

TO: DEFT
FR: Bruce Herbold
DATE: October 12, 1998
RE: Two scenarios

INTENTS AND ASSUMPTIONS

Implicit in the following scenarios are all the structures and habitats recommended by DEFT earlier. Our prioritization of structures and habitats suggests that we should not expect all of the structures and habitats and. In at least one case that would affect the water supply implications of the scenario.

As agreed at the October 7 DEFT meeting these scenarios attempt to maximize two of the three types of operational actions that could affect water supply that have been considered by DEFT to improve biological conditions in the estuary. These scenarios emphasize operational actions to reduce entrainment and improve ecological conditions through combinations of various entrainment reduction schemes with manipulations of VAMP conditions and with manipulations of X2. Extensions of VAMP or of X2 both change likely entrainment effects. VAMP extensions by improving south delta flows and/or reducing exports thereby improving salmon passage rates through the delta and permitting some fish, including delta smelt, to be downstream of the zone of influence of the pumps when the pumps resume operations. X2 improvements, in some months, would alter entrainment effects by increasing flows through the delta while improving the value of shallow habitats in Suisun Bay, thus increasing production and acting to keep more of the young of year delta smelt and striped bass out of reach of the pumps.

I have attempted to address the biological needs for reducing entrainment that were identified in my memos of September 29 and October 9. These are:

- 1 Reduce entrainment effects on young delta smelt during April through June in years when smelt spawn in the south delta.
2. Reduce entrainment effects on adult delta smelt during January through March when they are found in the south delta, which usually occurs following dry years.
3. Reduce entrainment effects on salmon fry from January through March in years with early, very wet storms.
4. Reduce entrainment effects on spring-run in the October through December period in years when the young of year spring-run did not move out the previous spring, this would usually occur following dry springs.
5. Reduce entrainment effects on striped bass in the June through August period, especially if striped bass spawned in the San Joaquin (usually a wet year phenomenon) or is most of the striped bass index is measured in the delta (usually a dry year phenomenon).

In response to discussions with DEFT on October 8 I have added:

6. Reduce entrainment effects on outmigrating steelhead young, generally every year in the February through March conditions.

Scenarios

Both scenarios below attempt to lay out:

1. Methods of providing environmental protection and their rationales.
2. Methods of relaxing requirements and their rationales.
3. Water supply actions to minimize the impacts of protective measures and maximize the value of relaxing requirements.
4. Water quality actions or concerns.
5. A list of the variables that policy makers could use to alter impacts in logically consistent ways.

Hydrological variability is generally in terms of X2 to facilitate discussion and linkages. In some cases other hydrological variables may be more appropriate but since X2 and the X2 requirements both reflect the unimpaired runoff of the system on a monthly time step I generally find them more useful than year types.

Scenario HX2 — Hybrid entrainment control measures and modifications of X2 requirements.

I Exports constrained in response to real-time monitoring as follows:

Trigger:	Response: months	# days	Max exports cfs	Target spp.
QWEST < -2000	Jan-Feb	20	to keep QWEST >-2000	steelhead
see II below	Feb-Apr	15	1500	adult DS
> 50% of yoy DS in San Joaquin River	Apr-June	25	1500	young DS
VAMP flows 7000 or more	May 15- June 30	7	5000	SB spawn in San Joaquin
VAMP flows 3200 or less	July	—	As per July b(2) req.	SB young from Sacramento in delta

downstream shift of X2 by 10 km	Jan-Mar	30	5000	salmon fry rearing in delta
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Springtime E/I ratios relaxed to 45% except as indicated.

II. Following dry years (X2 west of Chipps Island <80 days)

- A. Impose March-June 1962 LOD X2 requirements for the subsequent year.
- B. Close delta cross channel as early and often as possible from November 1 till June 20
- C. Limit November-January exports to 5000 cfs if 14 day X2 is upstream of Collinsville
- D. Arrange transfers and purchases in anticipation of delta export restrictions

Following dry years there are concerns about adult delta smelt abundance being low, adults may be more likely to be at risk of entrainment in February and March, spawning adults in the south delta would lead to young of year smelt being entrained probably in May and June, and spring-run yearlings probably being the dominant outmigrants of their cohort passing through the delta in November through January.

III Following years when X2 is west of Roe Island for > 90 days

- A. Impose March-June 1962 LOD X2 requirements for the subsequent year.
- B. Relax E/I constraints in fall to fill San Luis as early as possible

Delta smelt tend to suffer reduced population sizes in extremely wet years, as well as in critically dry years. Spring-run salmon on the other hand, either move out mostly as young of year in the spring or as yearlings in the following fall. Therefore, following dry years it is more safe to allow high exports in the fall so that exports can be minimized in the spring.

I have used 1500 cfs to represent an intensive restriction for use at times when fish are already at risk in the south delta and 5000 cfs to represent moderate exports that are unlikely to affect fish that are not already in the south delta. The number of days are based on the 1993 studies of Jones and Stokes but should be backed up with data from other years.

Action C would tend to shift filling of San Luis to later in the spring and would have some ancillary water quality benefits. Action E would have its greatest water supply benefits in drier conditions. The experimental Hood diversion would tend to increase QWEST and therefore reduce the water supply impact of this scenario.

These actions target shifting exports around within a year, except for dry years following dry years when ground water would be extracted for environmental transfers. Toward this end ISDP, and the joint point of diversion would be used, with an assumed relaxation of the COE limitation on SWP pumps. Ground water storage should be maximized to permit environmental storage solely for use in second and later years of a drought. No more than 50% of the stored water should be withdrawn in any one year.

Negotiations to achieve a desired balance of export performance and environmental protection

should focus on:

1. the number of days of real time restriction (this may also vary with hydrology)
2. the degree of real time restriction (this may also vary with hydrology)
3. The background levels of protection represented by E/I
4. The number of months and conditions under which X2 requirements are improved

Scenario HVAMP — Hybrid entrainment control measures and modifications of VAMP requirements.

I Exports constrained in response to real-time monitoring as follows:

Trigger:	Response: months	# days	Max exports cfs	Target spp.
QWEST < -2000	Jan-Feb	20	to keep QWEST >-2000	steelhead
see II below	Feb-Apr	10	1500	adult DS
> 50% of yoy DS in San Joaquin River	Apr-June	0	1500	young DS
VAMP flows 7000 or more	May 15- June 30	0	5000	SB spawn in San Joaquin
VAMP flows 3200 or less	July	—	As per July b(2) req.	SB young from Sacramento in delta
downstream shift of X2 by 10 km	Jan-Mar	30	5000	salmon fry rearing in delta

Background E/I ratios relaxed to 45% except as indicated.

II. Following dry years (X2 west of Chipps Island <80 days)

- A Close delta cross channel as early and often as possible from November 1 till June 20
- B. Limit November-January exports to 5000 cfs if 14 day X2 is upstream of Collinsville
- C. Arrange transfers and purchases in anticipation of delta export restrictions

III In response to real-time distribution of salmon, delta smelt and striped bass begin VAMP conditions as early as March 15 and extend to June 30. Flow targets in the March 15-April 15 period should be the anticipated target flows of the VAMP period. After the VAMP period, flows would target flows one step below the VAMP target. Export restrictions at all times

should be those of the VAMP period. In general, if San Luis is full then release water down into Mendota pool to augment San Joaquin flows. If San Luis is expected to be refilled outside of the period of concern, then limit exports as well. If the delta is in balance and San Luis is not expected to fill then restrict exports and reduce upstream releases as appropriate.

Expansion of VAMP by use of water from San Luis can be expected to have several impacts on San Joaquin River water quality and salt balances, delta export water quality, and south delta water levels and water quality at a time when use of the barriers may be most contentious. The flow and export targets outside of the VAMP period and the triggers that would accompany their use should be the subject of negotiation by policymakers. Other issues and negotiating tools are as described under the HX2 scenario.