

Briefing Statement

From: The Smelt Working Group (Working Group)

To: U.S. Fish and Wildlife Service

Date: February 21, 2008

Re.: Factors and process for evaluating flows in Old and Middle Rivers for protection of delta smelt larvae.

Until the new biological opinion for the Operation Criteria and Plan (OCAP) is completed, the Water Projects must comply with the Interim Remedial Order Following Summary Judgment dated December 14, 2007 (Order). The Order requires that the U.S. Fish and Wildlife Service (Service), in consultation with the Bureau of Reclamation and the California Department of Water Resources, set an Old and Middle Rivers (OR/MR) seven-day average flow of 750 cfs to 5,000 cfs towards the pumps (negative flow) to protect delta smelt larvae and juveniles. The action will start at the onset of spawning with flows being set on a weekly basis based upon the best available scientific and commercial information concerning smelt distribution and status.

On December 13, 2007, the Service requested that the Working Group, as part of the process described in the 2005 OCAP biological opinion, formulate a process to develop OR/MR flow recommendations. The Working Group has since evaluated different approaches but agreed that developing a strict decision tree with discrete outcomes would not provide optimal protective measures for the delta smelt. Instead the Working Group will rely on a flexible approach similar to what has been used in previous years to develop recommendations to the Service. The Working Group will evaluate current Delta conditions, available data on delta smelt and output from Particle Tracking Modeling to develop recommendations. The analytical process for evaluating real time data to develop an actual OR/MR flow recommendation is described below. Further, the Working Group has identified the most important factors that will influence recommendations and developed a structured decision process in how to weight the state of each factor.

Determining the OR/MR Flow Minimizing Smelt Larvae Entrainment

To determine what OR/MR flows would provide sufficient protection; the Working Group will examine real-time data and use the latest knowledge about smelt biology and entrainment risk. To do this, the Working Group will use an influence- exposure- intensity-response analysis:

- The Working Group will request that DWR conduct Particle Tracking Model (PTM) runs with current and/or projected Delta conditions to determine the pumps' relevant hydrological influence at different OR/MR flows.

- Smelt larvae exposure will then be determined by comparing the pumps' relevant hydrological influence from PTM results with what is know about smelt distribution using real-time data from surveys and salvage.
- The PTM runs will also provide the relative difference in the fate (i.e. where they end up after a given period of simulated time) of injected particles at different OR/MR flows.
- This information will be used to characterize the entrainment risk of delta smelt at different OR/MR flows.

Based on this and the concern level as described below, the Working Group will develop a flow recommendation for the Service.

Determining Level of Concern

The Working Group recognizes that the above analysis contain several uncertainties. Foremost among these are 1) the ability to identify smelt larvae distribution and 2) the relationship between proportion of particles entrained in PTM runs and actual smelt larvae entrainment. The Working Group also recognizes that the proposed analysis will not be a crystal ball that will give an undisputable OR/MR flow. Rather, the analysis will examine a range of different flows and estimate the resulting levels of protection, all subject to uncertainties. The Working Group therefore identified five factors that will determine the level of concern and help in selecting the appropriate level or degree of protection. The five factors are ordered according to importance and have three concern levels: high, medium, and less concern.

Factor	State
• Previous year's FMWT index	<40 = high concern, >300 = less concern
• Salvage	high numbers = high concern, low numbers = less concern
• Distribution	south = high concern, north/northwest = less concern
• X2 Location	>80 km = high concern, < 75 km = less concern
• Temperature	12° to 25°C = high concern, above 25°C = less concern

The five factors have been chosen based on the following:

Previous year's Fall Mid-water Trawl (FMWT) Index: A low FMWT index indicates low abundance of potential spawners which makes population growth rate more sensitive to loss of individuals. At a high FMWT index the population may tolerate some loss of larvae and juveniles without it affecting population growth rate.

Salvage: Detection of delta smelt in salvage samples indicates that larvae and juveniles are located in the central and south delta and therefore are vulnerable to entrainment. Further, future entrainment will be of more concern as the number of smelt that are entrained increases.

Fish Distribution: The hydrodynamic influence of the State and Federal pumping generally increases from Sacramento River to San Joaquin River to Old and Middle Rivers to the Clifton Court Forebay radial gates and Tracy Pumping Facility intake. Thus, smelt located in the central and south Delta are exposed to greater intensity of hydrodynamic influence than if they were in the north or west Delta.

X2 Location: There is a lot of uncertainty in estimating the distribution of smelt and their exposure to pumping effects from existing surveys, especially at low population abundances. However, the majority of smelt larvae and juveniles are often located just inland of X2 (2 parts per thousand boundary) and an easterly X2 would indicate that the smelt are at greater risk of entrainment by the State and Federal pumps.

Water Temperature: Laboratory studies of delta smelt temperature tolerance has shown increased mortality at temperatures exceeding 25.6°C. Both acclimation to water temperatures and variation in temperatures within the water column would increase water temperature tolerance as it is measured in the environment. Nevertheless, an average three-station Delta water temperature of 25°C is expected to shift distribution of delta smelt juveniles towards Suisun Bay. Most delta smelt remaining in the San Joaquin River portion of the Delta are expected to expire as water temperatures continue to increase over 25 degrees.

If many factors have a “high concern” state, then that will suggest that any uncertainty in the effect of increasing OR/MR (i.e. less negative) should be tipped in favor of protecting delta smelt (i.e. substantially error on the side of the species). We know that the first factor, “previous year’s FMWT index,” is at a high concern state given the 2007 FMWT index of 28, the second lowest ever observed.

Recommendation Process

The Working Group has agreed on a form and timing of recommendations. The Working Group will meet on a weekly basis to develop a recommendation to the Service. The Service will then provide the recommendation to the Water Operations Management Team (WOMT) via electronic mail the day prior to each WOMT meeting.

The following schedule will be followed to generate 1) necessary modeling results, 2) evaluate these results and real-time data, 3) develop a recommendation, 4) providing the recommendation to the Service, and 5) evaluate if and what new PTM runs would be necessary for the following round of recommendations.

Schedule and time frames for SWG meetings and deliveries.

	Mon	Tue	Wed	Thu	Fri
Morning	SWG meeting to develop recommendation				
Afternoon	SWG recommendation to Service	The Service presents SWG recommendation to WOMET	(DWR generates PTM runs)		SWG receives modeling results
	SWG provides modeling inputs to DWR.	(SWG refine PTM request if necessary)			