Mission – Founded 1951

• Preserve plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive

• Work in all 50 states and more than 30 countries
• Protect more than 119 million acres of land and 5,000 miles of rivers worldwide
• More than 1 million members
• Own and manage Staten Island and McCormack Williamson Tract in the Delta
Historical and Current Delta
San Francisco Bay and Delta Tidal Marshes – Historical and Current Conditions

(reprinted from http://sfbay.wr.usgs.gov/general_factsheets/change.html)
Phytoplankton production in estuaries typically is very high.

Better habitat = more growth

Suisun Bay 1988: ~20 g m\(^{-2}\) yr\(^{-1}\)

Narrangansett: ~310 g m\(^{-2}\) yr\(^{-1}\)

Lower Hudson: ~800 g m\(^{-2}\) yr\(^{-1}\)

Chesapeake: ~550 g m\(^{-2}\) yr\(^{-1}\)

Suisun Bay 1980: ~100 g m\(^{-2}\) yr\(^{-1}\)

Suisun Bay 1988: ~20 g m\(^{-2}\) yr\(^{-1}\)

Sources: J. Cloern (USGS) & A. Jassby (UCD): Oral presentations at the 2007 Annual IEP Workshop, Asilomar, CA
Delta Ecosystem in Crisis

SOURCE: California Department of Fish and Game.
NOTES: Graphs report the indices for the fall midwater trawl. Circles indicate the rank of indices in 2005. For delta smelt, longfin smelt, and striped bass, the recent indices represent low points in long-term declines of their populations.
Drivers of Change

• Six ‘drivers of change’ will impact Delta sustainability:
  – Subsidence
  – Sea Level Rise
  – Changes in Inflows
  – Seismicity
  – Invasive Species
  – Population Growth
Subsidence: Past and Future

Land Subsidence in the Delta
Delta Atlas reprinted 1995

- Above sea level
- Sea level to ~10 feet
- ~10 feet to ~15 feet
- ~15 feet and deeper

Pre-1880: Freshwater Tidal Marsh
- Anaerobic Decay
- CO₂, CH₄
- Vertical Accretion of Marsh Platform

1900’s: Elevation Loss
- Main Channel
- Microbial Oxidation
- CO₂
- Wind Erosion, Burning
- Compaction

2000’s: Increased Levee Maintenance
- Main Channel
- Decreased Levee Stability
- Increased Seepage Rates
- Sea Level Rise

or Levee Failure
Cumulative probability of levee failure/island flooding due to earthquake OR flood for a given interval of time  (based on DRMS draft data)
- Brackish Tidal Wetland
- Freshwater Tidal Wetland
- Seasonal Wetland
- Riparian
- Vernal Pool Grassland
- Native Fish and Salmonids
- Migratory waterfowl, shorebirds and water birds
Our Delta Engagement

- Delta Vision
- Bay Delta Conservation Plan (BDCP)
- Environmental/Economic Optimization Study

Shape the Delta Solution:
Engage in Delta planning processes to ensure conservation and recovery objectives are included in final plan.
Comparing Water Export Strategies Long-Term

- **Current Strategy:** through the Delta
- **Peripheral Canal:** around the Delta
- **Dual Conveyance:** both through and around the Delta
- **No Exports:** use other water sources and use less
Through-Delta Pumping: Low Chance of Restoring Fish, High Costs

Likelihood of Fish Viability (%)

Economic Cost ($Billions/year)

Delta smelt

Through-Delta Exports
Ending Exports: Better for Fish, But Even More Costly

Likelihood of Fish Viability (%) vs. Economic Cost ($Billions/year) for Delta smelt

- Through-Delta Exports
- No Exports
Peripheral Canal: Mid-range for Fish Viability, Least Costly

Delta smelt

<table>
<thead>
<tr>
<th>Economic Cost ($Billions/year)</th>
<th>Likelihood of Fish Viability (%)</th>
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</thead>
<tbody>
<tr>
<td>0.5</td>
<td>No Exports</td>
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<tr>
<td></td>
<td>Peripheral Canal</td>
</tr>
<tr>
<td></td>
<td>Through-Delta Exports</td>
</tr>
</tbody>
</table>

- No Exports: Likelihood of fish viability is 0%
- Peripheral Canal: Likelihood of fish viability is approximately 20%
- Through-Delta Exports: Likelihood of fish viability is approximately 80%
Dual Conveyance: Similar to PC for Fish, Probably More Costly

- Economic Cost ($Billions/year)
- Likelihood of Fish Viability (%)
- No Exports
- Peripheral Canal
- Dual Conveyance
- Through-Delta Exports

Delta smelt
Increasing Viability Through Plumbing and Ecosystem Investment

<table>
<thead>
<tr>
<th>Economic Cost ($Billions/year)</th>
<th>Likelihood of Fish Viability (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Exports</td>
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<tr>
<td>Peripheral Canal++?</td>
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<tr>
<td>Peripheral Canal</td>
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<tr>
<td>Through-Delta Exports</td>
<td>60</td>
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</table>

Delta smelt
Independent scientific and technical analyses have drawn the same conclusion:

A peripheral canal needs to be a component of the Delta solution if co-equal objectives are to be achieved.
Comprehensive approach required

- Habitat restoration
- Restoration of more natural flow conditions,
- Adaptive management,
- A governance structure that will ensure conservation objectives are being met.
One Expected Result