

**Flow Science Incorporated**

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April 14, 2010

Division of Water Rights  
State Water Resources Control Board  
Attention: Phillip Crader  
P.O. Box 2000  
Sacramento, CA 95812-2000

**Re: Delta Flow Criteria Closing Comments**

Dear Mr. Crader:

Flow Science, on behalf of the City of Antioch, appreciates this opportunity to submit closing comments to the SWRCB regarding its development of Delta Flow criteria for the purpose of informing planning decisions for the Delta Plan and the Bay Delta Conservation Plan.

Our closing comments include key points and recommendations for SWRCB consideration, supported by our written testimony and exhibits and the oral testimony provided at the hearings on March 22-24, 2010. Because we do not have the biological expertise to recommend specific flow rates and flow volumes, we are not providing specific quantitative recommendations with this submittal.

At the March 2010 hearing, we suggested that it may be useful for the SWRCB to consider a process of simultaneously working from the “bottom up”—identifying the flow needs of fish—and working from the “top down”—analyzing flows that can be provided by the current system and systems operations, in the context of other beneficial uses, including upstream flow and temperature requirements, and water supply needs. On behalf of the City of Antioch, I would be happy to work with SWRCB Staff to explore the advantages of such a process and to participate in such a process.

**Key Points for SWRCB consideration**

As discussed in our February 16, 2010, written submittal, the City of Antioch has been diverting water for drinking water use from the western Delta since the 1860s. In its written testimony, the City of Antioch has provided the SWRCB with information and data on historical flows and salinity conditions in the western Delta (testimony submitted by the City of Antioch on February 16, 2010, and incorporated here by reference in its entirety; see [http://www.swrcb.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/deltaflow/antioch.shtml](http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/antioch.shtml)). Key points in the City’s oral and written testimony include the following:

**1. Historical fresh conditions must be considered in any effort to restore ecological conditions in the Delta.**

We believe that it is essential for the SWRCB and its Independent Science Team to consider the historical salinity and flow conditions within which the Delta fisheries thrived, to ensure that the Delta flow criteria and other standards will ensure the protection of public trust resources, i.e. the future biological and ecological integrity of the Delta.

Systemic changes in the Delta over the years have reduced freshwater flows and dramatically increased salinity (Antioch testimony, Document #5, p. 1). Infrastructure and flow diversions have changed distribution and timing of freshwater flows, and historic conditions were far fresher than current conditions (Antioch testimony, Document #5, p. 2-4 & Document #6, p. 16-21).

It has sometimes been contended that the Delta was historically saline. As mentioned in our oral testimony (and as documented in the City's written testimony at p. 4-5 of Document #5), while the system experienced variability in flows and salinity in the past, the variability existed in a significantly fresher Delta, especially in the fall, spring and early summer months. As shown in Contra Costa Water District's submittal "Historical Freshwater and Salinity Conditions in the Western Sacramento-San Joaquin Delta and Suisun Bay" (at p. v and p. 47), while variability occurred historically, the levels of salinity were much lower than current conditions.

**2. Native species are adapted to historical conditions, so historic salinity and flow patterns must be considered in establishing appropriate flow and salinity standards.**

Our oral testimony during the March 2010 Informational Proceeding outlined the changes that have occurred to alter the flow and salinity environment in the Delta. This testimony on such changes was supported by other panelists. These changes include, in approximate chronological order:

- Alterations to Delta channels and loss of marshlands (Antioch testimony, Document #5, p. 1-2 & Document #6, p. 7)
- Alterations to sedimentation and transport patterns (Antioch testimony, Document #6, p. 7)
- Diversions of flows upstream of the Delta including the dewatering of significant portions of the San Joaquin River (Antioch testimony, Document #5, p. 2 & Document #6, p. 14-15)
- Diversions/exports of flows from the Delta and from Delta channels themselves (Antioch testimony, Document #6, p. 8 & p. 16)

**3. Because of these changes to the Delta, flow now plays a more crucial role than in the past, in order to maintain or improve physical habitat and water quality in the Delta.**

We encourage the SWRCB to explore and document the biological significance of the historical changes in flow and salinity regimes, and to consider this information in its recommendations. It is critical to keep in mind the significance of Sacramento River flows on the health of the public trust resources in the Delta.

**Closing Recommendations**

1. SWRCB should review, consider, and incorporate historic salinity data into its Flow Criteria analyses. The City of Antioch and Contra Costa Water District have provided valuable data regarding historic Delta flow and lower salinity conditions.
2. SWRCB should use historic flow and salinity data to establish a baseline of water quality and flows sufficient to restore public trust resources in the Delta.
3. SWRCB should ensure that flows are not reduced, nor salinity increased, beyond levels assured by D-1641 and current X2 requirements. Ideally, the SWRCB should increase flows to more proximate historic conditions of outflow and low salinity. The City is not recommending that historic flows be completely restored as this is not practical and could potentially impact other beneficial uses. However, historic flows and historic low salinity levels supported native species and must be considered in making any determinations on restoring Delta flows.
4. Compliance points for outflow and salinity should not be moved land-ward (easterly) and should likely be established more westerly than present as supported by the historical data.
5. Due to the loss of historic San Joaquin River flows, it is critical that Sacramento River flows be maintained in and through the Delta – and that the SWRCB recognizes that such Sacramento River flows included significant flows into the Central and Western Delta through Georgiana and Three Mile Sloughs.
6. SWRCB should consider using Antioch’s gauging station as a ‘point of interest’ to gauge flow and salinity conditions, given Antioch’s historical diversion of fresh drinking water dating back to the 1860s.

Please feel free to contact me or Phil Harrington with any questions.

Sincerely,

A handwritten signature in blue ink that reads "Susan C. Paulsen".

Susan C. Paulsen, Ph.D., P.E.  
Vice President and Senior Scientist

cc: Phil Harrington