Public Meeting

February 29, 2012

California Natural Resources Agency
Welcome

- Introductions
- Meeting Purpose
Agenda

- Working Group Updates
- BDCP Chapters Update
- Effects Analysis Discussion
- EIR/EIS Update
- Tunnel Conveyance
- Delta Programs Panel
- Next Steps/Action Items
Working Group Updates

- Governance
  - Met January 26

- Finance
  - Next Meeting on March 29

- Yolo Bypass Fishery Enhancement
  - Next Meeting on March 16

- South Delta Habitat Restoration
  - Met February 17

- Adaptive Limits of Water Operations Criteria
  - Next Meeting on March 6
Administrative Draft BDCP

David Zippin, Ph.D.
BDCP Chapters

- Ch. 1 - Introduction (49 pages)
- Ch. 2 - Existing Ecological Conditions (145 pages)
- Ch. 3 - Conservation Strategy (807 pages)
- Ch. 4 - Covered Activities (42 pages)
- Ch. 5 - Effects Analysis (506 pages)
- Ch. 6 - Plan Implementation (45 pages)
- Ch. 7 - Implementation Structures (40 pages)
- Ch. 8 - Cost and Funding Sources (137 pages)
- Ch. 9 - Alternatives to Take (42 pages)
- Ch. 10 - Integration of Independent Science (14 pages)
- 18 Appendices (3,963 pages)
Ch. 3 - Conservation Strategy

- What’s new
  - 3.3 - Biological goals and objectives
    - Ecosystem, natural communities, covered species
  - 3.4 - Revised conservation measures (1-18)
  - 3.4 - New conservation measures (19-22)
  - 3.5 - Important regional actions
  - 3.6 - Adaptive Management and Monitoring Program (incomplete)
Ch. 3 - Conservation Strategy

- Still to come
  - Adaptive limits for water operations (3.4, CM1)
  - Monitoring and research actions (3.6)
  - Updated history of conservation measures (App. 3-A)
Ch. 5 - Effects Analysis

- 5.1 - Intro and summary of conclusions
- 5.2 - Overview of methods
- 5.3 - Effects on Ecosystems
- 5.4 - Effects on Natural Communities
- 5.5 - Effects on Covered Fish (11)
  - Beneficial effects
  - Adverse effects
  - Impact of the Take on Species
  - Net effects
- 5.6 - Effects on Covered Wildlife and Plants (49)
Still to come

- Effects on critical habitat, Essential Fish Habitat (Section 5.7, Appendix I)
- Effects on two plants
- Full set of references
- Revised technical appendices (B, C, E, F, G)
Ch. 8 - Cost and Funding

- What’s new
  - Updated costs
  - Funding sources
    - Department of Water Resources
    - Bureau of Reclamation
    - State and Federal Water Contractors
    - Other State and Federal sources
BDCP Effects Analysis
Preliminary Conclusions

David Zippin, Ph.D.
Jennifer Pierre
BDCP: The Context

- Cannot be restored to “natural” state
- Continued decline of many covered species is expected
- Climate change will make conditions worse
- No framework in place (legal or financial) to enable restoration on a large scale within societal constraints
- All analyses compare BDCP to existing BiOps (under revision)
Effects Analysis - Purpose

- Provide necessary information for permitting
  - Endangered Species Act
  - Natural Community Conservation Planning Act
- Provide foundation for alternatives analysis
- Determine overall effects on covered species and natural communities as a result of BDCP
- Includes only analyses for biological effects
- Does not include evaluation of alternatives
Contribution to recovery must consider changing baseline for some conditions:

- Change in reservoir inflow, increased Delta temp., increased sea water intrusion
Improved East-West Flow through Delta (but substantial reductions in flow from Lower Sacramento River)
More tidal restoration has wide upland transition

Rivers better connected to larger floodplains

Seasonally inundated floodplains more resilient to invasive species (Yolo Bypass, South Delta)

Provides variation in habitats to support species diversity
BDCP Benefits: Climate Change Adaptation

- Mostly reduce ecosystem stressors
  - Predation - net reduction (localized)
  - Localized dissolved oxygen - eliminate stressor
  - Entrainment - mostly remain at current low levels
  - Food - expect dramatic increases
  - Invasive Aquatic Veg - exclude from restoration sites

- Increased flexibility in water operations to address higher variation in hydrology

- Adaptive management process to address changing conditions
BDCP Benefits: Ecosystem

- Creates protected reserve system
  - > 31,300 ac -- 49 terrestrial covered species
- Reserve system + restoration improves
  - Habitat connectivity
  - Increase ability to adapt to climate change
- Substantial increase in protection for some terrestrial species
- Effective and consistent management and monitoring to enhance terrestrial species
Preliminary Proposal (PP)

- Net Effects based on comparison of preliminary proposal (PP) with baseline
  - Preliminary proposal =
    - Alt. 1A in EIR/EIS
    - Dual conveyance, pipeline/tunnel
    - Construct intakes 1-5 (15,000 cfs capacity)
    - Operations Scenario A (Feb. 2010 Ops)

- PP is **NOT** DWR’s final proposed project
- All alternatives evaluated in EIR/EIS
Overview of Comparisons Made

- Environmental Baseline Condition without Fall X2 (EBC1)
- Baselines with Fall X2 (EBC2)
  - In two time periods: Early-long term (ELT), Late-long term (LLT)

Year 0  10  15  Year 50
Near-Term  ELT

- Preliminary proposal (PP_ELT, PP_LLTT)
- Comparisons were made between PP scenarios and each baseline condition
- Incorporate protective measures of BiOps
**BDCP Benefits: Terrestrial Species**

<table>
<thead>
<tr>
<th>Endemic or Near-Endemic to Plan Area</th>
<th>Substantial Portion of Range in Plan Area</th>
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<tbody>
<tr>
<td>Suisun song sparrow</td>
<td>Riparian brush rabbit</td>
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<tr>
<td>Delta mudwort</td>
<td>Riparian woodrat</td>
</tr>
<tr>
<td>Suisun marsh aster</td>
<td>Suisun shrew</td>
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<tr>
<td>Suisun thistle</td>
<td>Carquinez goldenbush</td>
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<tr>
<td></td>
<td>Mason’s lilaeopsis</td>
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<tr>
<td></td>
<td>Delta tule pea</td>
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<tr>
<td></td>
<td>Soft bird’s-beak</td>
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<tr>
<td></td>
<td>Heckard’s peppergrass</td>
</tr>
</tbody>
</table>
BDCP Net Effects: Terrestrial Species

- Adverse effects to most species relatively low
- Model “effects” on vernal pools from restoration can be avoided
- Substantial effects on from loss cultivated land on foraging habitat of three species:
  - Swainson’s hawk, sandhill crane, tricolored blackbird
  - Conservation of 25,000 - 32,000 acres of cultivated land will offset effects and contribute to recovery for all three species
  - Conservation and restoration of breeding sites for Swainson’s hawk and blackbird will contribute to recovery
BDCP Net Effects: Terrestrial Species

- Tidal wetland restoration effects
  - Potential for temporary adverse effects to salt marsh harvest mouse, Suisun shrew
  - Long-term benefits to species from increase in tidal marsh habitat
  - Careful phasing and design of restoration in Suisun Marsh will minimize short-term adverse effects
Regulatory Standards

- Applies to each covered species, listed or non-listed
  - Endangered Species Act
    - Minimize and mitigate to the maximum extent practicable
  - Natural Community Conservation Planning Act
    - Conserve the covered species in the Plan Area ( = “contribute to recovery”)

BDCP Net Effects: Terrestrial

- BDCP mitigates and contributes to recovery for all 49 terrestrial species
- Provides substantial long-term conservation for many species through
  - Strategic land protection
  - Habitat restoration
  - Population creation (plants)
  - Long-term monitoring and targeted research
PP Benefits: Covered Fish

SACRAMENTO SPLITTAIL (substantial)

GREEN AND WHITE STURGEON (substantial)

CHINOOK SALMON
winter, spring, fall and late fall

CENTRAL VALLEY STEELHEAD

PACIFIC AND RIVER LAMPREY

DELTA SMELT

LONGFIN SMELT
Stressors Evaluated

- Food Resources
  - Competition for food
  - Nutrient balance
- Flow Regulation
- Alternative channels
- Passage Barriers
- North Delta Intakes
- South Delta Pumps
- North Bay Aqueduct
- Diversions (Smaller Diversions)
- Tidal wetlands

- Channel Margin
- Floodplains
- Low Salinity Zone
- Submerged Aquatic Vegetation
- Temperature
- Turbidity
- Dissolved Oxygen
- Contaminants
- Microcystis toxicity
- Predation
- Harvest
Appendix

- Entrainment (B)
- Flow, Passage, Salinity, Turbidity (C)
- Contaminants (D)
- Habitat Restoration (E)
- Biological Stressors (F)
- Life Cycle Models (G)
- Construction Effects on Covered Fish (H)
Methods Used for Analysis of Effects on Covered Fish Species

- **Entrainment**
  - Salvage-density, PTM, proportional entrainment regressions, DPM, Manly regression

- **Flow/Passage**
  - CALSIM, DSM2, DPM, SRWQM, SacEFT, Egg Mortality Model, PTM

- **Contaminants**
  - Conceptual models, selenium and mercury quantitative models

- **Restoration**
  - HSI, literature review

- **Predation**
  - Bioenergetics for north Delta intakes, literature review for restored areas and hotspots

- **Life Cycle Models**
  - OBAN, IOS, Maunder-Deriso

- **Underwater Noise**
  - NMFS spreadsheet model for pile driving
**PP Benefits: Restoration**

- **Tidal wetland:** 65,000 ac
  - ~50%
  - West Delta
  - Cache Slough
  - Suisun Marsh
- **Floodplain:** >10,000 ac
  - S Delta (2-3X)
  - Yolo Bypass

![Cumulative Amount of Natural Community Protection and Restoration over Permit Term](image)
PP Beneficial Effects: Food Productivity

- More food expected in all tidal wetland restoration areas
- High uncertainties related to SAV, predation, and corbula
- Greatest increases:
  - Suisun Marsh
  - Cache Slough
  - South Delta

![Graph showing expected food productivity over different timeframes and locations.](image-url)
PP Beneficial Effects: Predation Reduction

- Submerged Aquatic Veg Control
  - *Egeria* control in restoration sites
- Strategic predator management: short-term, localized effects
**PP Beneficial Effects:**

**Habitat Restoration**

- Major increases in rearing and spawning habitat for delta smelt, longfin smelt, and splittail
- Increases in rearing habitat for salmonids and sturgeon
- Major uncertainties related to conversion of phytoplankton to zooplankton and export of food sources from all ROAs
- Predators, SAV, and clams could offset part of benefits
Improved passage for adult fish
- Expanded floodplain through increased duration of flooding and volume of water
- Reduced stranding
- 60-300% increase in splittail spawning and rearing habitat
- Increased food production and export
- No major difference in survival of juveniles
  - North Delta exports may increase predation
  - Conducting growth analysis for public draft
- Compared to tidal wetland restoration, less likely to attract predators, SAV, or clams
- High potential for large BDCP benefits
Old and Middle River flow patterns

Multi Study Comparison - Median Monthly Flow
Old & Middle River (OMR) Flow

Preliminary Proposal

Baseline Conditions
PP Beneficial Effects: Entrainment

- Overall slight decrease in entrainment (from already low levels mandated by BiOps)

South Delta
- Delta smelt: decrease overall
- Larval longfin smelt: increase (dry years)
- Splittail: increase due to larger population
- Chinook and steelhead: decrease overall
- Spring-run: little change

North Delta
- Minimal entrainment expected
- Impingement effects still being evaluated
Substantial short-term increase in underwater noise during construction (coffer dams)

- Depends % of impact pile driving: 1 season (Jun-Oct.)
- NMFS thresholds exceeded up to 8 hrs/day for 48 d (white sturgeon)
- Affects early, late portions of runs

Minimal effects on water quality

Remove 3.9 mi. low-quality habitat

- Replaced with 20 mi high-quality habitat

Potential for substantial increase in predation but affects small part of pop’n
Multi Study Comparison - Median Monthly Flow
Sac R d/s ND Diversion

Sacramento River downstream of diversions
Exports Reduce North Delta flows: example Rio Vista

Multi Study Comparison - Median Monthly Flow
Sac R @ Rio Vista
Minimal upstream effects on salmonid spawning, rearing, and egg incubation
  - Daily operations may minimize effects shown in modeling

Reduced flows during key salmonid migration periods at lower Sacramento River

Kimmerer et al. 2009 estimates reduced longfin smelt abundance based on reduced winter/spring outflow
  - Early Long-term (Year 15): 7-26% lower
  - Late Long-term: (Year 50): 1-18% lower

Feyrer et al. 2011 estimates abiotic habitat for delta smelt
  - Reduced in years following wet, above normal years (preliminary proposal does not include fall X2 action)
  - Increased in years following below normal, dry, critical years
Challenges with Net Effects Analysis

- Mix of quantitative and qualitative models
- Much debate about appropriate methods & interpretations
- No life cycle models available that integrate all effects
  - Cannot quantitatively examine interaction effects, synergies, population responses
  - Cannot perform “sensitivity analysis”
- Climate change
- Wide range of uncertainty in results
Overview of Net Effects

- **Qualitative assessment of net effects**
  - Based on qualitative and quantitative modeling and analyses
- **Systematic, comprehensive, and transparent**
- **Does NOT take into account**
  - Adaptive limits for water operations
Method for Net Effects Determination

1. Rank stressors as limiting factors on species/lifestages
2. Rank impact of BDCP on the stressors for species/lifestages
3. Combine positive and negative scores for stressors to determine net effects
4. Determine overall certainty of net effects determination
Procedure for Integrating BDCP Impacts

Species/lifestage Stressor Rank (0 to 4) X BDCP impact on stressor (-4 to 4) = BDCP Species Impact: Conclusion by stressor

Species/lifestage stressor certainty rating (1-4) X BDCP impact certainty rating (1-4) = Certainty rating for BDCP impact conclusion
## Net Effects: Example Stressor Ranking Table

<table>
<thead>
<tr>
<th>Stressor Category</th>
<th>Stressors</th>
<th>Stressor Definition</th>
<th>Spawning Eggs to Hatching</th>
<th>Hatch to Fully Developed Eggs and Air Bladder</th>
<th>Actively Feeding and Growing</th>
<th>Sexually Mature and Migrating Fish</th>
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</thead>
<tbody>
<tr>
<td>Water Operations—Entrainment</td>
<td>North Delta entrainment/impingement</td>
<td>Entrainment and impingement of fish at proposed North Delta intake (assumed effect in the future)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td>South Delta entrainment</td>
<td>Entrainment at existing South Delta export facilities</td>
<td>0</td>
<td>2</td>
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<td>2</td>
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<td>North Bay Aqueduct entrainment</td>
<td>Entrainment at North Bay Aqueduct</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>Agricultural diversion entrainment</td>
<td>Entrainment in agricultural and smaller diversions throughout the delta</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Habitat</td>
<td>Tidal habitat</td>
<td>Impact of loss of tidal habitat in terms of direct habitat for the species</td>
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<td>2</td>
<td>2</td>
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<tr>
<td></td>
<td>Channel margin</td>
<td>Impact of loss or change in channel margin in terms of direct habitat for the species</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
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Example Net Effects Diagram
Sacramento Splittail

**BDCP PP mitigates and contributes to recovery**

- Increased floodplain in Yolo Bypass is expected to substantially increase populations
- Increased rearing area in Suisun Marsh
- Reduced entrainment and exposure to contaminants
Chinook salmon and steelhead

BDCP PP mitigates and contributes to recovery

- Increased rearing habitat and food
- Improved passage through Yolo Bypass and Delta channels
- Reduced entrainment for all but spring-run (stays the same)
BDCP PP mitigates and contributes to recovery

- Increased rearing area for both sturgeon species
- Improved passage in Yolo Bypass
- Reduced entrainment
- Minimal upstream effects
BDCP PP has **small but uncertain net benefits** for Delta smelt

- Increased rearing and spawning habitat
- Increased food, but highly uncertain
- Reduced fall flows
- Entrainment reduced overall, but dry years have increased entrainment
Longfin smelt

**BDCP PP has no net effects on longfin smelt**

- Increased rearing and spawning habitat
- Increased food, but highly uncertain
- Reduced winter-spring outflow
- Entrainment slightly reduced overall, but dry years have increased entrainment
Next Steps

- Work with fish and wildlife agencies and stakeholders to revise preliminary proposal
  - Reduce adverse impacts on key species
  - Increase benefits of conservation measures
- Incorporate new and revised analyses in technical appendices
- Work towards:
  - Selected project (July 1)
  - Public Draft BDCP
EIR/EIS Update
<table>
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<tr>
<td>Lead Agency meetings</td>
<td>Weekly</td>
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<tr>
<td>Lead Agency Review of Batch A and B Chapters Complete</td>
<td>January 11, 2012</td>
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<td>Administrative Draft Released to Lead Agencies (Batch A and B)</td>
<td>February 27, 2012</td>
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<tr>
<td>Lead Agency Review of Batch C Chapters (Chapters 5,6,7,8,11,12,16,25,28,31,32,33,34,35,36,ES)</td>
<td>February 27, 2012 - March 27, 2012</td>
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<tr>
<td>Administrative Draft (Batch A, B) and Batch C Chapters Posted to BDCP Website</td>
<td>February 29, 2012</td>
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As of February 29 - All preliminary draft chapters available for public review.

Chapters being updated based on comments from agencies

June 29 - Public Draft EIR/EIS- revised chapters released for formal public review.
Pearson Tract Intermediate Forebay
Intermediate Pumping Plant
Surge Protection
Safety features are being engineered into the design of the pipeline/tunnel to ensure safe operation.

**Purpose:**
To absorb the pressure surges following the sudden shutdown of pumps.

**Where:**
One surge tank will be located at the head of each tunnel or pipeline.
DWR’s A.D. Edmonston Pumping Plant
Conclusions

- To insure the safety of equipment and personnel, surge towers are required at the head of each tunnel.
- Without the forebay, the height and number of surge towers will increase.
- Without the forebay, the tunnel/pipe wall thickness will increase.
Delta Programs Panel
Panelists:

- Joe Grindstaff, Delta Stewardship Council
- Les Grober, State Water Resources Control Board
Topics:
- Relationship of the BDCP to other Delta programs.
- Coordination between Delta planning efforts.
Meeting Close

- Review of significant discussion items
- Action Items for further consideration
- Next Meeting
  - March 28, 2012
  - Pagoda Building