

**CLOSING COMMENTS OF THE DEPARTMENT OF WATER RESOURCES
FOR THE PUBLIC INFORMATION PROCEEDING
TO DEVELOP FLOW CRITERIA FOR THE DELTA ECOSYSTEM
NECESSARY TO PROTECT PUBLIC TRUST RESOURCES
APRIL 14, 2010**

INTRODUCTION

At the conclusion of the public informational proceeding to develop flow criteria necessary to protect Delta public trust resources (Proceeding), the State Water Resources Control Board (State Water Board) stated that parties could summarize their recommendations as to what flow criteria is necessary. The Department of Water Resources (DWR) provides below its summary of recommendations addressing topics included in the State Water Board's March 25, 2010, email from Mr. Crader.

Mr. Crader stated that closing comments should summarize the flow criteria, including the volume, quality, and timing of water that would be necessary to protect public trust resources in the Delta under current conditions. In addition, parties may include in their closing comments, recommendations regarding: adaptive management, variable flows, flow measures that can and should be developed and implemented immediately, and possibilities for future scientific collaboration on flow-related measures.

RECOMMENDATIONS

1. Recommendations Regarding Flow Criteria, Including the Volume, Quality, and Timing of Water, Necessary to Protect Delta Public Trust Resources.

DWR recommends that the numeric Delta flow criteria should not differ from the current outflow objectives included in Water Right Decision 1641 (D-1641). For reasons explained below, DWR believes that D-1641's outflow objectives provide a reasonable basis for the necessary flow criteria under current conditions and pending possible future changes in the Delta arising from the Bay Delta Conservation Plan (BDCP).

DWR recommends the existing D-1641 flow and water quality objectives as the criteria developed from this Proceeding because the D-1641 Delta outflow objectives are intended to provide a reasonable level of protection to the Delta's fish and wildlife beneficial uses that stabilize or enhance the conditions of aquatic resources. While the effectiveness of the current flow and water quality objectives should be examined as scientific knowledge increases, they were thoroughly vetted and analyzed during State Water Board proceedings and litigation, and were found to be both reasonably protective and reasonably implementable (with some exceptions coming to light in recent years). As such, the State Water Board should look to the existing objectives when developing the flow criteria as the foundation for protecting the Delta fishery and should only modify or discard these criteria if the best available science provides

substantive evidence that a change from these criteria is needed and other reasonably feasible criteria can be implemented. Water Code section 85086(c)(1) provides some guidance by stating that in developing the flow criteria, “the board shall review existing water quality objectives and use the best available scientific information.” This language suggests that the current objectives are the starting point in the development of the flow criteria and that the best available science is the tool by which the State Water Board makes any necessary adjustments to the current flow regime. Thus, if the best available science does not require or allow for a change to the current D-1641 objectives, it is reasonable for the State Water Board to maintain those objectives and recommend them as the flow criteria from this Proceeding.

As a summary of these flow criteria, a chart developed by DWR showing D-1641’s numeric Delta outflow requirements is provided in Attachment 1. The bars in the chart demonstrate when particular criteria are active and the range of flows that are required for each criterion. The footnotes further explain what flows are required for the criteria in different water year types. Importantly, the Habitat Protection Outflow represents the often-called “X2” objective.

Basis for Maintaining Current Flow Objectives

The information presented to the State Water Board during the Proceeding supports a finding that the best available science does not require the development of new numerical outflow criteria. Participants at the Proceeding explained that the relationship between aquatic resources and Delta outflow is complex. Delta outflow is only one of many factors affecting fish populations in the Delta and the underlying causal mechanisms between Delta outflow and fish abundance are not well understood.

The evidence demonstrates that, sometime after the year 2000, the abundance of many Delta fish species underwent a decline, or “step change” and that flow alone does not account for the decline (Thomson et al. 2009). Analysis shows that the statistical relationships between outflow, as measured by X2, and fish abundances are deteriorating. Moderate to wet years after the year 2000 no longer resulted in the expected production of several pelagic fishes (Sommer et al 2007; Kimmerer et al. (2009)). These analyses suggest that there are factors other than flow causing adverse impacts on the Delta ecosystem and fish and these factors appear to limit the current flow regime’s effectiveness in benefiting the species. Flow should be considered as part of a suite of factors. The evidence demonstrates there has been a recent ecosystem change that does not appear to be explained by flow. Without recognizing, quantifying, and addressing the companion factors, water management focused solely on flow will be an inefficient tool that may not result in recovering the species. As such, the Board should focus on identifying and addressing the other factors and maintain current outflow that has been developed to benefit Delta fish. One example of these factors we and others discussed at the State Water Board’s proceeding was increased nitrogen loading and change in nutrient relationships that could account for the reduction in diatom production and pelagic fish food web. As we pointed out, food drives fishery production. The State Water Board needs to be actively involved in

understanding and correcting this phenomenon before making changes to the flow criteria.

Importantly, DWR's recommendation that the Water Board should accept the current D-1641 outflow objectives for the outcome of this Proceeding does not mean DWR believes the objectives are fully adequate. X2 remains a fairly crude mechanism for ecosystem management. DWR recognizes that X2 can be a useful indicator, but the recent deterioration of several of the X2 relationships suggests that other mechanisms have begun to dominate, and that better information is needed about the mechanisms. Thus, the ongoing Delta studies and investigations initiated in connection with the Pelagic Organism Decline, the BDCP, and the ongoing evaluation of D-1641 and the federal delta smelt and salmonid Biological Opinions provide exceptional opportunities to gain important understanding of the relative importance of various factors affecting public trust resources and the relationship of outflow to each factor. However, at this time, the science and understanding developed from those studies do not provide a basis for developing criteria that differ from the current D-1641 outflow objectives.

DWR also recommends that the State Water Board not develop criteria based on the specific conditions set forth in the federal delta smelt and salmonid Biological Opinions (BO). While any Delta outflow criteria must be consistent with the conditions set forth in the federal BOs, the State Water Board should not adopt numeric criteria based on those conditions. The Biological Opinions are currently being litigated and the conditions prescribing fish protection may change. For example, actions related to limiting flow reversal on the Old and Middle Rivers (OMR) are restrictive of the State Water Project (SWP) and Central Valley Project (CVP) (collectively, Projects) operations and there are important disagreements concerning the OMR values required by the BOs. If the State Water Board believes it should address the BOs as part of this Proceeding, DWR recommends that the State Water Board only address the need for consistency between the Proceeding flow criteria and the conditions in the BOs. DWR explains below some reasons why the State Water Board should not look to the BOs for developing flow criteria for this Proceeding.

The fundamental issue many parties believe needs to be addressed regarding the OMR requirement is whether and how salvage (or entrainment) numbers actually affect delta smelt population size. The State and Federal Water Contractors (SFWC) provided testimony addressing this issue. (See SFWC Ex. 2, pp. 17-26.) DWR largely agrees with the position put forward by the SFWC. Essentially, salvage must be "normalized" in relation to the abundance of delta smelt in the system in order to properly gauge whether the salvage will actually have an effect on the overall population. (*Id.* at 18.) Moreover, investigations confirmed that OMR reverse flow rates have no correlation with the rate of normalized salvage until OMR reverse flows are more negative than -6,100. (*Ibid.*)

DWR agrees that peak entrainment events of various fishes (like those that occurred in the early 1990s) should be limited and measures should be implemented to prevent occurrences of entrainment that adversely affect the sustainability of fish populations.

However, DWR believes that the approach set forth in the delta smelt BO, which does not impose measures tied to peak entrainment events, is inappropriate, and, as a result, is unlikely to have a significant impact on smelt population abundance and is unduly burdensome on the Projects.

A second example of why the Board should not adopt criteria for this Proceeding based on the BOs is the questionable basis for the fall X2 management for delta smelt. The delta smelt BO proposes to maintain X2 in the fall at 74 km and 81 km in wet and above-normal years, respectively. This action is achieved primarily through releases from Project reservoirs and its objective is to increase the quality and quantity of habitat for delta smelt growth and rearing, as defined by X2. This action will require a great deal of water to accomplish an objective that The National Research Council reviewed and opined, “[t]he controversy about the action arises from the poor and sometimes confounding relationship between indirect measures of delta smelt populations (indices) and X2. The weak statistical relationship between the location of X2 and the size of smelt populations makes the justification for this action difficult to understand.” (*A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California’s Bay Delta*, Committee on Sustainable Water and Environmental Management in the California Bay-Delta; National Research Council (2010) at 40, 41.)

In sum, DWR believes it would be inappropriate for the State Water Board to set any numeric criteria for OMR or fall X2 measures in this Proceeding. Both actions are the subject of current litigation and could be modified in the near future. Also, the statistical justifications for both actions have been questioned and appear weak, and some parties believe that the actions are unlikely to result in any significant improvement for the delta smelt population. The State Water Board should, instead, consider the requirements of the BOs for purposes of preventing inconsistencies and conflicts with any flow criteria developed during this Proceeding.

2. Recommendations Regarding Adaptive Management

DWR believes that adaptive management related to the Delta flow regime will be a useful and necessary management process when, and if, any new flow criteria get implemented. According to *The State of Bay-Delta Science 2008*, adaptive management is a “management process by which policies are implemented as though they were experiments[.]” (*The State of Bay-Delta Science 2008*, CALFED Science Program (2008) at 161.) While a promising management approach, adaptive management is difficult to implement in ecology and environmental sciences where predictions have high uncertainty.

“Ecosystems respond in complex and non-linear ways to stressors, sometimes absorbing stress for a long period with seemingly little change, then rapidly changing to a new stable configuration. . . .

The multifactorial (wicked) nature of environmental problems and the difficulty of sorting out cause and effect are well illustrated by the POD. Despite intensive study and analysis, researchers cannot determine whether the rapid decline of four pelagic species in the Bay-Delta has a common cause or is merely coincidence. Nor is it possible to narrow the potential causes much, to assess the relative importance of the various candidate causes with existing data, or to specify the quantitative benefits of any potential solution. . . . The appropriate approach is to treat any management action to address the POD as an experiment that can help us understand what is driving the decline.” (*Ibid.*)

By implementing adaptive management, the management program, itself, becomes a source of new information about the cause of the decline. (*Ibid.* (citing Lee 1994).)

DWR generally agrees with using adaptive management in managing the Delta’s ecosystem. If it is to be used, however, DWR supports a “bottom up” functional approach identified by the Delta Environmental Flows Group, as opposed to simply “dialing up” X2. As stated before, management of flow by itself may be relatively inefficient if the basic mechanisms underlying the linkages between flow and abundance are not understood and not addressed. Thus, to truly apply adaptive management, we need to break down the action into component parts, with specific testable hypotheses about the mechanisms and expected outcomes. Then the costs of providing the measure and the monitoring plan must be evaluated to make sure both are reasonable and implementable.

At this time, there is insufficient information and understanding to reassemble or develop a new Delta flow regime. Instead, we should be looking at what we are already doing and attempt to better understand the casual mechanisms that are driving key fishery trends that are a concern. Some of these types of studies are being conducted and planned as part of the new Interagency Ecological Program work plan. Also, the BDCP process has done extensive work on the stressors in the Delta system and developed specific conservation measures to address many of these stressors.

3. Recommendations Regarding Variable Flows

Some parties to these Proceedings believe that the Delta flow regime needs to be variable and closely related to the natural hydrology in a particular year. However, providing more variability in the Delta flow regime is likely to have consequences, both great and small, that need to be identified and addressed before any major change is proposed in the current flow regime. For example, allowing salinity to intrude during dry years may benefit the ecosystem by controlling invasive species such as the clam *Corbula*. However, there is also evidence that delta smelt often do poorly in dry years. As a result, there is a *Flow Variability Paradox* – periodic major salinity intrusion may be a good thing for the ecosystem, but bad for delta smelt (Moyle et al. 1992; Feyrer et al. 2007). Moreover, additional salinity will also likely affect municipal and agricultural uses in the Delta. Lastly, Project operations are mostly determined by looking at past data,

e.g., the previous month's rainfall and runoff, and the Projects often do not know how the water year will end until far into the spring months. Thus, any attempt to add variability into the flow regime must take into account the inability of the Projects to accurately predict future conditions. The bottom line is that flow variability targets need to be considered in relation to the landscape, both present and future, other water quality objectives, and the limited flexibility the Projects have in controlling underlying hydrologic conditions. .

4. Recommendations Regarding Flow Measures that Can Be and Should Be Developed and Implemented Immediately

DWR is unaware of any new flow criteria that can be and should be developed and implemented immediately. The federal BOs and D-1641 are intended to provide sufficient protection so that the Projects' activities will not jeopardize the continued existence of the sensitive species. Anything above that level of protection should go through the State Water Board's statutory process of developing water quality objectives and assigning responsibility to various parties to implement those objectives. The State Water Board process will take considerable time. DWR recommends that the State Water Board continue with its schedule of actions described in its Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.

5. Consideration of BDCP Activities

According to Water Code Section 85086, subdivision (c)(1), the purpose of the Proceeding is to inform the planning decisions for the Delta Plan and BDCP. As an agency whose operations and activities will be greatly affected by the outcomes of the BDCP, and the lead agency pursuant to the California Environmental Quality Act responsible for evaluating the ecosystem restoration and water conveyance alternatives identified by the BDCP, DWR has a unique perspective on the final product of this Proceeding.

DWR and the BDCP Steering Committee have been working on conservation activities for more than three years and have identified some flow criteria that will be analyzed in the habitat conservation plan analysis currently underway. In addition to addressing other stressors and various forms of habitat restoration, the BDCP has been discussing flows within the conveyance changes being investigated. Some of the principle flows being compared are bypass flows on the Sacramento River after an intake and Net Delta Outflow. The information being developed in the BDCP process should be very helpful to the State Water Board in its current proceeding and in future proceedings.

CONCLUSION

DWR recommends that the State Water Board use the D-1641 Delta Flow objectives as flow criteria to recommend to the Delta Stewardship Council. In addition, the State Water Board should recommend that the Council, during its development of a Delta

Plan, consider relevant factors besides flow that have been identified as affecting the health of the Delta ecosystem and fishery. Finally, DWR supports use of appropriate adaptive management tools and reasonable variability in Delta flows to achieve beneficial conditions for the sustainability of Delta species.

ATTACHMENT 1

Bay Delta Standards

By DWR Staff