

fish screen capable of handling approximately 30,000 cfs at high tides unless flow control structures are added. It is difficult to envision such a facility in the available space unless one of the new high velocity fish screens is proposed for the site. These screens (Eicher or MIS screens) have not been proven for the mix of species present in the Delta, and would present substantial issues for the fishery agencies.

State-of-the-art fish screens (i.e. positive barrier screens) at the site of the J.E. Skinner Fish Protective Facility are more feasible, due to the space available. However, the gains in fish screening efficiency would have to be balanced against the known predation losses in Clifton Court Forebay. These concerns led the Fish Facility Team to recommend new state-of-the-art fish screens at a new intake on the north end of Clifton Court Forebay.

The exact sizing of a fish screen and necessary flow control devices would depend on operations studies and modeling of the tidal amplitudes and CCF storage requirements, work which is yet to be done.

This alternative requires more gates and hydraulic control than stated in the documents. Allowing complete flow control flexibility will be necessary to equalize water levels, prevent pump cavitation and allow for good hydraulic conditions at the fish facilities (especially if located ahead of the forebay).

Two, larger intakes will likely make the South Delta water level/quality impacts more difficult to deal with due to increased CCF filling.

Fish entrainment through the nearly adjacent dual intakes will have little fishery differences with the increased draw of water into the South Delta. It is anticipated that there will be even less of a difference with the construction of barriers, i.e. both draw from the same basic source water.

Recommendation - Modify to provide one fish screen complex at the head of Clifton Court Forebay, as recommended by the Fish Facilities Team, or abandon the alternative. We do not believe the fish entrainment at these two sites to be all that different (especially if the barriers are installed) and may not justify the expense and complications of two, full-sized facilities.

ALTERNATIVE - 1C

This alternative combines the previous components with south Delta improvements to improve conveyance capacities in the south Delta channels and improve water surface elevations and water quality in the southeastern portion of the Delta. Fish facilities concerns would be the same as for Alternative 1B, although the addition of the "flow control structures" could require fish passage facilities. Studies of the interim barriers in the south Delta should provide the information necessary to address these issues.

One advantage of the barriers is that it could provide more flexibility in South Delta water levels management and therefore more flexibility in the fish facility operations. This is in part to a

This modified alternative would look much like the one proposed by Pete Chadwick in an exchange of e-mail earlier this year (See attachment).

ALTERNATIVE - 2B

This alternative is much like Alternative 2A, with the south Delta fish facility improvements. As such it suffers from the same north Delta shortcomings of that alternative. The south Delta fish facility improvements are identical to those in Alternatives 1B and 1C, and suffer from the same problems.

Recommendation - Incorporate the 15,000 cfs north Delta fish screen recommendation from Alternative 2A, and the south Delta fish screen recommendations from Alternative 1C. Close the Delta Cross-channel/Georgiana Slough complex, and provide boat locks and fish passage facilities for upstream migrants. Abandon the use of Snodgrass Slough as a conveyance channel.

ALTERNATIVE - 2C

This alternative cannot stand alone, and is now incorporated into the new Alternative 3I. As discussed earlier, this alternative assumes the use of the existing CVP and SWP fish screens, with the same concerns described in the review of Alternative 1. The predation losses would be expected to increase due to the additional area of "forebay" created by the three arms.

The western arm would take out about one third of the Holland Tract "Habitat Island" proposed as wildlife mitigation habitat for the Delta Wetlands project impacts. This would have to be resolved before either project moved forward.

Recommendation - Although it may be costly, (from an O&M and capital expenses point of view), we believe that the three intake arms should be screened for much of the same reasons as we recommend the intake to the CCF be screened. Operationally, hydraulically controlling the three "arms" on a real time basis will be difficult. These intake screens will require elaborate flow control structures for the intake facilities to operate within reasonable flow limits (tidal filling could be in excess of present CCF inflows). Allowing the fish salvage facilities to remain at their existing locations will suffer from the same problems as listed for Alternative 1 configurations.

If this alternative is carried forward, consider as Alternative 3I.

ALTERNATIVE - 2D

This alternative is identical to Alternative 2B from a fish facilities point of view. As such it shares the same concerns. In addition, the creation of large amounts of "shallow aquatic habitat" along the migratory corridors leading to and from the Mokelumne River could present major problems to anadromous fish migrating into and out of the Mokelumne River system.

ALTERNATIVE - 3B

This alternative is identical to Alternative 2A, with the addition of new and improved fish facilities for the CVP/SWP. Since the fish facilities are in the same locations as presently built, the alternative suffers from the same problems as described for Alternative 1B.

Recommendation - Better than 3A, but questionable overall fish facility benefits. Increase the screened diversion on the Sacramento River, even if only 5,000 cfs is isolated.

ALTERNATIVE - 3C

This alternative is identical to Alternative 3B except for the use of a buried pipeline.

Recommendation - See 3B. The use of a buried pipeline does not change things from a fish facility point of view or to resolve the fish facilities concerns described earlier.

ALTERNATIVE - 3D

This alternative is identical to Alternative 3C except for the use of a buried pipeline.

Recommendation - See 3B. The use of a buried pipeline does not change things from a fish facility point of view or to resolve the fish facilities concerns described earlier.

ALTERNATIVE - 3E

This alternative is for all practical purposes the "Peripheral Canal," and is the preferred alternative of the Fish Facilities Team. As envisioned by the team, all diversions would take place through the screened intake at "Hood." Such an alternative would screen all diverted water at an optimum location, and would eliminate adult migrant straying concerns. This alternative is the least risky from a fish facility operational and performance point of view. It is consistent with the recommendation of the Fish Facility Team.

Recommendation - Carry this alternative forward and adopt it as the preferred alternative, from a fish facilities perspective.

ALTERNATIVE - 3F

This alternative combines all the worst features available, from a fish facilities perspective. The Sacramento River intake is moved downstream to an area of greater tidal reversal, and does not screen the full 15,000 cfs of CVP/SWP export capability. A number of smaller diversions in the central Delta are incorporated, and new fish screens at the site of the existing CVP/SWP fish facilities are suggested. This alternative ignores most if not all of the Fish Screen Team (and its predecessors) recommendations, and is inconsistent with the fish protection goals of the program.

Recommendation - Abandon.