DEFT Team Recommended Programmatic Actions

Draft
For Discussion Purposes Only
September 16, 1998

A. Improve aquatic habitat for resident and anadromous fish for spawning and rearing by restoring a wide range of depleted habitat types.

B. Improve lower trophic level dynamics and foodweb productivity by managing the magnitude and durations of Delta inflows and outflows, as well as the pathways of water flow in the Delta. Improve lower trophic level dynamics and foodweb productivity by managing the magnitude and durations of Delta inflows and outflows, the pathways of water flow in the Delta, the concentrations of nutrients entering the system and other factors which adversely affect productivity.

This opens the door to managing allochthonous nutrient balances and other factors such as exotics.

None of these things (including flows) are easily managed, but man has altered each of these factors and thereby has encurred a responsibility to attempt to manage them. FYI, Alevizon estimates historic Delta Intertidal wetland carbon production at around 900 million lbs organic carbon per year, most of which the system no longer receives.

C. Reduce entrainment of eggs, larvae, and juvenile fish and their foodweb organisms by screening unscreened diversions, upgrading ineffectively screened diversions, and changing operational schemes that would reduce entrainment risks.

D. Increase survival of entrained fish by improving fish collection, handling, and transport at points of diversions in the south Delta.

E. Assist migrating fish through the Delta by establishing appropriate environmental cues such as positive net downstream tidal average flows.

F. Eliminate toxicity of water and sediment in Delta channels by identifying, reducing, and sequesturing inputs of toxins throughout the watershed. Water quality actions to protect instream habitat values must identify the basis of both acute and chronic toxicity to delta fishes. Sources of toxic compounds should be identified and management actions taken to reduce their transport into waterways. Continued bioassays should be monitored to ensure that new compounds are not introduced that negate the value of earlier actions. Protection of delta water quality is likely to require efforts in tributary watersheds as well as within the delta. Until delta waters are no longer acutely toxic to aquatic organisms we cannot expect full effectiveness of any other restorative actions.

G. Reduce body burdens of contaminants and metals in higher trophic aquatic organisms as

necessary to eliminate human health risks from eating these organisms by reducing loadings and mobilization of contaminants and metals.

H. Reduce harvest and harvest rates of weaker wild stocks of Sacramento and San Joaquin salmon by limiting fishing at specific times and in specific areas where wild fish predominate and by limiting harvest to hatchery fish where and when possible.

I. Flexible Operations

Discussions and analyses by the DEFT and its technical teams have highlighted the importance of improving habitat and enhancing success of fish migrations. However, the continuing problem associated with direct entrainment (and concommittant changes in survival in the south delta) has not been satisfactorily addressed for any members by the proposed actions in DEFT scenario A. DEFT Scenario B may greatly reduce entrainment impacts but is not expected to be compatible with the broader CALFED program.

The problems of entrainment are substantively different than most other DEFT and ERPP recommendations. Unlike habitat or water quality improvements, the problems of entrainment are largely species specific, except for the removal of lower level trophic supplies. If trophic impacts can be mitigated by the construction of more productive habitats within the delta then it may be possible to manage entrainment for a few species using monitoring data in the estuary.

Data on patterns of entrainment have recently been the focus of analysis by CUWA/Ag consultants and demonstrate the intermittent and intense impacts that have become common patterns in recent years as attention has focussed on the daily take of endangered species.

We anticipate using entrainment data to identify new tools to avoid reduce entrainment problems by reducing export impacts when the selected species are percieved to be at risk on a daily or weekly basis rather than monthly. Such operations will require reliable short-term monitoring data (such as has been provided by IEP in the last three years), a rapid response process of the export operations, and agreement on a reasonable limitation on the size, frequency and duration of export reductions "and increases". This process could occur without change to the 1995 Water Quality Control Plan by taking advantage of the little-used option to change daily export rates above and below the required longer-term targets.

Modeling of this type of tool will be difficult. Particle tracking and DSM outputs will allow some estimation of the protective value to fish of short-term export restrictions. Water supply effects of such changes in operations cannot be addressed by most of the current modeling tools. Daily models such as Jones & Stokes's Delta SOS Model will probably be the principal tool to

estimate water supply impacts but are not comparable to DWRSIM runs of total system operations. Models currently used by DWR Operations may be enhanced to incorporate the operational changes and then used to estimate water supply impacts. These models consider reservoir operations, Delta requirements, power requirements, and other factors influencing operations. As these models encompass many factors, it may be as easy to use. Other daily models, such as Jones & Stokes's Delta SOS may also be used to estimate water supply impacts, but it may not be comparable because the model currently does not consider total system operations."

As an example of the way this tool might develop,
1.the salvage data may identify a number of days in each month when each species is at risk
2. the average number of times when salvage impacts overlap across species can be calculated to weight the number of days for each species
3. hydrodynamic modeling might show the duration, degree and frequency of decreases in exports required to achieve a given level of protection under different flow conditions for each species. "Under different hydrology or flow conditions, the duration, degree and frequency of decreases in exports required to achieve a given level of protection for each species may vary."
4. the regulatory agencies might then be able to call for export restrictions, consistent with those findings, in order to avoid entrainment rather than having to wait for take limits to be exceeded.
5. On the other days of the month export rates could be relaxed to minimize impacts on deliveries, as long as all other multi-species protection measures are met.

1. This work should be conducted through the DNCT, not the DEFT alone. Insert wherever appropriate.
2. The institutional framework proposed by Fullerton has much higher potential for increased fisheries protection than the approach implicit in #4. We should state so where appropriate and include by reference Fullerton's Real Time Management of Exports paper of 9-3-98.

DEFT Recommended Actions for Stage 1 Implementation

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The DEFT team recommended Stage 1 actions include actions identified in the Common Program, CVPIA program, and actions developed specifically by DEFT. Actions are described below by category.

Structural Changes:

1. A new screened Hood Diversion Facility on the Sacramento River capable of diverting up to 2,000 cfs water from the Sacramento River to the Mokelumne River. The facility would have an alignment as defined for Alternatives 2 and 3, so that those options would not be precluded in the future. Screen operation would be under criteria established by NMFS, FWS, and DFG. The facility would be operated for the following purposes:

   i. Test screening efficiency and bypass mechanisms (Programmatic Action: D).
   ii. Test upstream passage mechanisms (Programmatic Action: E).
   iii. Enable closing the Delta Cross Channel without compromising interior Delta water quality (Programmatic Action: C).
   iv. Improve Delta water quality (Programmatic Action: F).
   v. Improve cues for migrating fish (Programmatic Action E).

This action also has some potential negative effects:

- exposes young salmon to a new screen system
- may impair cues of migrating fish
- may block or impair upstream passage of migrating fish

2. A Barrier at the Head-of-Old-River. The facility would be operated for the following purposes:

   i. Improve San Joaquin salmon survival (Programmatic Action E).
   ii. Improve estuary trophic dynamics (Programmatic Action B).
   iii. Improve water quality in lower San Joaquin River below the Barrier (Programmatic Action F).

This action also has some potential negative effects:

- May impair upstream migration of San Joaquin salmon in the fall
- May impair estuarine trophic dynamics in southern Delta via hydraulic isolation or phytotoxins
- May increase entrainment of organisms living in the central and southern Delta

3. A new Tracy Fish Screen and Handling facility capable of screening 2,500 cfs at 0.2 fps through-screen velocity and 5,000 cfs at 0.4 fps through-screen velocity. This new

facility would screen all water gravity fed or pumped into the Tracy pumping plant. A pump with a capacity of 4,600 cfs would be installed behind the screen. Screen operation would be under criteria established by NMFS, FWS, and DFG. The facility would be operated for the following purposes:

i. May improve survival of salvaged fish at the Tracy pumping plant (Programmatic Action C).
ii. May reduce entrainment at the Tracy pumping plant (Programmatic Action C).

This action also has some potential negative effects:

- There may be some stranded costs if the point of diversion is moved sometime in the future.

4. A new Clifton Court Screen and Handling facility at the northeast entrance to Clifton Court Forebay capable of screening 6,000 cfs at 0.2 fps through-screen velocity and 12,000 cfs at 0.4 fps through-screen velocity. This new facility would screen all water gravity fed or pumped into the SWP pumping plant. A pump with a capacity of 10,300 cfs would be installed behind the screen. Screen operation would be under criteria established by NMFS, FWS, and DFG. The facility would be operated for the following purposes:

i. May improve survival of fish in the south Delta near the State export pumping plant (Programmatic Action D).
ii. May reduce predation of fish in Clifton Court forebay (Programmatic Action D).
iii. More constant export rates (less gulping) may reduce disruption of fish migrations (Programmatic Action E) and reduce exposure of fish residing in or migrating through the central and south Delta to entrainment (Programmatic Action C).

This action also has some potential negative effects:

- There may be conflicts with higher pumping rates (e.g., overpumping screens or exporting water that is not first screened).

Operational Changes

5. Allow higher or lower export rates and changes to export-to-inflow ratios other than those prescribed by Water Quality Control Plan. Seasonal shift pumping rates such as reducing pumping when inflow is low or fish are present in large numbers, or increasing pumping when outflow is high or few fish are present in the south Delta. Provides opportunity to place some water in an environmental account. The export rates would be altered for the following purposes:

i. Reduce entrainment (Programmatic Action: C).
ii. Improve foodweb productivity (Programmatic Action: B).

iii. Protect fish migrating through the Delta (Programmatic Action E).

This action also has some potential negative effects:

- Impacts may shift to other species or life stages.
- May locally impact water quality.

6. Modify flow volumes, distributions, and pathways. Flows may be changed by altering inflows (storage releases), exports, barriers (e.g., DCC, Head of Old River barrier, Montezuma Slough salinity barrier, etc.). Flow would be altered for the following purposes:

   i. Reduce entrainment (Programmatic Action: C).
   ii. Improve foodweb productivity (Programmatic Action: B).
   iii. Protect fish migrating through the Delta (Programmatic Action E).
   iv. Improve fish habitat - (e.g., alter salinity, water temperature, inundate floodplain) (Programmatic Action A).
   v. Improve water quality - (e.g. reduce concentrations of toxins, areas of low dissolved oxygen) (Programmatic Action F).

This action also has some potential negative effects:

- Impacts may shift to other species or life stages.
- May locally impact water quality.

Habitat Actions

The following are specific Stage 1 habitat restoration actions that address Programmatic Action A.

7. Restore tidal freshwater, riparian and seasonal and permanent wetland habitat in the area of the proposed Yolo Bypass National Wildlife Refuge including Prospect, Liberty, and Little Holland island-tracts, and tidal portions of the Yolo Bypass.

8. Create large areas of shallow tidal wetland habitat in the vicinity of Suisun Bay, Sherman Lake, and Big Break.

9. Restore and rehabilitate riparian and SRA habitat along all practicable reaches of major fish migration corridors including the Sacramento River, the San Joaquin River, Georgianna Slough, and Steamboat Slough.

10. Restore and rehabilitate riparian, SRA, tidal freshwater, and seasonal and permanent wetland habitats along the North and South Forks of the Mokelumne (including dead-end sloughs of the Eastern Delta) to bolster migration and rearing of salmon from the Mokelumne and Cosumnes rivers.

11. Restore the habitat corridor of the lower Cosumnes and Mokelumne rivers within and above the Delta including floodplain, riparian, SRA, and wetland habitats to bolster salmon populations in these rivers.

12. Restore a large area of tidal freshwater, riparian, and marsh habitat in the South Delta as a pilot project to test concept of "interceptor habitat".

13. Restore tidal freshwater, riparian, and marsh habitats along the lower San Joaquin River between Stockton and Mossdale as a pilot project to test tidal river floodplain restoration.

14. Restore freshwater, riparian, SRA, and marsh habitats in the floodplain of the Sacramento River below Sacramento as a pilot project.

15. Restore Frank's Tract's fish habitat values including creation of a broad expanse of shallow water and wetland habitats within the tract.

16. Evaluate habitat restoration options in the non-tidal portion of the Yolo Bypass that are consistent with its present flood control and agricultural uses.

Harvest Actions

The following are specific Stage 1 habitat restoration actions that address Programmatic Action H.

17. Explore "bubble fisheries" to protect weak stocks. Requires unique genetic markers to identify weaker wild stocks.

18. Evaluate the feasibility of restricting harvests of weaker stocks by expanding existing restrictions in fishing times and locations for winter run salmon to other weaker stocks including spring-run and San Joaquin fall-run. Requires expanded cwt tag recovery data and analysis, as well as DNA microsatellite marker analysis.

19. Evaluate the feasibility of selective fisheries to protect weaker stocks by evaluating marking hatchery fish, restrictions on fishing methods that have high hooking mortality rates, and abundance of hatchery fish at times and locations in coastal and inland fisheries. Requires expanded cwt tag recovery data and analysis, as well as DNA microsatellite marker analysis.