

# USE OF WATER FROM FLEXING THE E/I RATIO TO FILL AN EWA CONTRACT

## BACKGROUND

The 95 WQCP permits flexing the E/I ratio away from its default levels in order to reduce entrainment effects on fish.

This option has been little used because:

It is seen by waterusers as an assumption of risk on their part unless the replacement water is pumped in advance of ecological need and

The regulatory agencies have been hesitant to pre-pump water because of a lack of facilities for holding water until entrainment becomes a problem. In addition, under the terms of the Plan any pre-pumped water must be used within six months.

Thus, the default levels have been the main regulatory tool to reduce entrainment and entrainment of delta smelt has exceeded the take limits.

## THE PROPOSAL

The volume of water retained in delta channels due to the E/I ratio varies by month and hydrology, but generally is greatest when fish are most likely to be present and flows are low.

Modeling of changes to the E/I ratio could be used to translate given sets of hydrological conditions into increased annual deliveries of the projects. The increased deliveries could be directly translated into a new contract to contribute to the EWA each year. This contract could be written in such a way that its delivery would not interfere with other deliveries; a time and place of use at San Luis Reservoir on August 30 would ensure adequate storage space was available. This delivery could then be traded for other volumes of water that would otherwise be exported at times of fish entrainment.

The modeling would need to identify all pertinent features that combine to make the

impact of the current E/I ratio requirement an actual decrease in project annual deliveries, rather than a simple shift in the timing and volumes of exports into other times of year. Such model parameters as San Luis carryover, upstream carryover, and the levels of valley accretions in each month. The E/I ratio tends to increase carryover storage so impacts on winter-run cold water pool requirements would also need to be considered.

By closely tying the contract delivery volume to hydrological characteristics where the present E/I ratio constrain operations, the regulatory agencies could be ensured that that level of protection could always be reinstated. However, the ability to offer the contract amount as collateral would greatly facilitate the restriction of exports on an as-needed basis.

The delivered contract amount each year would probably vary inversely with other contract amounts. The 90% exceedence forecasts in February and March would probably tend to overpredict the delivered amount of the contract.

Modeling could be done under a variety of flexible options:

1. At times of year when salvage is dominated by sudden sharp increases, the present E/I ratio is probably most ineffective (thus replacing the limits from May 15 to July 30 with an EWA contract is probably most effective
2. At times when salmon smolts are outmigrating, the broader protection of the E/I ratio may serve to provide a low level of protection over a longer period of time so that retention of some level of E/I requirement would give confidence to fishery managers that rarer species were not being protected (Thus replacing the present limits with a 45% limit from November through April 15 and dedicating any yield above the current level into an EWA).
3. The E/I ratio in its present form can shift more quickly than the general hydrodynamics of the estuary. Thus, replacing the limits with an EWA contract could be limited to times when X2 is below Chipps Island.

## II. Policy Issues and Problems:

The 1995 WQCP will require emendation to permit translating the present requirement with a contractual agreement. This probably cannot happen unless all parties are in favor.

Secondary impacts of a replacement with some or all of the E/I requirements with an EWA contract may have secondary impacts. Such impacts might include carryover

storage for winter-run and upstream reservoir release requirements for salmon spawning.

Export manipulations in years when the EWA contract would be largest might produce unacceptable changes in water quality or stage in the south delta.

Entrainment of species in years when the E/I contract amount is small ( probably mostly in critical, above normal and wet year types) will need to be addressed through other means.

The joint point of diversion is likely to have an impact on yield in years when the E/I ratio would have little effect. Together the two tools might ensure an EWA that is adequate to significantly reduce entrainment in all years.

### III. Technical questions

What hydrological features are the best predictors of increases in total annual deliveries from flexing the E/I constraint?

Likely candidates include:

Nov-Apr monthly upstream storage and 8-river index

Nov-Apr monthly SLR storage and delta inflows

Feb-Apr 50% exceedence forecasted Sacramento Index

What is priority status of contract? Is it the most junior or is it highest since it is based on an implementation of a standard? (Same question would apply to a gallon-for-gallon account). If it is junior, how can the accounting system assure that other users aren't simply increasing their demand to take all water supplied by the E/I flex?

How much does delivery forecast vary from month to month within a year? Do the conditions accompanying this contract conflict with reliability goals for other contractors?

What are the consequences to water quality, water stage, and power accounts:

1. If the contract actually is taken as an increased delivery in some years instead of being used as collateral for a desired pumping outage? How much more energy is used to pump the additional water and how are those costs reimbursed? If the additional pumping can be identified as occurring at times when the E/I ratio is greater than the default values called for in the WQCP it may be easy to track the secondary impacts. These impacts can be

approximated through DWRSIM or similar tools.

2. If the contract is used to impose pumping restrictions without impact on total deliveries? The timing of those restrictions may have impacts which will depend on unforeseeable biological triggers. These impacts might best be anticipated during the gaming process.