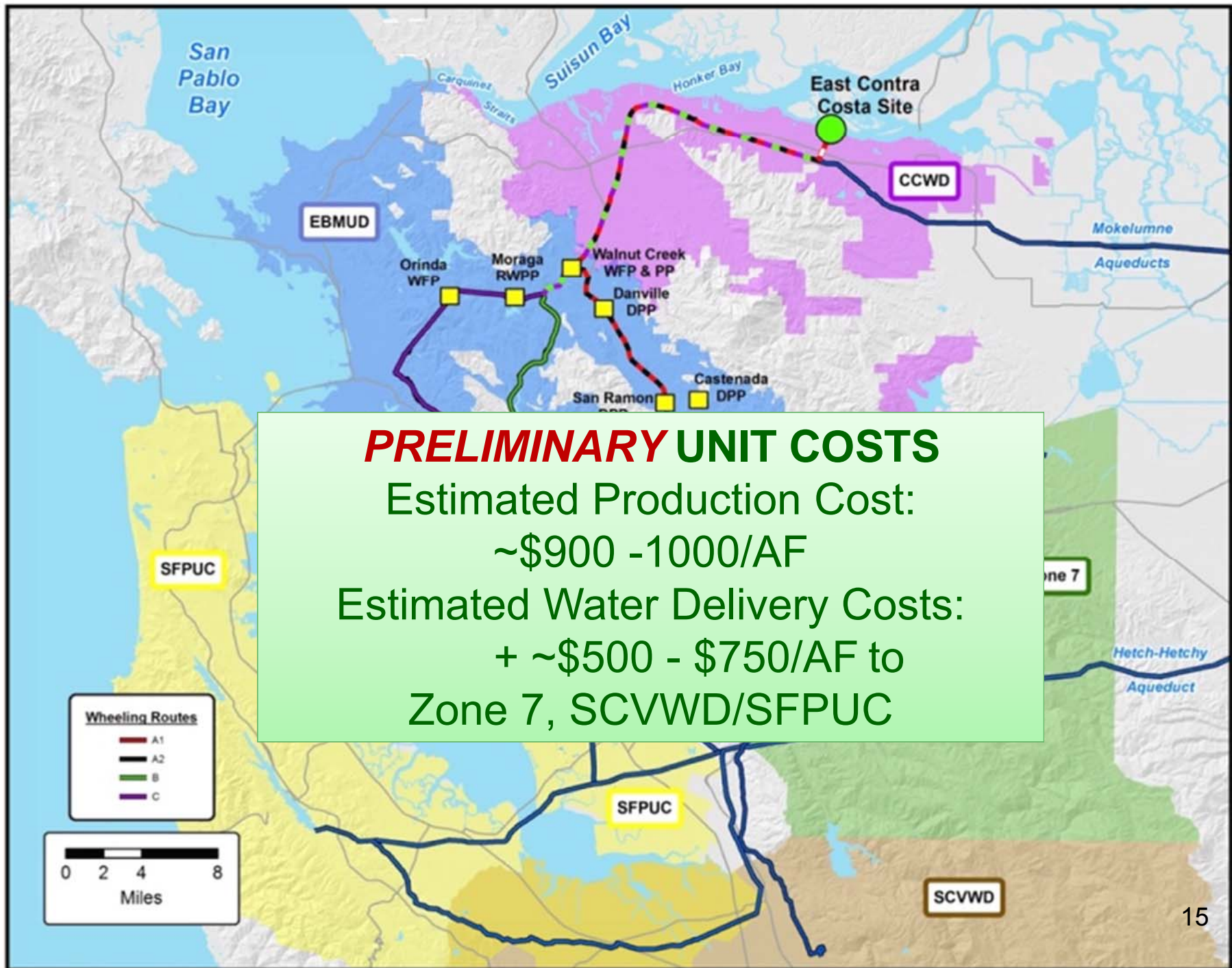
- Non-Sensitive Fish Present

- Prickly Sculpin, Pacific Herring, Inland Silverside, Northern Anchovy, and Sunfish

Summary of Pilot Results

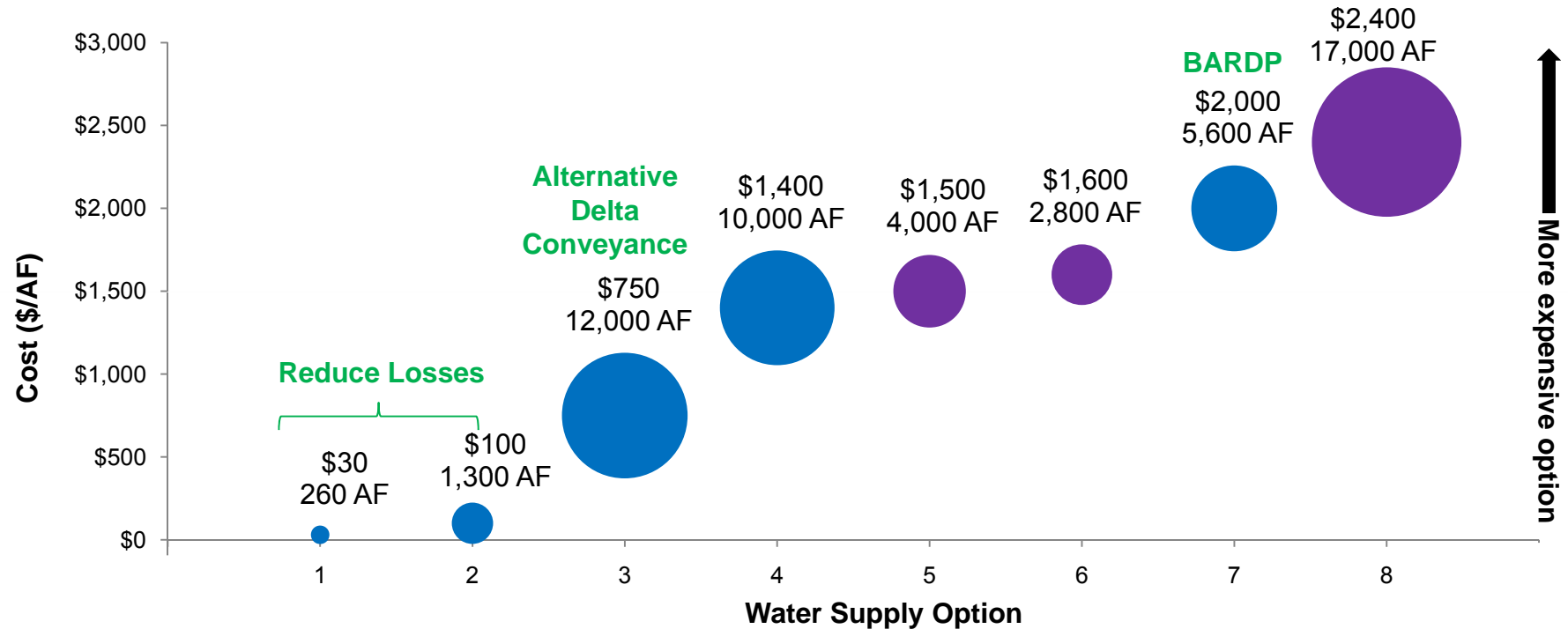


- **Technically viable**
- Significant **variation in salinity**
($<1,000 - 12,000$ mg/L TDS)
- 2-Stage RO had highest **recovery**
($> 80\%$)
- Wet-year operations possible
impacts to fish species (Longfin
and Delta Smelt)
- Brine toxicity produced no effects
on local species
- Estimate of **Full Scale Plant** and
delivery costs



***PRELIMINARY* UNIT COSTS**
 Estimated Production Cost:
 ~\$900 -1000/AF
 Estimated Water Delivery Costs:
 + ~\$500 - \$750/AF to
 Zone 7, SCVWD/SFPUC

Zone 7 Comparison of Water Supply Options



Size of circle is related to the potential amount of water available.
 Involves recycled water.

- 1 Reduce Groundwater Demineralization Losses
- 2 Reduce Unaccounted-for-Water Losses
- 3 Alternative Delta Conveyance
- 4 Long-term Water Transfers
- 5 Recycled Water – Direct Use
- 6 Groundwater Injection: Recycled Water
- 7 Regional Desalination Project (BARDP)
- 8 Recycled Water - With Storage

Source: PRELIMINARY ESTIMATES from Zone 7 2011 Water Supply Evaluation

Site Evaluation

- Oceanside removed from consideration
- Compared near Carquinez Bridge, Bay Bridge and East Contra Costa site (Mallard Sough Pump Station) alternatives
- East Contra Costa selected for further study

Feasibility Study narrowed down to 3 potential sites



Why Study Mallard Slough Pump Station?

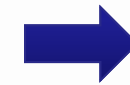
- Pros:
 - Leverages existing infrastructure and water rights
 - Existing state-of-the-art screened intake
 - Close to CCWD and EBMUD aqueducts for partner delivery
 - Nearby wastewater treatment plants for brine disposal
 - Ability to incorporate storage to manage supplies
 - Lower treatment costs
 - Existing PG&E connection for power supply

Why Study Mallard Slough Pump Station?

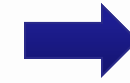
- Cons:
 - Sensitive Delta fish species present
 - CCWD operations designed to avoid fish impacts
 - CCWD monitors intake for presence of fish and larvae then adapts operations
 - Additional or modified water rights could be required for some scenarios
 - CCWD has existing water right at Mallard Slough

Questions Agencies Need to Answer Before Deciding to Proceed to Next Step

- What are the **Greenhouse Gas emissions**?
- What are the **potential Delta water quality and water supply impacts**?
- What are the **potential impacts to fisheries**?
- What are the **full costs to each agency**?
- Does EBMUD have the **capacity to deliver water** to partner agencies?
- Are there opportunities to optimize the project by using **storage in Los Vaqueros**?



**Greenhouse Gas
Analysis**



Delta Modeling



**Hydraulic
Computer
Modeling**



**Storage
Optimization**

Site-Specific Analysis

Selected for further study:

- East Contra Costa Site
 - Existing Intake at CCWD's Mallard Slough Pump Station
 - Studies focusing on 20 mgd facility
 - Water delivery through EBMUD
 - Zone 7 - New intertie
 - SFPUC/SCVWD – Existing Hayward Intertie
- Brine discharge
 - Blend brine with treated wastewater

Memorandum of Agreement Overview

- Studies focused on East Contra Costa
- Agreement for Site-Specific Analysis signed by partners in October 2011
- Scope of work consists of technical analysis, refinement of cost estimates, and public outreach
- 95% of work will be completed by partner agencies in-house
- Equal sharing of costs amongst five partners

Project and MOA Overview

Budget:

| Technical Services | Lead Agency | Technical Services Cost |
|---------------------------------------------|--------------------------------|-------------------------|
| i. Hydraulic Modeling | EBMUD | \$470,000 |
| ii. Delta Modeling and Storage Optimization | CCWD | \$380,000 |
| iii. Greenhouse Gas Reduction Analysis | Zone-7 - SCVWD | \$60,000 |
| iv. Public Outreach | SFPUC | in-kind |
| v. Contingency | | \$90,000 |
| | | |
| | TOTAL COST | \$1,000,000 |
| | Contribution Per Agency | \$200,000 |

Greenhouse Gas (GHG) Reduction Analysis

- **Goal:** Estimate the potential GHG emissions and evaluate potential alternatives to minimize the desalination facility carbon footprint
- ***Agency Contact:*** Amparo Flores, Zone 7

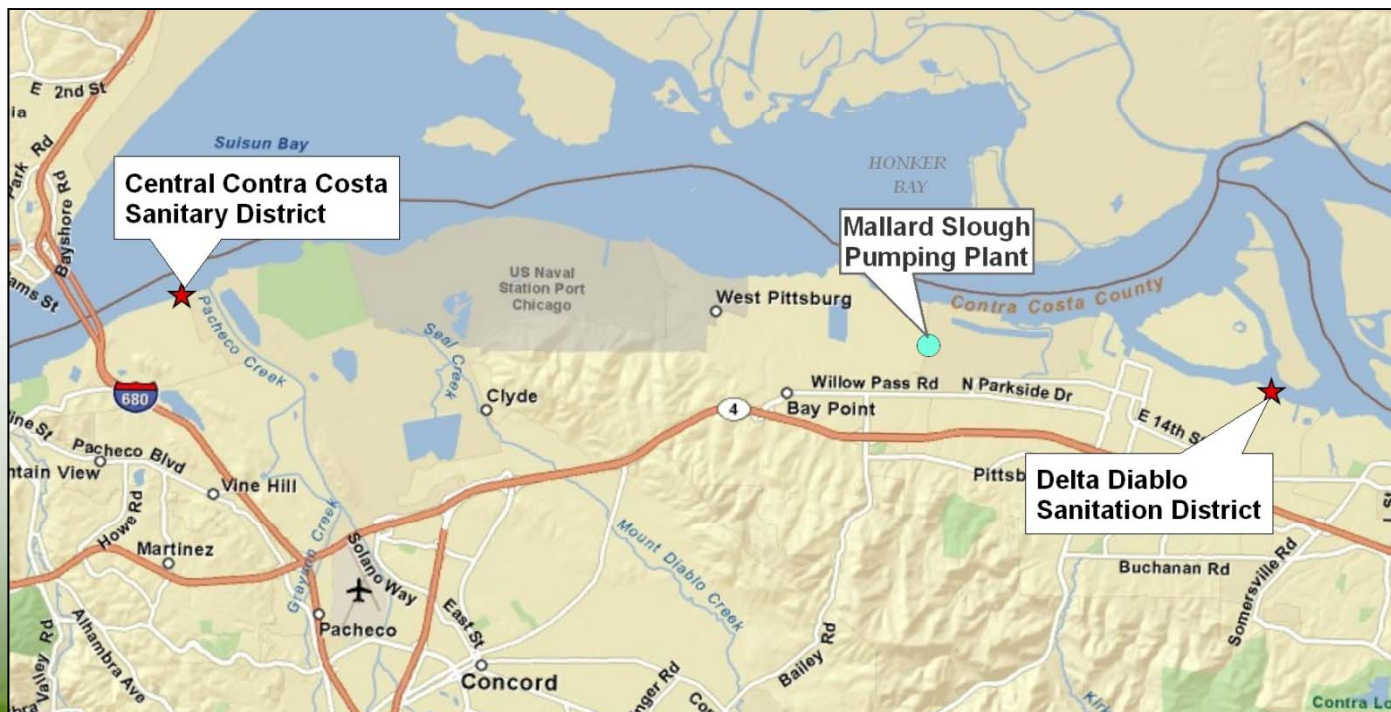
Delta Modeling and Storage Optimization

- ***Three Components:***
 - Delta Modeling: Water Quality/Water Supply
 - Fisheries Modeling
 - Storage Optimization

- ***Agency Contact:*** Emily Corwin, CCWD

Delta Modeling: Water Quality and Supply

- **Goal:** Evaluate impacts to Delta water quality and supply
- **Scope:** Evaluate intake effects and brine disposal at nearby wastewater treatment plants

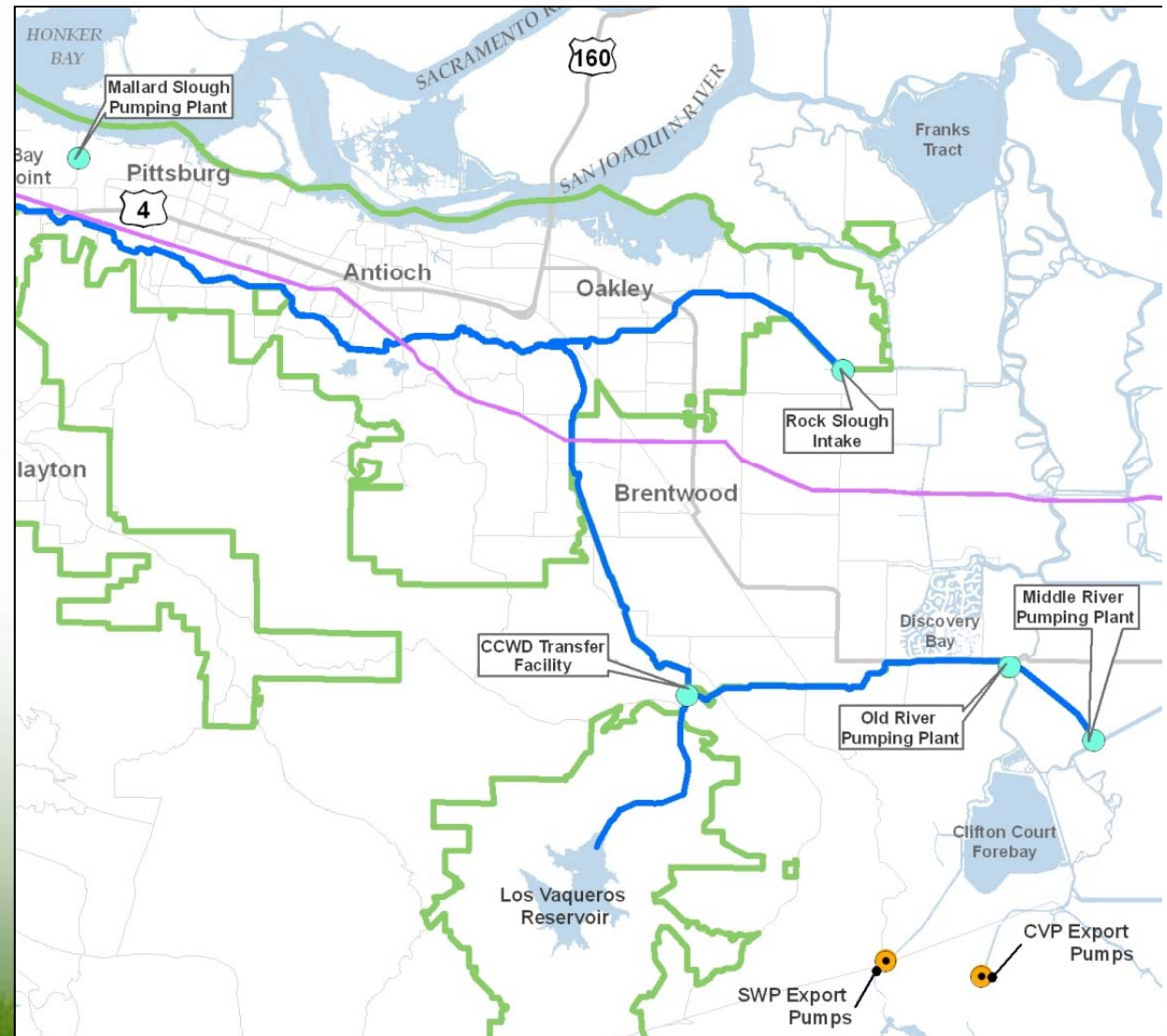


Fisheries Modeling

- **Goal:** Evaluate impacts to sensitive fish species in the Mallard Slough vicinity
- **Scope:**
 - Evaluate existing fisheries data
 - Estimate potential entrainment resulting from project operation
 - Develop strategies to minimize fishery impacts

Storage Optimization

- **Goal:** Evaluate how storage in Los Vaqueros Reservoir can be incorporated



Hydraulic Computer Modeling

- **Goal:** Refine EBMUD capacities and costs for delivering water to Zone 7, SFPUC, and SCVWD
- **Agency Contact:** Hasan Abdullah, EBMUD



Public Outreach

- **Goal:** To inform and engage the public in our service areas, and to engage regulatory agencies who will be involved in future project permitting
- **Agency Contact:** Manisha Kothari, SFPUC



Where you might have heard about Regional Desal:

- Pilot Plant Updates & Presentations (EBMUD & SFPUC)
- Bay Area Water Forum
- Included in Agency Planning Documents:
 - UWMPs
 - EBMUD WSMP 2040 PEIR
 - Zone 7 WSE
- Committee presentations
- Contra Costa Council Task Force Presentations
- AWWA CA-NV Section – Desalination Workshop
- DWR Grant
- Press Releases
- CBS-5 News Story

■ Agency Websites

Key: UWMP = Urban Water Management Plan, WSMP = Water Supply Management Plan, PEIR = Program Environmental Impact Report, WSE = Water Supply Evaluation, AWWA = American Water Works Association, DWR = California Department of Water Resources



Upcoming Public Meetings

April 2012

January 2013

April 2013

West Bay

Scope of Site-Specific Analysis

Preliminary Technical Results

Recommendations

East Bay

Today

Preliminary Technical Results

Recommendations

Regional

Meetings with Public Agencies (e.g., RWQCB)

Opportunities to Provide Feedback

- Contact staff directly
- Feedback at each one of the planned public meetings
- Team members happy to present at other public forums

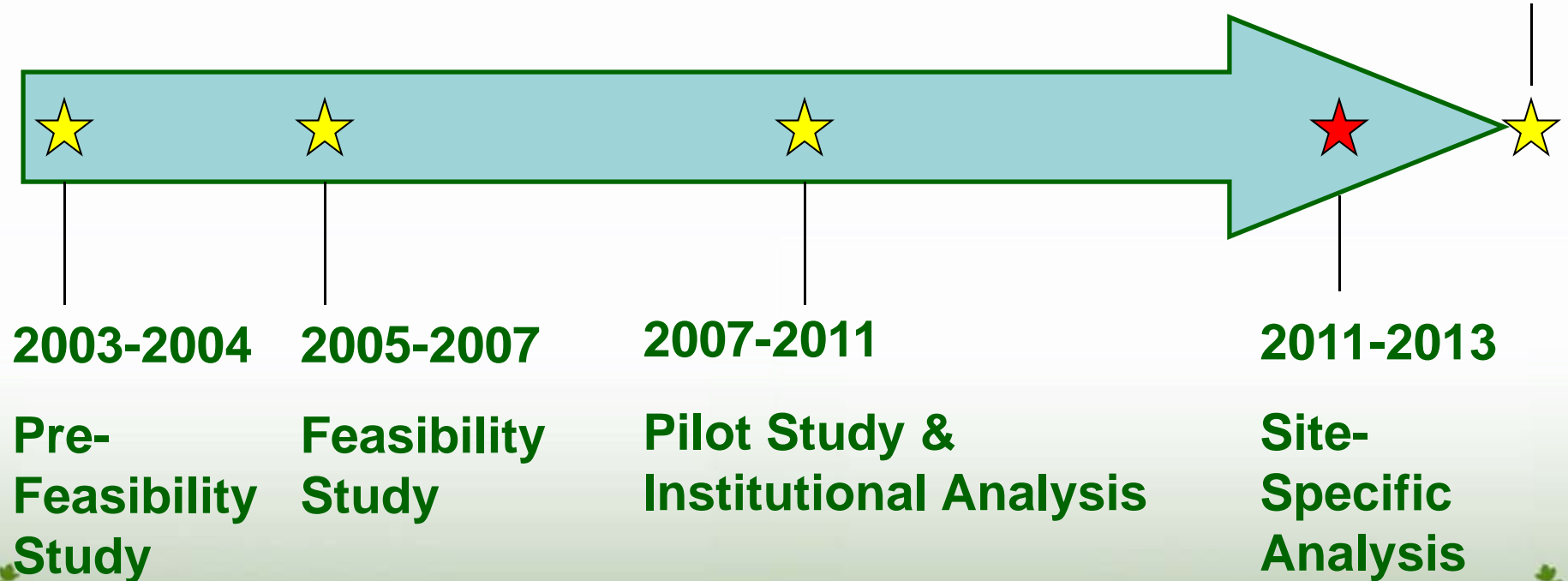


- Website - www.regionaldesal.com
- Email list sign up

Timeline

June 2013

Decision on agency participation
and initiation of CEQA process



Summary

- Desalination technology is technically viable in East Contra Costa County and would consume less energy than traditional desalination
- The partners are evaluating an East Contra Costa Site in more detail, specifically the environmental impacts related to GHG emissions, fisheries and brine discharge
- **WE LOOK FORWARD TO YOUR INPUT!**

Partner Contact Information

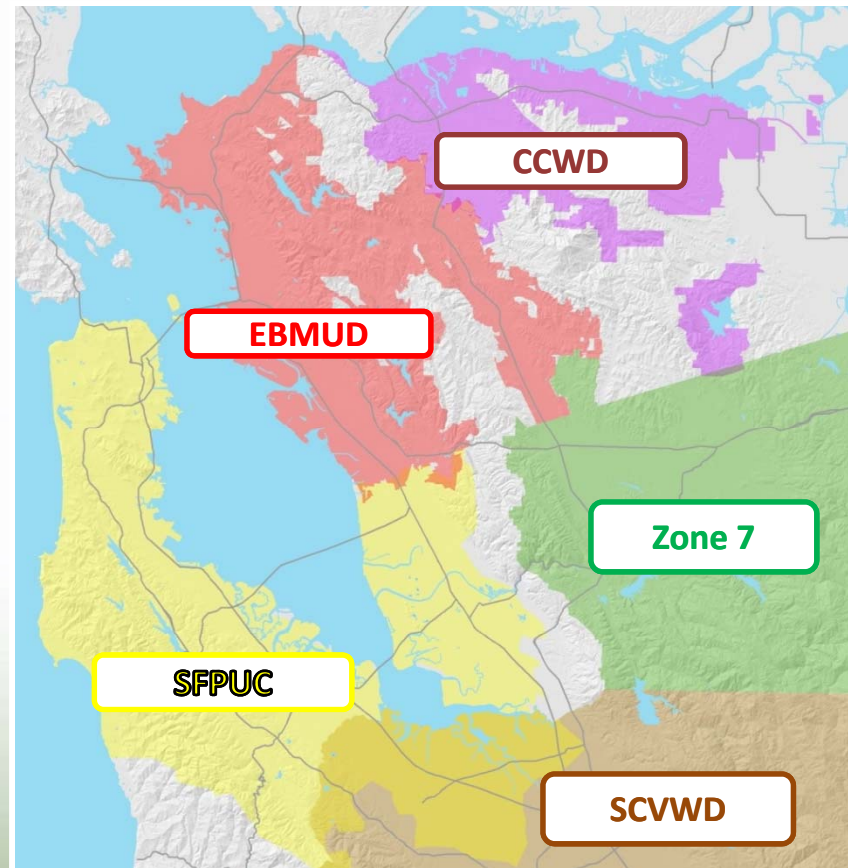
www.regionaldesal.com

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Questions

