Bay Delta Conservation Plan

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California’s Water Distribution System

- Population is concentrated in the South
- Water sources are predominately in the North
- 2/3 of Californians rely on Delta water
- Over 500,000 people live in the Delta
- 80% of the state’s commercial fishery species live in or migrate through the Bay-Delta
- Habitat for 700 species, including 20 listed by ESA
- Average Annual Gross Value Agriculture totals more than $2 billion
Historic Delta Conflicts

- Center of competing demands for quantity and quality
- Water supplies are not fully reliable
- Water quality degradation makes it difficult and expensive to meet drinking water standards
- Levee failures threaten agricultural and urban uses
Where Do We Go From Here

The Bay Delta Conservation Plan

Co-equal goals

• Contribute toward the recovery of endangered and sensitive species and their habitats

• Allow for the protection and restoration of water supplies

http://baydeltaconservationplan.com
Assembling Major Stakeholders

- Department of Water Resources
- Bureau of Reclamation
- Santa Clara Water Agency
- Metropolitan Water District of Southern California
- San Luis & Delta-Mendota Water Authority
- Mirant Energy
- Westlands Water District
- Zone 7 Water Agency

- State Water Resources Control Board
- US Army Corps of Engineers
- US Fish and Wildlife Services*
- CA Department of Fish and Game*
- National Marine Fisheries Service*
- California Bay Delta Authority
  *Ex Officio status

- American Rivers
- Defenders of Wildlife
- Environmental Defense Fund
- Natural Heritage Institute
- The Bay Institute
- The Nature Conservancy

- North Delta Water Agency
- California Farm Bureau Federation
- California Resources Agency
- Contra Costa Water District
- Friant Water Authority
Project Elements

Restoration Actions

• Ecosystem Goals
• Natural Communities Goals
• Species Goals

Conveyance

• Up to 5 intake sites
• 4 conveyance options
Project Operations Considerations

- Geographic extent of water operations
- Restoration effects
- Conveyance effects
- Climate Change
Challenges of Balancing Recovery of Endangered/Threatened Species and Water Supply

• Habitat conversion creates social impacts from loss of jobs and homes

• Habitat enhancements do not equally benefit sensitive species
  Delta smelt vs. Salmonids
  Aquatic vs. Terrestrial

• Habitat restoration can mobilize hazardous materials—methylmercury

• Competition for water by people and fish
Surface Water

1,115 miles of levees protect about 700,000 acres within the Delta, directing water from the:
- Sacramento
- San Joaquin
- Cosumnes
- Mokolumne
- and Calaveras rivers

Minimal topographic relief = high flood potential

Levee reliability concerns
- Subsidence
- Sea Level Rise
- Climate Change
- Seismicity
Water Balance

Water balance in the Delta is influenced by:

- Inflow from the tributaries, controlled by:
  - Operations of the dams and reservoirs
  - Snowmelt and other runoff
- Exports to the Central Valley from the SWP and CVP pumping stations
- Outflows to the Pacific Ocean
- Tidal influences in the San Francisco bay
- Roughly 40% of the drainage water in California travels through the Delta each year.
Climate Change

Models indicate the future will be in one of these quadrants.

- Warmer
- More precipitation
- Earlier runoff
- Wetter

- Drier
- Less precipitation
- Snow pack increases
- Colder

Climate Change Effects on Water Resources:
- Total precipitation may increase or decrease
- Increased air temperature
- Less snowpack
- More precipitation as rain than snow due to higher temperatures
- Earlier runoff from snow melt
- Changes in timing and amount of river flows
- Changes in water resource system operations
- Sea level rise

Ecological Changes
Salinity Intrusions

Salinity in the Delta has changed due to water operations.
Water Quality Analysis

- Water quality analysis to address construction, operations and restoration activities in 3 time steps
- 33 scenarios × 5 water year types × 14 sampling locations × 20 constituents = 46,200
Fish and Aquatic Resources Evaluation Focus

**BDCP Covered Species**

- Delta smelt
- Longfin smelt
- Chinook salmon  
  (winter, spring, fall and late fall)
- Green and white sturgeon
- Central valley steelhead
- Sacramento splittail
- River and Pacific lamprey

**EIR/EIS Species**

*All BDCP covered species plus*

- Warmwater game fishes
- American Shad
- Striped Bass
- Bay Shrimp
- Hardhead
- Sacramento-San Joaquin Roach
- Tule Perch
Other Stressors Consideration

- Ammonia and Endocrine Disrupters in Wastewater
- Agricultural Contaminants
- Urban Runoff
- Low dissolved oxygen
- Methylmercury
- Non-native Species
- Fish Hatcheries and Harvest
- Entrainment by Non-project Diversions
- Predator Control
Species-Specific Evaluation
Species-Specific Evaluation

Model Dependent Analyses

- Parameters
- Data reduction
- Data presentation
- Life cycle models

Temperature exceedance probability distribution example

Flow time Series example

Delta EC distribution example
Species-Specific Evaluation

- Predation
- Food Web
- Entrainment

Predation bioenergetics model example output

- Construction
- Essential Fish Habitat
- Other Stressors

Historical monthly average loss rate of winter-run Chinook salmon at CVP and SWP salvage facilities.
It is a major challenge to restore an ecosystem in an environment like the Delta that is highly altered and largely unnatural.