Delta Technical Brainstorming Workshop

MEETING DATE & TIME: January 19, 10:00 am - 4:00 pm

MEETING LOCATION: Stanford Room, 650 Capitol Mall: Sacramento

MEETING OBJECTIVES:

- Developing a shared understanding of significant issues
- Idea generation around solutions (e.g. suggestions for operational and infrastructure changes, habitat restoration projects)

Item	Time	Topic	Lead
#1	10:00 am	• Registration	
# 2	10:10 am	• Welcome and Introduction • Today's Agenda and Objectives	Mike Harty
# 3	10:20 am	• Intro to Reinitiation of Consultation on Long Term Operations (ROC on LTO) Idea Generation Phase • Explanation of Idea Generation (Presentation)	Katrina Harrison Ben Nelson
#4	10:50 am	• CVP Operations Overview (Presentation) • Q&A	Tom Patton
	11:20 am	BREAK	
#5	11:30 am	• Biology Overview (Presentation) • Q&A	Josh Israel
#6	12:00 pm	• Issues Exercise & Discussion	Mike Harty
	12:30 pm	LUNCH BREAK	
#7	1:45 pm	• Idea Generation Exercise	KW & USBR Facilitators
	2:50 pm	BREAK/Transition Time	
#8	3:00 pm	• Small Group Reports and Discussion	Mike Harty
#9	3:45 pm	• Next Steps	Katrina Harrison
	4:00 pm	Adjourn	

Morning Presentations & Discussion

Action Items

- Distribute presentation slides.
- Assemble a bibliography of what has been learned since the BiOps.

Questions

Regarding introduction to ROC on LTO's three tracks:

- Question (Q): Where do the biological assessments and opinions fit into the three tracks?
    - Response (R): All three tracks will include ESA compliance and documentation, but it is unclear what that will look like for each track yet.
- Q: How do we know which track ideas should go into?
    - R: Do not filter your ideas excessively. USBR will figure out what track ideas belong in.
- Q: Is USBR pursuing state funding?
    - R: No, USBR is not looking for state funding for the ROC on LTO/NEPA process. When they implement the projects outlined in the documents, they will likely look to the state for funding assistance. USBR is taking the lead on all three tracks; DWR is still evaluating its options re: how to coordinate. Chris Wilkinson is the DWR lead.

Regarding the Operations Presentation:

- Q: Has CVP considered putting in a variable speed pump at Jones? It would help flexibility.
    - R: It is hard to turn the existing pumps on and off and vastly increases the wear and tear on the system.
- Q: How operable is the Delta cross channel?
    - R: There is a concern about wear and tear: the facilities are aging, and maintenance is a priority. It is unclear whether the gates were designed to be opened that often. They also have to be opened on site, so manpower is another limitation.

Regarding Biology Presentation:

- Q: Have you put together a bibliography of what we've learned since the BiOps?
    - R: No, that would be a good resource.

Idea Generation Exercise

TableA : Infrastructure,Barriers,and Science

Facilitator: Mike Harty
Notetaker: Armin Halston

Issues (identified in AM exercise)

Delta Cross Channel

- DCC gates not designed for daily operation
- Redesign/rebuild DCC
- Aging infrastructure – rebuild?
- Replace DCC with operable system that allows tidal/daily operation

Barriers

- Head of old River Barrier: poor survival SJR route and poor survival interior Delta
- South Delta temporary barriers impede salmon out migration
- Temporary barriers slow migration in South Delta
- BAFF in Walnut grove
- Need to repair West Sacramento sector gates

Science

- Lack of scientific support for existing operational constraints
- Science based salmon survival targets
- Lack of validation of models to reduce uncertainty
- Lack of monitoring results to inform management decisions
- Uncertainty in fish estimates

Discussion Overview

Delta Cross Channel (DCC): The structure has passed its life span. It was built for certain operations. A feasibility study is needed to address potential improvements/replacement and could be completed in-office with little field work or modeling needed. The problem is well understood; the DCC could be more efficiently operated with new data. Alternatively, fish could be pushed to use other routes and bypass the DCC.

Barriers: There is currently low survival for either route chosen. The current barrier designs are not working for fish. Need to shift from use of barriers to dredging and increased fish screens on diversions. Further acoustics tag studies are needed, along with a cost/benefit analysis of deployment. Trap and haul may be a best route. Track one could study the best locations for barriers. Jon Burau of the USGS could better inform barrier placement and use. Land owner issues must be also addressed.

Science: There were many data gaps in the 2008 and 2009 Biological opinions. Data is not being used to drive management decisions; instead, it is often feelings or politics vs. data in driving management decisions. Management actions should be backed by studies. There needs to be better deployment of data gauges and more precise data produced.

Discussion/Ideas Generated:

Delta Cross Channel (DCC)

- The gate should be updated to have diurnal operations.
- Using the gate to control salinity requires a lot of water.
- The gate has complex hydrodynamics, as it pulls water from all around.
- Gates need to be redesigned, potential study project.
- Some science concerning the gate is already available.
- The DCC is less of an issue for delta smelt.
- The gate has to address the needs of recreational boaters.
- Feasibility study is needed for any redesign.
- Do the water benefits equal the cost of a redesign?
- Any redesign should incorporate a boat lock.
- Problem is well understood by the bay-delta science community.
- Would diurnal operations help water quality?
- A pinball flipper design to catch flows but deflect fish should be evaluated.
- The DCC could be studied by desk looking at existing modeling which could result in more water.
- Send them down steamboat slough or shipping channel, or canal to the west will avoid DCC.
- How many studies will be needed to pull the trigger on construction?
- Built in 1952, the gates are old and have reached their lifespan.
- Built for certain operations, and past studies have damaged the gate.
- Need to study the feasible of replacement.
- RPA action in spring protection closes the gate.
- Any D-1461 issues?
- Need cost / benefit study for replacement
- Flippers may not work, green sturgeon barrier, due to tidal changes

Delta Barriers (HOR & Temp Barriers)

- Both routes through the southern Delta have high fish mortality.
- Is trap and haul a better option than more barriers to increase survival?
- Magnuson Stevens Act requires restoration of migration corridors.
- Barriers are less effective than ten years ago.

- As for on the Stanislaus river, redesign diversions so that water pipes reach the river; do not raise the river to reach the pipes.
- Pumps connected need to be primed; that's why pipes need to stay wet.
- Expense of temp barriers vs the cost of improving pipes and pumps? But may not be feasible since pipes and pumps are privately owned.
- Track 1 could be a study of barrier redesign.
- Water cost vs barrier cost needs to be further evaluated.
- Currently the barriers are effecting out migrating salmon.
- The culverts in the barriers do not work well for passing fish.
- There are land owner issues concerning barriers.
- Are there any hybrid solutions to the south barriers?
- The temp barriers delay salmon passage and lower survivals
- Fish need to be able to pass the temporary barriers.
- A permanent barrier was determined cause jeopardy; sturgeon cannot pass at all.
- Need to shift from barrier installation to dredging and fish screens.
- New HOR could be part of track 3.
- Barriers could be used for good.
- Contact Jon Burau from USGS; he has ideas about using weirs to push fish into the Yolo Bypass.
- Is there data collected to find the sweet spot for these barriers?
- Need more acoustics tag studies to determine survival of fish through different routes.
- Need to try weir on American River.

Current State of Delta Science

- Data is not being used to drive decisions.
- Feelings vs Data
- Politics drive management actions.
- Need to have studies to support management actions.
- New Rio Vista research stations needs to house operation folks.
- There are a lot of data gaps in 2009 BiOps.
- Flow gauges are located in easy spots for deployment but not in the right spots for data collection.
- Nephelometric Turbidity Unit (NTU) Boat data vs gauge data
- Better way to track presence/ absence such as eDNA
- More precision needed in management data
- Mixed feelings on multiple ROC on LTO tracks

TableB:Fish Entrainment

Facilitator: Terra Alpaugh
Notetaker: Elissa Buttermore

Issues (identified in AM exercise):

- *Re: Entrainment in Pumps:*
  - ESA-listed fish loss through pumps
  - Level of certainty around salvage triggers
  - Entrainment rates at CVP & SWP intakes are unknown
  - Re-engineer South Delta diversions so we don't need South Delta barriers/export reductions to manage stage
  - Interim MOU w/ ACOE to hold more water in the flood space (this year is perfect example)
  - Operational effects due to inability to manage export changes (due to lack of understanding)
- *Re: Entrainment in Interior Delta:*
  - Better understand project operational effects on through Delta survival of salmon
  - Fish entrainment into interior Delta

Discussion/Ideas Generated:

- Improve access into Yolo Bypass to deter fish from entering less desirable habitat where survival would be lower by constructing a functioning weir notch. A participant brought up a study that showed that rearing in the Yolo Bypass decreases survival of juvenile salmonids. While juvenile salmonid survival is reduced by predation when they are in the Yolo Bypass, modeling studies show that rearing in the Yolo Bypass ultimately benefits the population because the surviving fish are larger and in better condition when they enter the ocean, thus resulting in greater escapement. (Near term project)
- Deter fish from entering undesirable habitat (through DCC, Georgiana Slough, Steamboat Slough, and Sutter) by using guidance barriers. (Near term project, a.k.a. Sacramento River Salmonid Protection Study; DWR has been investigating engineering alternatives to reduce juvenile salmonids into the interior Delta for about ten years now)
- Restore habitat, e.g. Frank's Tract. Design should be complete by this spring. Feasibility study is complete.
- Remove invasive weeds to improve habitat conditions (as described by the resiliency strategy) and reduce habitat that is desirable to predators. There is too much channel capacity in the South Delta. Vegetation gets pushed into the South Delta and then decomposes, creating hypoxic conditions.
- Preferentially pump through the CVP, because there is less fish loss than through the SWP facility.
- Pump the CVP at 4 units—when the screens are most efficient at reducing fish loss. At lower velocities fish swim through the screens into the louvers.

- Re-design screens. Make improvements to the cleaning process of the screens at the pumping facility, by reducing the time the screens are removed.
- Maintain facilities to take care of corrosion issues.
- Improve fish monitoring. More sensitive tools are needed to avoid delta smelt take. If we use more preventative measures, we could gain more operational flexibility later on in the water year, e.g. incorporate eDNA to better detect ESA-listed fish.
- Use updated models that account for fish loss. (Near term effort; DWR has made significant progress on this effort)
- Study uncertainty of entrainment rates at different export levels. A multi-year study is needed to evaluate different export levels.
- Use forecast-based flood control.
- Some participants did not think that real-time monitoring was leading to more informed management of ESA-listed species. Uncertainty around daily salvage trigger is high and uncertainty of presence of fish is high. Weekly salvage triggers would be more accurate.
- Update DCC structure.
- Restore habitat in Cache Slough.
- Improve turbidity management and monitoring to prevent delta smelt entrainment. With better models that consider more accurate first flush criteria and wind events, we could strategically reduce pumping.
- Create adaptable triggers based on conditions for OMR. We could explore the salvage data to see if it would be possible to reduce fish density-triggered OMR restrictions (e.g., from 5 day to 3 day), depending on USBR's response time and the density of fish salvaged.
- Avoid entraining fish through Clifton Court by constructing a new canal (aka Kevin's Canal) connecting the SWP facility to the Delta Mendota Canal.
- There was some discussion about pumping at different times of the day. Sometimes it is beneficial to increase salvage rates to move fish quickly through Clifton Court, so they have less exposure to predators. What distance is too close to the pumps? Another consideration is the effects of wear and tear on infrastructure.

Table C: Predation, Invasives,and Habitat

Facilitator: Cici Vu
Notetaker: Luke Davis

Issues (from AM exercise):

- Habitat conditions
- Invasive species
- High predation rates
- Lack of specificity on predators of listed species in the Delta
- Predation in Clifton Court
- Herbicide

- Predation in Clifton Court Forebay and in front of trash racks at Tracy Fish Collection Facility
- Predation in South and Central Delta
- Invasive aquatic weeds in areas used by salmon/delta smelt, especially near restoration sites
- Too much water weeds
- Food production
- Floodplain habitat
- Flow variability
- Expediency of restoration funding/property
- W. Sacramento Ship Channel
- Poor quality and quantity of food
- Lack of understanding of links between environmental drivers on food for delta smelt

Ideas:

- New channel to CCF downstream of CVP fish facility
- Increase capacity of intertie
- Dredging reconfiguration
- Track time of fish loss (technology exists)
- Replacement of fish facilities (which are old)
- Electroshocking
- Netting
- Address 80-90% loss at Clifton Court
- Adjust parameter/constant
- Response fund for new species
- Enhanced monitoring/detection of new invasives
- Limit habitat space for invasives
- (seasonal) variable flows/turbidity
- Focus in channels?
- Set back levees
- Targeted treatments
- UV lights (alternative to herbicides)
- DRAWP Bio controls
- Mechanical removals
- Understand/study catfish role in predation
- Changing F&G code bag limits on stripers
- Funding for evaluation of adaptive management
- Aquatic weed removal
- Create tempting rearing habitat in North Delta Corridor
- Farming, food – active multi-use wetlands management
- Change bathymetry (tidal), track 2
- Flows thru North Delta – food bank

- Improve DS Suisun marsh gate operation to improve habitat
- Upgrading Sacramento wastewater treatment plant
- Survey methods
- Increased tracking/reporting

Discussion:

- The Tracy Facility is important to predation.
- NASA data from the Dark Skies Association, related to night-time pollution, could be looked at for predation.
- The main issue is with aquatic invasive species.
    - Aquatic weeds have changed now to predominantly *Egeria densa*. However, some invasive weeds may support delta smelt habitat.
    - Invasive clams are also a major issue.
- Use only YY chromosome females to limit reproduction of bass. This has not yet been done for bass species. This may be more for Track 3 due to the potential timeline for implementation.
    - Q: Can it jump to different species?
        - R: No.
- Electrofishing is ongoing in Clifton Court Forebay (CCF). It is tricky to know the full population count of invasive predators in CCF.
    - CCF should be filled with water via a new channel downstream of Tracy fish collection facility – a channel that does not use the river channel.
        - Q: Would DWR still conduct the pumping?
            - R: Yes.
        - Q: Does CCF need to be as big as it is?
            - A report on channelized flows from DWR is coming out. Would focus on digging a channel and reconfiguring the bathymetry.
            - Increasing capacity of the Jones pumping facility would help screen fish.
            - The facilities are old; it would be best to implement new technology.
- A new study that releases tagged salmon could show if mortality is due to predators or if it's due to other stressors.
- Predation is only an issue due to the lack of habitat.
- There are concerns that habitat restoration promotes predator habitat.
- It's difficult to control invasive species and predators, and herbicides can be problematic.
    - Control of invasives/predators is possible, but eradication is impossible.

- Variable flows and turbidity can help provide flushing flows which push out *Egeria densa*.
    - Winter-time flushing flows help remove invasive weeds.
    - The goal should be to restore the delta back to a tidal estuary with tidal flows.
    - Winter-run chinook salmon are affected by sea tides. Would it be possible to set back the levees and create floodplain habitat?
        - It would be good to setback levees and create floodplain habitat.
- Some areas are better to focus on *Egeria densa* than others.
    - The Delta smelt resiliency strategy study compares two islands, with one having been treated herbicides and one without.
- Recommendation to change the bathymetry, tidally, but it may not be possible within a one year timeframe.
- UV studies are ongoing at Lake Tahoe to remove invasives.
    - This may need to be considered, but results are unknown at this time.
- Fishing and electrofishing are ongoing at CCF. Targeted predation removal at CCF would help with pumping.
    - Solving predation in CCF would mean greater numbers of listed species showing up in the pumping facilities.
- Recommendation for a study that focuses on catfish in the Delta and their impact as predators.
- Management is essential for invasive species.
- The Delta Smelt Resiliency Strategy talks about improving North Delta flows, downstream habitat, and aquatic weed removal. One third of habitat is covered by aquatic weeds.
- A better spatial understanding of weeds would be useful for management.
    - An app for the public to use may help document where invasive species are.
- Change the fish and game code on stripers (bag limits, etc.)
- Add sediment to increase turbidity.
- Funding is the biggest issue and that landowners should be included in the process.
    - What is the long-term funding source for adaptive management?
        - Funding is affected by the economy/taxes and, therefore, fluctuates.
        - Higher taxes on water may assist in funding issues.
- There are upcoming upgrades to the Sacramento Waste Water treatment plants, which may assist in food production.
- Enhanced monitoring and education for invasive species would be useful
    - Recreational boaters are well educated on invasive species.