Modernizing the System
California WaterFix

Roger K. Patterson, Assistant General Manager
August 24, 2017
San Diego County Water Authority
Imported Water Committee Meeting
Metropolitan’s Service Area
Diverse Water Supplies

- 25% Colorado River
- 30% State Water Project (through the Delta)
- 45% Local Supplies
  - Los Angeles Aqueduct
  - Conservation
  - Groundwater
  - Recycling
  - Desalination
Metropolitan’s Board Policy Adopted 2007

Benchmarks for a Delta Solution

- Provide water supply reliability
- Enhance ecosystem habitat throughout the Delta
- Allow flexible operations in dynamic fishery environment
- Improve water quality
- Reduce seismic risks
- Reduce climate change risks
Existing SWP and CVP Export Facilities are Located in the South Delta
Key Delta Risks

Fishery Declines
Delta smelt

Seismic Risk
Bay Area Faults

Sea Level Rise

Subsidence
SWP-CVP Export Capability Has Declined Due to Regulations

<table>
<thead>
<tr>
<th>Period</th>
<th>Annual Average Export Capability (MAF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980's</td>
<td>8</td>
</tr>
<tr>
<td>1991 NMFS BiOp</td>
<td>8</td>
</tr>
<tr>
<td>1992 CVPIA</td>
<td>7</td>
</tr>
<tr>
<td>1994 Accord</td>
<td>6</td>
</tr>
<tr>
<td>2000 Trinity River Flows</td>
<td>4</td>
</tr>
<tr>
<td>2006 San Joaquin Flows</td>
<td>4</td>
</tr>
<tr>
<td>2008-9 Smelt/Salmon BiOps</td>
<td>4</td>
</tr>
<tr>
<td>Future</td>
<td>?</td>
</tr>
</tbody>
</table>
What is the Preferred Solution?
Alternatives Analyzed – State/Federal

11 Years – Planning Agreement October 6, 2006

Public Draft EIR/S
- 16 alternatives
  - No Action
  - Isolated Conveyance (Pipeline/Tunnel/Canal)
  - Through-Delta
  - Dual Conveyance

Recirculated EIR/S
- Three additional sub-alternatives

California WaterFix
- Preferred alternative
California WaterFix - Overall Program

- Intakes
- Intermediate Forebay
- Clifton Court Pumping Plant
- Sacramento
- North Tunnels
- Main Tunnels
- Stockton
- Head of Old River Gate

Legend:
- Intake
- Main Construction Shaft
- Ventilation/Access Shaft
- Tunnels
Main Tunnels

- Twin bore main tunnels
- 30 miles long each
- 150 ft below grade
- 2-foot thick concrete liner
- 40-ft internal diameter
- Gravity flow
Who will build the Project?
Design and Construct Authority

- Single-purpose organization – Joint Powers Authority
- Under contract with State DWR
- Independent staffing
- World-class expertise and methods
- Sunsets at completion of project commissioning
What are the Project Benefits?
Total Average Delivery Capability With and Without CA WaterFix

<table>
<thead>
<tr>
<th>SWP-CVP Capability (MAF)</th>
<th>Existing Conditions</th>
<th>Future without CA WaterFix</th>
<th>Future with CA WaterFix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.7¹</td>
<td>3.5² to 3.9³</td>
<td>4.7⁴ to 5.3⁵</td>
</tr>
</tbody>
</table>

¹ California WaterFix EIR/EIS No Action Alternative, existing conditions with 2025 climate change impacts
² 2015 Delivery Capability Report Existing Conveyance High Outflow scenario
³ 2015 Delivery Capability Report Existing Conveyance Low Outflow scenario
⁴ California WaterFix EIR/EIS Alternative 4A-H4, initial operating criteria lower range
⁵ California WaterFix EIR/EIS Alternative 4A-H3, initial operating criteria upper range
North Delta Bypass Criteria Protect Flows, Water Quality, and Fish

Sacramento River Flow

- No Diversions
- 0 to 540 cfs
- 900 to 3,000 cfs
- 1,600 to 7,000 cfs
- 9,000 cfs
- > 35,000 cfs
Increased export with California WaterFix ~ 781,000 acre-feet (thru Feb 17)
SWP/CVP export losses due to BioOp ~ 800,000 AF (larger amount of SWP loss)
Analysis by State Water Contractors – Feb 2013
Enhance Ecosystem Fishery Habitat Throughout Delta

- Improved flow patterns
- Reduced risk of entrainment
- Physical habitat actions

Photo by Morgan Bond
Photo by Jacob Katz
Photo by Joel Williams
Sacramento, San Joaquin & Colorado River water quality represents historical average annual recorded data.

State Water Project water quality is a comparison of modeled data from the Recirculated Draft EIR/EIS.

- SWP (Existing) 302 mg/l
- SWP (Cal Water Fix) 221 mg/l (27% improvement)
- Sacramento River 100 mg/l
- San Joaquin River 320 mg/l
- Colorado River 650 mg/l

California WaterFix Improves Water Quality
27% salinity reduction
CA WaterFix Provides Sea Level Rise Adaptation

Sea Level Rise Effects with CA WaterFix (Drought Conditions)

Salinity lines indicate 2,000 ppm TDS

Analysis conducted by CH2M for Metropolitan Water District
Potential Water Transfer Capability

SWP and CVP Total

Northern Intake | Transfer Capability (50% exceedance)
---|---
Without | 0.2 MAF
With | 1.1 MAF

Data represents modeled transfer capability; Seller willingness & actual deliveries not represented. Preliminary State Water Contractor analysis - Subject to Revision.
Cost Estimate and Cost Allocation
# Cost Estimate Comparison

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Estimate 1 5RMK Inc. (Billions) $^{1,2}$</th>
<th>Estimate 2 Jacobs Engineering (Billions) $^{1,2}$</th>
<th>Estimate 3 Risk Adjusted with Mitigation at 75% Confidence Interval (Billions) $^{1,3}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>$9.50$</td>
<td>$8.86$</td>
<td>$10.66$</td>
</tr>
<tr>
<td>Contingency</td>
<td>$3.38$</td>
<td>$3.15$</td>
<td>----</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$12.88$</strong></td>
<td><strong>$12.01$</strong></td>
<td><strong>$10.66$</strong></td>
</tr>
<tr>
<td>PM/CM/Eng</td>
<td>$1.91$</td>
<td>$1.91$</td>
<td>$1.91$</td>
</tr>
<tr>
<td>Land acquisition</td>
<td>$0.15$</td>
<td>$0.15$</td>
<td>$0.15$</td>
</tr>
<tr>
<td><strong>Overall Total</strong></td>
<td><strong>$14.94$</strong></td>
<td><strong>$14.07$</strong></td>
<td><strong>$12.72$</strong></td>
</tr>
</tbody>
</table>

1. Program estimates in 2014 dollars
2. ~36% contingency on construction for 5RMK and Jacob Engineering estimates
3. Based on risks known at time of assessment
## California WaterFix

### Capital Cost

<table>
<thead>
<tr>
<th>ITEM</th>
<th>2014 ($ Billions)</th>
<th>2017 ($ Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conveyance Facility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Construction</td>
<td>9.5</td>
<td>10.4</td>
</tr>
<tr>
<td>• Contingency for construction (~36%)</td>
<td>3.4</td>
<td>3.7</td>
</tr>
<tr>
<td>• Program Mgmt.</td>
<td>Construction Mgmt.</td>
<td>Engineering</td>
</tr>
<tr>
<td>• Land acquisition (includes 20% contingency)</td>
<td>.15</td>
<td>.16</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>14.9</strong></td>
<td><strong>16.3</strong></td>
</tr>
<tr>
<td><strong>Mitigation</strong></td>
<td>.37</td>
<td>.40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$15.3 B</strong></td>
<td><strong>$16.7 B</strong></td>
</tr>
</tbody>
</table>
California WaterFix
Capital Cost Share

- **Capital & Mitigation**
  - $16.7 billion

- **Central Valley Project**
  - $7.5 billion (45% share)

- **State Water Project**
  - $9.2 billion (55% share)

- **Metropolitan Water District**
  - $4.3 billion (26% share of total)

1. In 2017 dollars
California WaterFix

Cost Allocation

Key Principles
- Beneficiaries Pay
- Costs follow benefits

Key Financing Assumptions
- 55% SWP / 45% CVP split
- 26% – Metropolitan’s share
- 40-year bond term
- 4%, 6%, 8% bond rate scenarios (current market rate ~ 3.9%)
- Capital costs are debt financed
- Operation & maintenance costs are paid as incurred
Cost and Rate Impacts
## Cost Impact Summary in 2017 Dollars

<table>
<thead>
<tr>
<th>State Water Project Share</th>
<th>Metropolitan's Share Annual Project Cost</th>
<th>Metropolitan's Cost Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWP Total Annual Costs (Capital + O&amp;M)</td>
<td>Total Costs (47.13% of SWP)</td>
<td></td>
</tr>
</tbody>
</table>

### Base Case 4% Interest
- **State Water Project Share**
  - Unit Costs: $438 M
- **Metropolitan's Share Annual Project Cost**
  - **Total Costs (47.13% of SWP)**: $207 M

### 6% Interest Scenario
- **State Water Project Share**
  - Unit Costs: $567 M
- **Metropolitan's Share Annual Project Cost**
  - **Total Costs (47.13% of SWP)**: $268 M

### 8% Interest Scenario
- **State Water Project Share**
  - Unit Costs: $709 M
- **Metropolitan's Share Annual Project Cost**
  - **Total Costs (47.13% of SWP)**: $334 M

### Metropolitan's Cost Impact
- **Overall Cost Increase**
  - **Base Case 4% Interest**: 13%
  - **6% Interest Scenario**: 17%
  - **8% Interest Scenario**: 21%
- **Annual Cost Increase (spread over 15-yrs)**
  - **Base Case 4% Interest**: 0.9%
  - **6% Interest Scenario**: 1.1%
  - **8% Interest Scenario**: 1.4%
- **Average Cost Increase per AF Sold**
  - **Base Case 4% Interest**: $122/AF
  - **6% Interest Scenario**: $157/AF
  - **8% Interest Scenario**: $196/AF

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(1) Based on Metropolitan's 2017/18 Revenue Requirement of $1,574 M
(2) Based on Metropolitan's 2017/18 sales budget of 1.70 million acre-feet
**Calculation Method and Assumptions**
- Residential water use = ~70% of total regional water use
- Metropolitan’s service area = ~6.2 million occupied households
- Household impact estimate calculation:
  - Monthly Impact = (Annual Cost x .70) / 6.2 million / 12 months

**Household Impacts**
- **Base Case**
  - $1.90 = ($207M x .70) / 6.2 Million / 12
- **6% Interest Case**
  - $2.50 = ($268M x .70) / 6.2 Million / 12
- **8% Interest Case**
  - $3.10 = ($334M x .70) / 6.2 Million / 12
Water supply reliability
Costs - Alternatives?
Calculation Method and Assumptions

- Marginal cost of WaterFix at Delta pumps = $613/AF
- Marginal cost to convey & treat SWP supply = $227/AF
- Power for transportation = $197/AF
- Variable treatment costs = $30/AF

Marginal cost in MWD Service Area

- Marginal Costs at Delta Pumps + Power & Variable Treatment

$840 per AF = $613 + $227
California WaterFix Maintains Cost and Rate Stability

California WaterFix vs. Alternative Supplies

MWD 2017 FULL SERVICE TIER 1 TREATED WATER RATE W/ CA WATERFIX = $1,101 TO 1,175/AF*

* Based on Metropolitan’s 2017 Full Service Tier 1 Treated Rate of $979 plus WaterFix costs ranging from $122/AF to $196/AF.
Process
- Three Joint WP&S and Bay-Delta Committee Meetings
- Workshop & Special Board Meeting

Three white papers
- Infrastructure
- Operations
- Finance/Cost Allocation
Questions

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