

DEFT scenario using a specified number of days of export reduction and VAMP-type approach

The premise is entrainment effects are significant to species populations and there are shortcomings of the Accord and current AFRP Delta actions that fail to prevent unacceptable levels of adverse impacts.

This scenario applies days of export curtailment approach to entrainment reduction and the VAMP-type approach to define habitat conditions, with triggers, to accomplish some/all of the additional goals for salmon, smelt, striped bass, steelhead listed below.

We asked if this is a complete list of goals for this exercise. I have modified Bruce's descriptions of several of the salmon-related goals to address his characterizations of the entrainment problem and I re-introduced one goal (No. 6) that we discussed on 10/8 but Bruce left off his list.

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. Evidence from salvage samples is that SJ fry move into the south Delta in years when big storms and high river flows occur in these months. *(SJ fry are more vulnerable to entrainment than Sacramento River basin fry. Other sampling indicates fry from the Sacramento basin move downstream into the Delta every year, however, at least until they attempt to emigrate from the Delta, they are less susceptible to entrainment in the CVP/SWP diversions.)*
4. Reduce entrainment effects on spring-run yearlings in the October through (December) January period. *Yearling emigration is not restricted to the fall of years when it had been dry in the spring. The yearling strategy is primarily an adaptation to slow development and growth of the young life stages cold, higher elevation reaches, e.g. Mill and Deer creeks. Yearling emigration occurs to a lesser degree in lower elevation streams such as Butte Creek. In the Mill/Deer creek situation, I see the yearling strategy not as a dry year phenomenon but as a regular behavior pattern driven by the environmental conditions and critical to persistence of spring run in these creeks. In Butte Creek, most spring run salmon emigrate in the spring. Salmon are probably more likely to hold over during the summer and emigrate as yearlings when the spring has been wet and the creek environment is favorable. If it is dry and the conditions begin to deteriorate in the spring, the juvenile salmon are able to leave. The yearling behavior is more of a volitional behavior exhibited by a distinct minority of fish, mostly in years when the spring is wet, not dry, and therefore probably not critical to the persistence of spring run in Butte Creek.*
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).

6. Reduce entrainment effects on juvenile San Joaquin salmon from mid-March through mid-June.

7. Reduce entrainment effects on outmigrating steelhead young, generally every year in the February through May period.

MY ASSUMPTION IS EXPORT RELATED EFFECTS ARE NOT LIMITED TO CVP/SWP ENTRAINMENT LOSSES. Mortality due to entrainment in local diversions, predation, or other causes increase for migrating juvenile salmon that deviate from their migration route. The longer it takes to find the way through the Delta, the higher the probability of dying there. This is real mortality caused by factors operating in the Delta which occurs at a higher level than it otherwise would due indirectly to the effect of exports on flow patterns and of flow patterns on fish migration. We all recognize that this does not match with everyone's view of how Delta conditions influence fish survival. The relative magnitude of the observable entrainment mortality and the more difficult to quantify "indirect" mortality is a key question in evaluating Delta impacts.

What is the prioritization of these goals, if any? Should priority be based on significance of residual impacts to populations and degree of protection already provided by Accord and AFRP?

DAYS/VAMP scenario

Spring run salmon yearlings in Nov, Dec and Jan

with potential collateral benefits for winter run salmon rearing in Delta, late fall run salmon emigrating through the Delta, and YOY striped bass

- DCC Gates closed when salmon from the Sacramento basin begin to arrive at Delta,
- reduce combined exports at the CVP/SWP by 2500 cfs or 25 %, whichever is less, for up to 15 days:

when expanded salvage of spring run yearling-size salmon exceeds ??? salmon per day

and/or

if the cumulative loss of late fall run CWT surrogates from distinct release groups has exceeded 1 % for upriver or 2% for in Delta release groups, reduce exports as above when salvage is greater than (½ the above value) salmon per day.

Benefit is greater if export reduction occurs at SWP, unless SWP diversion is through screened intake to CCF and current losses in CCF are thus avoided.

Maximum effect on exports: 75,000 AF

Export at greater than 65% E:I may occur in NDJ under conditions determined in real time by fishery agencies, to store water to offset subsequent export reductions. Year to year carryover capability is essential.

SJ salmon smolts in March, April, May

with potential collateral benefits for Delta smelt adults and juveniles, spring run and winter run smolts, emigrating juvenile steelhead, Sac Basin fall run rearing and migrating juvenile salmon, striped bass spawning in lower San Joaquin:

- CVP/SWP export and Vernalis inflow conditions as in VAMP for up to 31 days between March 1 and May 31,
- CVP/SWP exports as in VAMP (single step) for up to 20 additional days between March 1 and May 31, implement for intervals of no less than 5 consecutive days,
- timing based on salmon sampling in the lower Stanislaus, Tuolumne, and Merced rivers and the San Joaquin River at Mossdale,
- Head of Old River barrier closed concurrently with above

Maximum effect on exports: can be calculated in real time but not estimated in advance