To: DNCT
From: Bruce Herbold
RE: Rules of the game
Date: 10 March 1999

INTENT OF THIS PROPOSAL

In this memo I am trying to identify all the aspects of the EWA gaming exercise that I think we have talked about in the last two months. I present this in the form of a proposed set of game rules. By the actual game playing at the end of the month we should agree on

1. what tools we use,
2. how we play, and
3. how we evaluate the results.

In this iteration I am assuming that we make the EWA as large as it could likely be and that we emphasize using the EWA with the fewest prescriptive standards. I suggest this because we already have a model run of the federal scenario from October and I believe evaluation of that model run can be done by a smaller group and will be most informational if we can compare it with an extreme opposite condition. Therefore, the features in this scenario are simply my interpretation of what a likely opposite extreme scenario could be.

I have tried to use everything that has come up in discussions in the subteams, but for some things I have had to make wild estimates. Technical teams, if they are formed quickly, may be able to make better estimates. Evaluate whether these estimates are adequate for the purposes of the game, not whether you believe them to be true, I certainly don't.

TOOLS

Historic salvage data for 1985-1995 should be available. Data should be both in absolute terms and fish per acre-foot.

Historic abundance data for delta smelt, striped bass, the various salmon runs, steelhead, splittail, longfin smelt, green and white sturgeon, and American shad. Species whose abundance or distribution is expected to change due to the Accord (including the winter-run opinion) or upstream AFRP actions should be identified and some process identified to assess how changes called for by the Accord or upsteam AFRP would affect them quantitatively. This will be very crude but is a valuable step in my mind.

A very useful tool would be a reconstruction of what monitoring data might have told us if the present monitoring had been taking place. If DAT members believe there are any logical ways to back-calculate monitoring data from the salvage records it would be good to have them do so. Lacking that, the rules below assume that new, comprehensive monitoring allows the salvage records to be anticipated by one month.

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Historic hydrological conditions from DAYFLO for 1985-1995. Output tables should include:

- Sacramento Inflow at I St.
- San Joaquin Inflow at Vernalis
- Total delta outflow
- X2
- Export rates at each facility
- Total exports
- QWEST
- E/I

Other hydrological data not in DAYFLO

- Shasta storage
- San Luis Storage
- Cross delta channel configuration
- South delta barriers configuration
- Flows on streams affected by upstream AFRP actions

All data should be in cfs for flow measures and TAF for reservoir storage. All tables should be organized by water year (October-September) both daily and monthly values from DAYFLOW and monthly and annual values from DWRSIM.

DWRSIM model run of Accord without E/I and with upstream AFRP. Output tables should correspond to historical data tables.

Spreadsheet available to track the various costs of EWA actions.

Gmodel to track water quality changes.

List of EWA resources consistent with the work of the acquisitions group, including a 122 af contract for each year. Information should include the schedule of repayment required by each major affected user, i.e. how much can we defer paying off until the next low point in SLR?, how much can we defer for one year? How much can we defer for two years?

RULES

1. Historical October hydrology is described.
2. Historical November salvage (and any other relevant, available biological data) are described.
3. Change from historical hydrology is called for by biological team. Available tools to protect each species, (and my estimate of their relationships) are:

Delta smelt adults

1. reduce exports on daily basis reduces entrainment proportionately
2. Improve X2 reduces entrainment 25% per km when X2 is >71

Delta smelt young

1. reduce exports on daily basis reduces entrainment proportionately
2. Improve X2 reduces entrainment 50% per km when X2 is >71
3. VAMP conditions reduce entrainment 2 x proportionately

Sacramento salmon fry

1. Close DCC reduces entrainment by half
2. Reduce exports on daily basis reduces entrainment proportionately

San Joaquin smolts

1. Increase in QWEST reduces entrainment by 50% per 2000 cfs when QWEST<4000
2. Reduce exports on daily basis reduces entrainment proportionately
3. VAMP conditions reduce entrainment 2 x proportionately
4. HOR reduces smolt entrainment by 60%

Spring-run yearlings

1. Close DCC reduces entrainment by half
2. Reduce exports on daily basis reduces entrainment proportionately

Striped bass Eggs & Larvae

1. Increase in QWEST reduces entrainment by 25% per 2000 cfs when QWEST<4000
2. Reduce exports on daily basis reduces entrainment proportionately
3. VAMP conditions reduces entrainment 2 x proportionately
4. DCC reduces entrainment by 50%
5. Improve X2 reduces entrainment 50% per km when X2 is >71

Steelhead

1. Reduce exports on daily basis reduces entrainment proportionately
2. VAMP conditions reduces entrainment 2 x proportionately

For all other species entrainment reduction is simple proportion of export change

4. Modeled hydrology for October is described
5. Modeled hydrology is modified to fill EWA if approved by biological team. Such modifications are limited by the operators' assessment of constraints from flood protection, reservoir release requirements, pumping capacity etc.
5. Differences from historical hydrology to DWRSIM hydrology (or as modified at step 5) are described
6. Water is used to meet whichever tool is already closest to target condition for target species
7. Productivity changes are assessed for salmon, striped bass, delta smelt and splittail
8. Entrainment effects on each species are described as percentage change and total number reduction

EVALUATING RESULTS

Summaries of the game should report (for each month and at the end of each year):
1. Status of the various EWA assets
2. Entrainment effects on each species relative to historical
3. Productivity effects on each species relative to historical
3. Which tools we used each month