

DRAFT
Meeting Minutes
DEFT Team
October 15, 1998
1:00pm to 5:00pm

Participants

Pete Chadwick, Peter Rhoads, Jim Buell, Jim Snow, Mike Thabault, Mike Fris, Larry Brown, Elise Holland, Bruce Herbold, Dale Sweetnam, Gary Stern, Paul Fujitani, BJ Miller(phone), Karl Halupka, Jim Buell, Nicol Sandkulla, Curtis Creel, Ron Ott

Ground Rules

- Talking biology only - not where water comes from.
- Discussion of entrainment does not imply agreement on conceptual model or the assumed importance of the entrainment - need not buy into conceptual model or its underlying assumptions.
- Recognize that there are differences in hypotheses
- Recognize that there will be experimental (mode) adaptive management.
- We all recognize that reducing entrainment is a good thing.

Agenda

What we did last week.
Assignments from last week.

Highlights and Actions:

- Consensus to go forth with detailing scenarios and evaluating their performance with available modeling tools - Peter L's, Russ Brown's, and George's.
- Query George, Russ, and Peter L as to their needs.
- Bruce: will complete his scenario with full data set to provide our template.
- DEFT scenario team will meet Monday to 9:30-12:00 to refine scenarios. (Tom will flush out Jim B's scenario and will get Warren and Russ to attend Monday's meetings.) DNCT will then meet from 1-5 to discuss.

New Scenario details for flex operations

I. Bruce developed flex ops options for two types: Hybrid + VAMP and Hybrids + X2, and then summarized his memo. (See his memo and attached table for details)

- Vamp is an adaptive management tool - adjust inflow from San Joaquin and amount of export, or both + how long each is employed and how to repay water cost.
- X2 is an adaptive management tool - slide the level of development
- scenarios control entrainment (VAMP) and estuary habitat (X2)

- Bruce described details of his alternatives (see attached summary table).

Discussion:

experimental aspect of scenarios

1. Bruce: focusing on entrainment may lead us not to consider other impacts that are benefitted from these actions.
2. Mike T: some things are testable, but carrying out experiments on listed species is not; they should not be put at risk in these experimental scenarios. Experiments should be conducted under protected conditions.
3. Bruce: we could conduct these scenarios under protected conditions.

Refining scenarios

4. Bruce: these criteria are only examples based on indications from 1993 data only; they need to be refined based on all available years.
5. Pete C: our assignment requires refinements so that we can determine benefits/costs of water for each scenario.
6. Bruce: we should be able to refine scenarios and evaluate them adequately by Nov 24th.

Discussion of Bruce's scenarios

7. Mike T: likes structure; easy to change numbers and conduct sensitivity analysis of each proposed standard.
8. Jim S: Concerned about what triggers would be used to apply these new standards for VAMP and X2.
9. Bruce: real-time monitoring may tell you when to start, how long to apply, when to shut off for different levels of risk.
10. Jim B: can triggers apply to start and stop application of restrictions in VAMP? Can we shorten time restrictions are applied based on monitoring? Bruce: Yes, but he trusts start triggers but not stop triggers. But there may be examples of good stop triggers.
11. Pete R: he is comfortable with applying the restrictions to protect listed or native species, but not striped bass.
12. Carl: How do you account for number of days applied, especially when applications overlap? Bruce: may or may not overlap, but when they do you have options.
13. Elise: SJ salmon with VAMP 30-90 days is not covered.

II. Mike T's scenarios: Modified exports and X2, fixed Vamp. One conservative and one less conservative. (See his memo for details; summary in attached table)

- assumed 1962 level of application for VAMP - held constant in both scenarios.
- E/Is standards should follow hydrology - take less % of inflow the drier it gets.
- Did not set E/Is for fall and winter for salmon; only winter-spring for delta smelt.
- conservative scenario starts with 90 days of VAMP, but triggers allow backing off to a

- base of 31 days of export reductions.
- the less conservative scenario starts from the Accord Base with limited deviations using relaxation or restrictions on E/Is based on salvage and other triggers.
- VAMP could be extended based on triggers.
- tougher standards less monitoring and visa versa
- restrictions vary with water year type: wetter - less restrictions and visa versa.
- New storage would provide makeup water.
- Conservative scenario developed to protect vast majority of species by reaching out beyond simply salvage/entrainment.

Discussion

14. Jim B: Is a full core needed for VAMP in either scenario? Mike: need a core treatment like 31 days as other species are being protected. Core period could be shifted depending on species we are trying to protect.
15. Dave F: restricting E/Is based on outflow rather than year type would provide a more real-time basis. Mike: Yes, varying by month to follow natural hydrology seems reasonable. Use some sort of sliding scale of restrictions or relaxation based on real-time conditions.
16. Bruce: recommends not focusing on ratio, rather on export level; restated his concern for E/I ratios not reflecting the independent nature of E and I effects on fish. Mike: agreed that E/I is poorly related to entrainment, exports often control entrainment, but ratio controls habitat conditions. Bruce: Inflow controls habitat conditions.

Jim Buell - Another Scenario (See Table and Memo for Details)

- sensitive to more than just entrainment
 - phases out E/Is and X2 and replaces with real time biologically based controls of operations with unique triggers and degrees of controls on exports and other operations.
 - X2 controlled by outflow not export restrictions.
17. Bruce: this is a third way to tighten exports: as long as fish are there you clamp down on exports. There is no time set, the risk is to water supply. They take risk and benefit.
 18. Elise: what are magnitudes of triggers? Risks of false positives? Would you vary curtailment based on how large triggers are? Jim: Peter L's model indicates substantial gains despite uncertainties.
 19. Pete C: curtailment and trigger levels need to be worked out.
 20. Mike T: why relate curtailment to pop level? Jim: could be other factor like distribution of population.
 21. Bruce: suggested % of population in other parts of Delta - to determine significance of take at pumps.
 22. Pete R: important to understand mechanism behind X2 standard. Bruce: attacking the causal factors if possible for some species but not for all. Jim B: we need to get after the mechanisms in X2 and use this knowledge to protect fish by other means than X2.

General Discussion:

23. Ron: can we prioritize actions at this time?
24. Pete C: questions our ability to prioritize because a lack of information on effects. Even with operating criteria, he couldn't say what actions are better. We need to evaluate env benefits and water costs of these scenarios first.
25. Mike T: we could evaluate utility of different actions and put different promising pieces in new scenario. Simply need to show how they would work. What kind of tools needed to supply water needed.
26. Ron: how would we mix and match tools we have identified.
27. Bruce: we should list out our tools and ask operators what they feel about them.
28. Carl: we should figure out how our tools could achieve objectives.
29. Mike T: would like feedback from operators as to what they need to make evaluations.
30. **Action:** write up and get George's feedback.
31. Bruce: concerned about how we compare among tools without a common base of comparison.
32. Jim B: can we package tools into few scenarios for evaluation?
33. Ron: present your package of tools to management - get tools to same level so they can be compared.
34. Mike T: bring scenarios to Bruce's level.
35. Pete C: we then need to evaluate each scenario and tool within scenarios as to effects using something like Russ Brown's simulation model. Critical that effects and tradeoffs of flex ops are shown with a daily model like Russ's and then effects transferred to George to determine water supply impacts.
36. **Consensus** to go forth with detailing scenarios and evaluating their performance with available modeling tools - Peter L's, Russ Brown's, and George's. **Action:** Query George, Russ, and Peter as to their needs. **Action:** Bruce: will complete his scenario with full data set to provide our template.
37. **Action:** DEFT scenario team will meet Monday to 9:30-12:00 to refine scenarios. DNCT will then meet from 1-5 to discuss.

Table 1. Summary of Scenarios

Mike T. Scenario 1 - Conservative (very protective) application of E/Is and VAMP.

E/I Standard:

- unrestricted in wet and AN year types
- Base: Feb-June 0.35 in Normal; 0.2 in Dry; 0.1 in Critical
- Base: Nov-Jan 0.35 in Normal; __ In Dry; __ in Critical
- Flex operations relaxation in winter if salvage is low and smelt and salmon numbers are low in central and southern Delta.

VAMP:

- Base: 90 days Mar15-Jun15. 60 days Apr 1-May 31 fixed.
- Flex operations relaxation on start and finish based on salmon tributary and Mossdale monitoring

Makeup water above that provided by relaxations from new storage.

Mike T. Scenario 2 - Liberal application of E/Is and VAMP.

E/I Standard:

- Accord Base
- Increased restrictions in fall to protect spring run based on salvage and monitoring triggers (outside of south delta).
- Relaxation or greater restrictions at other times up to a max of 0.65 based on monitoring and salvage triggers.

VAMP:

- Base: 31 day VAMP
- More restrictive start and later finish based on salmon triggers as in #1.

Makeup water above that provided by relaxations from new storage.

Bruce H. Scenario HX2 - Entrainment and X2 changes

Entrainment Standard (set constant)

- Accord Base except spring limit raised to 45%, except under following conditions.
- Jan-Feb cutback of export : trigger - if QWEST falls below -2000 cfs; target keep QWEST above -2000 for 20 days.
- Feb-Apr cutback of exports: trigger - dry year; target 1500 max exports for up to 15 days.
- Apr-Jun cutback: trigger - if greater than 50 % of delta smelt distribution in on San Joaquin side; target 1500 max exports for up to 25 days.
- May15-June15 cut back of exports: trigger VAMP flows in excess of 7000 cfs; target 5000 cfs limit for 7 days.
- Jan-Mar cutback in exports: trigger 10km shift downstream in X2; target 5000 cfs export

limit for up to 30 days.

X2 Standard

Following dry years (when X2 is west of Chipps Island for less than 80 days)

- Mar-Jun: impose 1962 LOD X2
- Close DCC as early as possible from Nov 1 - Jun 20
- Nov- Jan: limit export to 5000 cfs when 14 day average of X2 is upstream of Collinsville.
- make up water from transfers and purchases

Following wet years (when X2 is west of Roe Island > 90 days)

- Mar-Jun: impose 1962 LOD X2
- Relax E/Is as necessary to fill San Luis.

Bruce H. Scenario HVAMP

Entrainment Standard (Set constant)

- Accord Base except spring limit raised to 45%, except under following conditions.
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X2 Standard

Following dry years (when X2 is west of Chipps Island for less than 80 days)

- Mar-Jun: **do not** impose 1962 LOD X2
- Close DCC as early as possible from Nov 1 - Jun 20
- Nov- Jan: limit export to 5000 cfs when 14 day average of X2 is upstream of Collinsville.
- make up water from transfers and purchases

Following wet years (when X2 is west of Roe Island > 90 days)

- Mar-Jun: **do not** impose 1962 LOD X2
- Trigger greater VAMP (start as early as Mar15 and extend as late as June 30) if monitoring indicates high abundance of salmon, delta smelt, and striped bass at risk to exports. If triggered late flows would be only one-half of VAMP.
- Relax E/Is as necessary to fill San Luis.

Jim Buell Scenario

- Accord Base of standards with triggers for relaxation or greater restrictions.
- Full protection for CCWD water supply in Delta.
- E/I standards will be relaxed or more restrictive based on real-time monitoring and salvage. Eventually monitoring and salvage will provide operation rules such that E/I standards can be phased out.
- Flows and exports rules developed under real-time operations will allow X2 standards to be phased out.
- VAMP experiment will be conducted in Phase 1 with real-time monitoring to determine when period should start.
- Flex operations will involve pumping plants and all other facilities in Delta (e.g., DCC, HOR barrier, etc.)
- Triggers will be based on real-time monitoring of relevant biological parameters including salvage, population abundance, distribution, health, and habitat conditions. Surrogate physical triggers such as X2, QWEST, etc will be phased out as monitoring parameters are established that better relate to biological parameters.

Jim White Alternative

- Accord based with restrictions and relaxations
- Nov-Jan: **trigger** - if DCC gates are closed and spring run salvage exceeds ___ salmon per day and/or one half this level if late fall run salvage exceeds 1 or 2% of CWT upriver and Delta groups, respectively. **Action** - then reduce exports to 2500 cfs or E/I of 25 %, or whichever is less export for up to 15 days or a maximum reduction of 75 TAF.
- Nov-Jan: **trigger** - if fish abundance is low. **Action** - then exports can exceed 65% if sufficient storage is available.
- Mar-May: **trigger** - if salmon sampling indicates rearing and migration San Joaquin salmon at Mossdale. **Action** - then concurrent with closure of HOR barrier, extent VAMP for up to 20 additional days in the period Mar 1- May 31 with intervals of no less than 5 consecutive days.