

EWA GAME 5

"WATER USERS' GAME"

Buell's thoughts on how to set up the game and how to play it.

- This is an opportunity to insert those **BIOLOGICAL** assumptions which we believe are supported by some real evidence (data) and/or good analysis into the gaming process. These assumptions may be new, or may be changes in other assumptions used in earlier games. They may also be the "removal" of an assumption with which we disagree (an assumption NOT supported by data or analysis, or contradicted by data or analysis).
- This is an opportunity to insert those **INFRASTRUCTURE** elements which we believe to be appropriate, if there are some that are different from those used in previous games. I am not sure that there will be any, but we need to think about it, and make any changes we think are rational and defensible.
- This is an opportunity to identify those **EXPERIMENTAL** approaches we feel are appropriate, including actually inserting experiments into the game, and making recommendations to CMARP for future experiments and monitoring exercises which will settle long-simmering disagreements or legitimate questions regarding how the delta and the river systems work biologically, hydrodynamically and physically as an integrated whole.
- This is an opportunity to stretch the **OPERATIONAL** flexibility built into the models, and those operations we do by hand, to see if we can "milk" enough biological protection and water supply/quality out of the game models to demonstrate that it's much better to have an EWA, with whatever shortcomings may be associated with it, than to not have it; to demonstrate that an EWA is part of an integrated solution, rather than being an impediment to one, **ESPECIALLY** as compared to other approaches such as "prescriptive standards".

THE SETUP

- We need to identify the nature of the "starting gate" (Day-one-Phase-one??):
- What **PHYSICAL** assets will be in place (expanded Shasta storage? Modern fish screens at CCFB? Delta island storage? Connections between Tracy and Banks? Unlimited Joint-Point? South Delta Barriers? (temporary?) Operable HORB? Expanded groundwater in-out? Expanded pumping at the Projects? Other???)
- Who will "own" or have control of physical assets? Will there be sharing of individual physical assets and associated capacities? How will sharing be accomplished? Will there be

"triggers" for the sharing formulas (e.g. to protect vital water quality parameters or large pulses of fish) will "delta in balance" be one of those "triggers"? If one "trigger" is pulled, will there be some compensatory mechanism to make the other "side" whole?

- What FINANCIAL assets will be in place? Will we start with \$30 - 40 million in the EWA account or some other figure? Will there be a water quality account? Will we have the same or comparable "rules" for water options? Are there any additional "market rules" that should be in place?

- What REGULATORY assets will be in place? How will the various B.O.'s be taken into account? How will VAMP look? Should we have VAMP do experiments during the game(s) to answer real questions or supply vital missing data? If so, how will we justify precisely when and why such experiments will take place; should we have criteria set up ahead of time which will "trigger" an experiment (or cancel it)? Will the Accord be modified for this game (will X2 be relaxed in accordance with an outflow threshold?)

- Other????

THE ASSUMPTIONS

I propose some changes in BIOLOGICAL assumptions:

- Biological consequences of decisions to change or not change operations will be denominated in "adult equivalence" terms. Justification: Although statistically imperfect to varying degrees for Delta species, adult equivalence has been a widely accepted regulatory approach for a long time (decades), especially where early life stages are at stake, and the concept is extremely sound; data on contributions of various earlier life stages to adult life stages for the various species being considered in the game is at least as good as, and in many cases superior to, data on other assumed relationships (X2, Q-west, Vernalis flows, etc.); failure to assume adult equivalence when assessing biological impact is much more likely to result in large errors than assuming it.

- Biological protection decisions will consider adult equivalence gains and/or losses in light of reasonable estimates of the total population (population-level impact) to the extent possible. Justification: Recovery of depressed populations, and conservation of populations in general, require the consideration of population-level impacts, by definition.

- Assume NO project-induced increase in central delta mortality for EITHER Sacramento or San Joaquin salmon (but leave an incremental differential mortality in place for the central Delta v. the mainstem Sacramento (see below)...probably NOT the San Joaquin or its tributaries). Justification: The latest Baysean analysis by Ken Newman of 286 separate

models using the Newman/Rice parameters showed no influence of project operations on Chipps Island Trawl recaptures, and this parameter was rejected as being meaningful.

- Assume that the incremental differential mortality for the central Delta is 50% of what the model presently assumes. Justification: Comparison of ocean (and inland) tag recoveries from the SAME tag groups used to generate the assumptions presently in the model indicates that differential total survival to adulthood of the paired tag release groups is consistently about half that suggested by the Chipps Island Trawl data analyses; furthermore, the ocean tag return data set is much more robust.

- Q-west is not a factor and should not be considered when making fish protection decisions. Justification: There is no relationship between Q-west and any survival index for salmon. An analysis by Hanson and Bratovitch (1993) showed no relationship between Q-west and salmon survival; an analysis of San Joaquin salmon data by the San Joaquin Tributary Exporters for the Settlement Agreement showed no difference in travel time as a function of San Joaquin outflow (Vernalis); Hanson's 1994 experiment did not show movement of delta smelt with a pulse flow (producing a positive Q-west), but there was westward movement after the pulse flow was terminated (resulting in a negative Q-west); real-tide hydrodynamic models show that tidal flux greatly overwhelms any net flow, whether or not induced by project operations, except "net" outward flows produced by large flood events.

- X2 can be relaxed when outflow is less than 20,000 cfs with no adverse BIOLOGICAL consequences; chloride standards should be strictly observed, and protection of water quality should not be sacrificed. Justification: A recent analysis by Miller shows a threshold of 20,000 cfs, above which there is no relationship between biota and X2.

- Salvage of salmon, steelhead, splittail and yearling striped bass will be 85% efficient (from point of capture to point of release, including local release-point predation) at the projects, after subtracting whatever pre-screen mortality is appropriate, given assumed fish protection infrastructure (e.g. whether screens are provided at the entrance to CCFB or not). Justification: Even under present infrastructure conditions, achievable changes in procedures and relatively small infrastructure modifications can result in this efficiency; with assumed infrastructure improvements, this efficiency would be less than is achieved in the region with modern facilities; point of release will be significantly less threatening from a local mortality perspective than remaining in the south delta for these species.

- Salvage of adult delta smelt will be 50% efficient ONLY with improved fish protection facilities. Justification: Recent testing of "fish friendly" pumps at Tracy, which would likely be one of the most fish unfriendly elements in new facilities, successfully pumped gravid adult female delta smelt with no immediate or latent mortality; the ova were stripped and fertilized with captive male sperm, and the offspring are presently being successfully reared at Tracy; this suggests that a 50% efficiency for adult delta smelt is reasonably achievable.

- More ????????????

PLEASE ADD TO AND MODIFY ASAP!

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