Summary of Results for the BDCP Mini-Effects Analysis

Bay Delta Conservation Plan

Steering Committee Meeting

January 29, 2010

Topics To Be Covered

1. Background
2. Methods
3. Results
4. Lessons Learned
5. Next Steps

Background

Purpose: To conduct a preliminary analysis of the potential beneficial and adverse effects of draft BDCP water operations and related draft conservation measures on selected covered fish species to inform decisions about water operations criteria for the BDCP Conservation Strategy.

SAIC consultant team product, but a collaborative effort with representatives from:

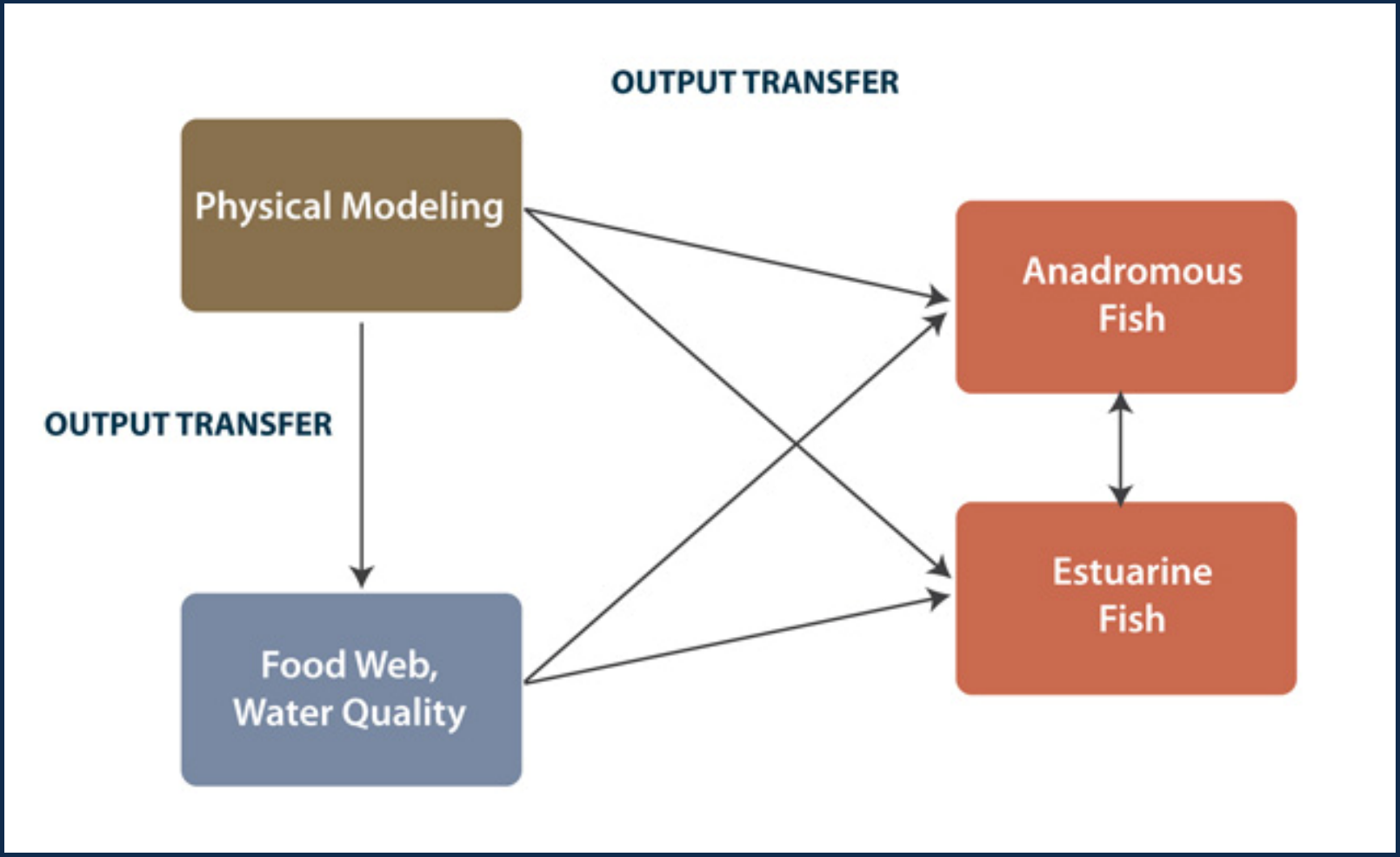
- DFG
- USFWS
- NMFS
- DWR
- USBR
- PREs
- NGOs
- DHCCP

Methods – Fish Species Evaluated[1]

- Estuarine Fish Subgroup
  - Delta smelt
  - Longfin smelt
- Anadromous Fish Subgroup
  - Winter-run Chinook salmon
  - Spring-run Chinook salmon
  - Sacramento River Fall-/Late fall-run Chinook salmon
  - San Joaquin River Fall-Run Chinook salmon
  - Sacramento River Steelhead
  - San Joaquin River Steelhead
  - Green sturgeon

[1] Additional BDCP covered fish species will be evaluated in the Full Effects Analysis

Methods – Relationship among subgroups



Methods

- Evaluation time periods:
  - Near-term (~10 years after permits signed)
  - Early long-term (~15 years after permits signed)

- No climate change effects (e.g., sea level, temperature, hydrology) evaluated

Methods

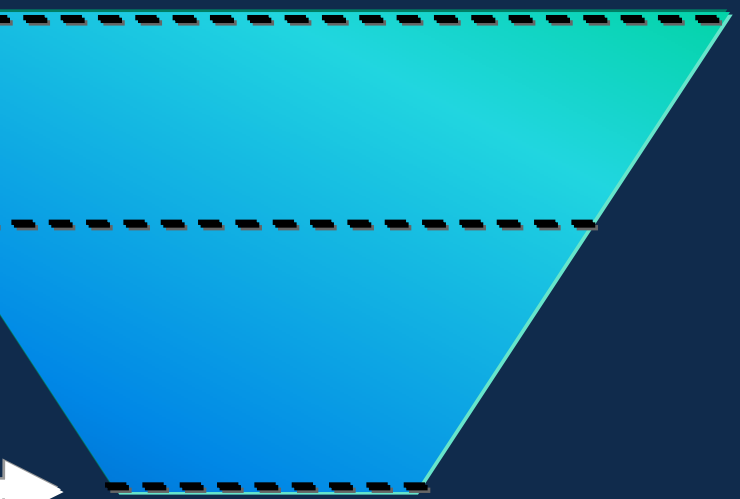
- 5 model runs, based primarily on proposed operations from Chapter 3 *Draft BDCP Conservation Strategy,* July 27, 2009
  - Existing Conditions (RPAs)
  - Near-Term
  - Early Long-Term – Proposed
  - Early Long-Term – Range A
  - Early Long-Term – Range B

Methods – Subset of stressors evaluated

All stressors/drivers[1]

"Major" stressors/drivers[2] or stressors/drivers deemed important for mini-analysis

Major stressors/drivers affected by water operations



Stressors evaluated for Mini-Effects Analysis

[1]All stressors/drivers will be analyzed for the full analysis

[2]Defined as potentially having population level effects on the species

Results – Delta and Longfin Smelt

Near-Term (relative to existing conditions):

- Minimal change in overall turbidity, although some localized increases from habitat restoration
- Marginal increases in primary productivity due to habitat restoration, although uncertainty regarding effect to smelt
- No difference in Spring X2 (defines position of Delta smelt and Delta outflow for longfin smelt)
- No difference in Fall X2 (defines habitat of Delta smelt)
- Entrainment risk at Mirant power plants could be large, but group needs to know more about operations

Results – Delta and Longfin Smelt

Near-Term (relative to existing conditions):

- No difference in entrainment risk of pre-spawn adult Delta or longfin smelt
- Higher entrainment risk of larval and juvenile Delta smelt, though still lower than pre-BO conditions because OMR flows are more positive
- Reduction in toxic loads, which are predicted to benefit smelt, but effects are not quantifiable (same in ELT, but greater)
- No consensus within subgroup on whether predator reduction measures have benefits to smelt (same in ELT)

Results – Delta and Longfin Smelt

Early Long-Term (relative to existing conditions):

- Proposed and Range A mostly similar, Range B generally more protective of smelt
- Minimal change in overall turbidity for all model runs, although localized increase from habitat restoration
- Summer/Fall turbidity reduced under Range A and Proposed, but no different from existing conditions in Range B
- Increased primary productivity due to habitat restoration, reduced south Delta exports, and increased residence time in south Delta, although uncertainty regarding effect on smelt

Results – Delta and Longfin Smelt

Early Long-Term (relative to existing conditions):

- Increase in Spring X2 (more easterly) under Proposed and Range A, decrease in X2 (more westerly) under Range B (defines position of Delta smelt and Delta outflow for longfin smelt)
- Increase in Fall X2 (more easterly) (decrease in Delta smelt habitat) under Range A and Proposed, decrease in Range B. Subgroup could not reach consensus on population level effects of Fall X2

Results – Delta and Longfin Smelt

Early Long-Term (relative to existing conditions):

- Increased entrainment of larval/juvenile Delta smelt in Range A and Proposed, reduced entrainment of Delta smelt in Range B.
- Reduced entrainment risk of Delta smelt adults in Range A, Proposed, and Range B.
- No predicted entrainment of Delta and longfin smelt larvae at North Delta diversions in Range A, Proposed, and Range B.

Results – Delta and Longfin Smelt

Overall:

- High level of uncertainty precluded subgroup from determining overall benefits and tradeoffs among conservation measures
- Red flags identified:
  - Fall X2 (Delta smelt habitat),
  - Larval/juvenile Delta smelt entrainment, and
  - Entrainment risk at Mirant power plants

Results – Anadromous Fish

Near-term (relative to existing conditions):

- Habitat restoration in the North Delta and Yolo Bypass inundation will increase rearing habitat
- Reverse OMR flows and, therefore, predicted entrainment risk for juvenile salmonids, are equal to existing conditions in Dec-Mar, but higher than existing conditions in April 3
- No major effects to entrainment risk of green sturgeon
- Seasonal flows will be similar between NT and existing conditions.
- No net change in temperature-related upstream mortality

Results – Anadromous Fish

Near-term (relative to existing conditions):

- Conservation measures to reduce abundance of invasive species may provide some benefit in reduced effects on San Joaquin salmonids but this cannot be quantified. Limited benefits of reduced toxics loading.
- No major difference in available upstream spawning and staging habitat.

Results – Anadromous Fish

Early Long-Term (relative to existing conditions):

- North Delta fish screen are more effective in avoiding direct entrainment of juvenile salmon than South Delta facilities.
- Change in north Delta hydrodynamics and conveyance structures may increase predation mortality, but this can not currently be quantified.
- Reverse OMR flows and, therefore, predicted entrainment, are lower (more positive) than existing conditions in Dec-Mar, but higher in April and May.

Results – Anadromous Fish

Early Long-Term (relative to existing conditions):

- Increased primary production would be an incremental benefit that would be greater than existing conditions and NT; although there is uncertainty regarding translation of phytoplankton into preferred salmon food.
- There are reductions in toxic loads, which should benefit salmonids, but residence time may increase exposure of salmon to toxics.
- Increased residence time in Delta may increase SAV/FAV and associated predation in the Delta.

Results – Anadromous Fish

Early Long-Term (relative to existing conditions):

- Better San Joaquin River attraction flows for adult steelhead and fall-run Chinook, and lower Sacramento River attraction flows for Sacramento basin runs in wetter years in Range A, Proposed, and Range B as a result of reduced Sacramento River outflows, but not drier years.
- Spawning habitat for green sturgeon will not differ in Range A, Proposed, or Range B.
- Water temperatures will be increase in some, but not all, spawning locations for green sturgeon in Range A, Proposed, or Range B.
- Juvenile migration flows will be lower for green sturgeon

Results – Anadromous Fish

Overall:

- High level of uncertainty precluded subgroup from determining overall benefits and tradeoffs among conservation measures
- Red flags identified:
  - Seasonal pulse flows and other high flows
  - Juvenile entrainment due to no San Joaquin i:e ratio/ OMR flows
  - Upstream coldwater pool storage
  - Reduced survival of juvenile salmonids below diversions
  - Predation at diversions

Results

Operational issues raised:

1. Sacramento River and Hood Bypass flows in ELT, including seasonal pulse flows, and effects to juvenile salmon survival, predation risk, and channel margin habitat effects.

Solution: Refined proposed operations criteria.

Results

Operational issues raised:

2. Yolo Bypass flow relationship with Sacramento River flow criteria (NT/ELT).

Solution: Sensitivity analysis on water supply conducted and met with agencies to refine criteria.

Results

Operational issues raised:

3. Upstream storage and water temperature.

Solution: Sensitivity analysis on water supply conducted and met with agencies to refine criteria.

Results

Operational issues raised:

4. Fall X2 more easterly/Habitat reductions for Delta smelt (ELT)

Solution: Refined operational criteria

Results

Operational issues raised:

5. South Delta Exports (April-May)
   a. San Joaquin i:e ratio/OMR flows (NT)
   b. San Joaquin River inflow (NT/ELT)
   c. Increased entrainment of larval/juvenile Delta and longfin smelt (NT/ELT)

Solution: Conducted further analysis and refined operational criteria

Results

Operational issues raised:

6. Predation risk at North Delta intakes

Solution: Proposed further analysis and discussed additional solutions

Results

Additional issues raised:

1. Lack of information regarding some covered activities and conservation measures

Solution: Gathering needed information and adding detail

Results

Additional issues raised:

2. Limitation of some analytical tools

Solution: Revising analytical tools and approach for the Full Effects Analysis