TO: DNCT
FR: Bruce Herbold
RE: Scenarios
DATE: Oct 5, 1998

Mike Thabault suggested four categories of operational scenarios that I believe cover the range, with Pete Chadwick's offering being an example of one category. This memo reflects only my understanding of Mike's categories and my efforts to put a little flesh onto some examples of each They do not carry the imprimature of Mike or of anybody else. These descriptions of scenarios are intended to hasten discussion and the fulfillment of our task; none should be considered as proposals of an actual Stage 1 package.

Mike's scenarios only cover operations that affect export pumping rates, they do not address structural issues or water quality issues or habitat protection measures. We have no process in place to identify issues unrelated to export operations. DEFT has discussed several structural, flow and habitat options that are largely independent of the operational tools. Similarly, NoName has identified an array of water supply tools (and is developing water quality tools) some of which have value independent of operational rules in the delta.

As I understand them The four ops scenarios are:

1. Strict accounting of environmental water such that relaxations to the E/I standard are used to provide an exactly equivalent volumetric restriction at other times. The accounting tools of Dave Fullerton and the October 5 scenario of Pete Chadwick are in accord with this scenario.

It is unclear how the increased flexibility, impacts and yield of CalFed water supply projects are accounted under this type of scenario.

2. Use of historical salvage data to estimate the volume and duration of export impacts on all species of interest. These data would allow development of appropriate responses of exports to real-time data on fish distributions. Water supply tools, such as the four recommended for further analysis by the NoName Group would be used to offset the general impact of fish protection actions. This type of scenario differs from #1 principally in the comparison of average and critical period effects on water supply, instead of a strict gallon-for-gallon accounting system for each year. Thus, under this type of scenario, the NoName Group tools might increase yield by 200 TAF and the export restrictions might decrease exports at specific times by 100 TAF but in each year the actual numbers would vary.

3. New baseline operating conditions to enhance recovery of aquatic resources, with the impacts of such new rules offset by the unconstrained use of NoName tools and relaxations of the operating requirements when it could be determined that such relaxations were not harmful to fish.

4. Hybrid combinations of the above such as an extension of VAMP conditions to 2 or 3 months with flexible operations in response to triggers in all other months or new limits on springtime

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exports in critical years but relaxations on springtime exports in wetter years.

ESA assurances seem to become more difficult the more a scenario relies on flexible operations as the basis of protection. Scenario #1 gives little assurance of additional protection to recover threatened species, Scenario #2 could provide substantial protection but says little about what conditions will actually be like in each year, Scenario #3 gives a great deal of certainty of protection by making water supply opportunities carry the burden of proof. A hybrid scenario provides a combination of assurance and flexibility

Following are examples of operations scenarios based on the latter four basic types. Pete Chadwick is developing an example scenario 1A. All of these scenarios assume the structural and habitat features (including X2 at 1962) in the DEFT scenario A. Also included are some of the water supply tools identified by the NoName Group, but the desirability of each tool can vary under different operational rules.

II. Real-time export restrictions:

Scenario 2A. The number of days when the entrained species of concern have been historically subject to salvage is determined for different hydrological and biological conditions. Under similar hydrological and biological conditions that number of days (plus some factor to reflect our imperfect abilities) of export restriction to ____ cfs are available on call by the relevant resource agency. At other times pumping is constrained only by those elements of the 1995 WQCP other than the E/I ratio. Additional protective export restrictions are available through purchase or accounting as under scenario 1A.

A family of scenarios like this can be developed by the level to which exports are held, which may differ under different hydrological conditions or for different targeted species.

Scenario 2B. Same as scenario 2A but with the monthly average export limits conforming to the E/I ratios in the 1995 WQCP

Scenario 2C. Same as scenario 2A but with JPOD and Madera Ranch.

Scenario 2D. Same as scenario 2A but with JPOD, ISDP and Madera Ranch.

Scenario 2E. Determination of the average annual (or critical period) improvements on yield of various sets of the NoName Group tools. That incremental average volume would be available to restrict exports in any individual year. Thus, if a set of NoName tools under no operational constraints could provide 200 TAF of improved yield, then the regulatory agencies could call for export reductions totaling 5000 cfs for 20 days or 2500 for 40 days. In most years the export restrictions could be made up by later pumping so that an increase of supply was assured.

Scenario 2F. Same as scenario 2E but the volume in the environmental account is held to half the average improvement in yield.

Scenarios 2G and 2H. Same as scenarios 2E and 2F but the increments of yield are calculated for different hydrological conditions, thus a tool that is of use only in wet years is not used to justify greater protection in dry years, or vice versa.

2I. BJ's discussions seem to suggest a scenario wherein , when particular densities of fish are encountered at the export pumps, the exports are restricted for a period equivalent to the duration of entrainment impacts under similar historical conditions. I would prefer to leave the fleshing-out of this option to others. One component of this scenario uses the differences in take that have historically occurred at the two facilities, for instance the take of adult delta smelt occurs earlier in the year at the SWP than the CVP, whereas the take of young delta smelt usually peaks a month earlier at the CVP than at the SWP. These differences in timing of impact suggest the possibility of treating the two projects independently.

III. Real-time export relaxations

These scenarios establish background conditions that are protective enough to accommodate all incremental impacts of NoName Group tools.

Scenario 3A. This scenario relies on monitoring adequate to justify increased pumping. Unless spring-run have not left their natal stream and fry of other runs are not abundant in the delta, exports in the November through March period are held to 25% of inflow. Unless delta smelt adults are found mostly outside of the southern delta, exports in February and March are held to 25% of inflow. After San Joaquin salmon smolts have left their natal streams exports are held constant with the appropriate requirements of VAMP. Unless or until most delta smelt young are found north or west of the San Joaquin River, export rates are held to 1500 cfs.

Scenario 3B. This scenario relies on restricting pumping at times of fish sensitivity to times of clearly surplus flow. Water quality benefits are also apt to be substantial. Restrict exports in relation to hydrologic conditions: In the November through July period, hold total exports to 3000 cfs if average salinity at Collinsville is >2.6 mmhos, to 8000 cfs if average salinity at Mallard Slough is> 2.6 mmhos and remove export limits if salinity is <2.6 at Port Chicago (except for the VAMP period). This scenario puts a high premium on implementation of conjunctive use/ groundwater programs.

Hybrid forms.

4A. A combination of improved seasonal protection and sporadic additional protection could include: Extension of VAMP conditions to all of April and May. Ten days of restricting exports to 1500 cfs in February or March to protect adult delta smelt, if the previous year was dry or critical or in March if San Joaquin salmon show early outmigration.. Ten days of restricting exports to 1500 cfs if young smelt are found in the south delta. Restriction of QWEST in November through January to no less than -1500 if spring-run yearlings are likely in the delta.

4B Focus on protection of critical years: Reduce entrainment, which has its greatest impacts on delta smelt in dry years by limiting exports to 10% of inflows in the February through June

period unless monitoring shows the population to be north of the San Joaquin River. Extend VAMP conditions in dry and critical years from March 15 to June 15, or until water temperatures exceed 67 F. Limit exports to 35% of inflow until the Suisun Bay portion of the striped bass index exceeds the delta portion in July.

4C. Focus on augmenting protection in wetter years: If the Accord is adequate to prevent extinction but not to ensure recovery, actions under CalFed might focus on maximizing wet year benefits. Augment Yolo Basin, Sutter Bypass and Paradise Cut flooding by obtaining additional easements to lengthen period of inundation after any initial spills. This may also require the installation of flow control structures in some places. Provide maximum numbers of protective days of low exports in wetter years when fry may be rearing in the delta and many species are more distributed within the south delta than usual. Focus habitat restoration more on Suisun Bay, such as around Wheeler Island in order to take maximal use of wet year hydrodynamic effects on aquatic resources. Additional operational restrictions in drier years might focus on species and life stages that may by listed since the Accord (like salmon, steelhead and splittail) or for which the Accord seems inadequate (newly spawned delta smelt). Such restrictions could be carried over as parts of 4B or others.