



# Delta Independent Science Board

980 NINTH STREET, SUITE 1500  
SACRAMENTO, CALIFORNIA 95814  
WWW.DELTACOUNCIL.CA.GOV  
(916) 445-5511

February 18, 2016

Mr. Mark Cowin, Director  
California Department of Water Resources  
P.O. Box 942836, Room 1115-1  
Sacramento, California 94236

Ms. Felicia Marcus, Chair  
State Water Resources Control Board  
1001 I Street, 25<sup>th</sup> Floor  
Sacramento, California 95814

Mr. Randy Fiorini, Chair  
Delta Stewardship Council  
980 Ninth Street, Suite 1500  
Sacramento, California 95814

**Chair**

Jay Lund, Ph.D.

**Chair Elect**

Stephen Brandt, Ph.D.

**Past Chair**

Tracy Collier, Ph.D.

**Members**

Brian Atwater, Ph.D.  
Elizabeth Canuel, Ph.D.  
Harindra Fernando, Ph.D.  
Richard Norgaard, Ph.D.  
Vincent Resh, Ph.D.  
John Wiens, Ph.D.  
Joy Zedler, Ph.D.

Re: Modeling Barriers and Levee-Break Effects on Delta-Wide Salinity

We recommend that the State Water Resources Control Board and the Department of Water Resources co-sponsor a modeling study of the effects of barriers and island flooding on salinity throughout the Sacramento–San Joaquin Delta. Such an analysis should make efficient use of limited budgets and technical capabilities, and provide a common transparent basis for a range of Delta management decisions and agencies:

- State Water Project and Central Valley Project planning, operations, and regulation
- Water quality control plans, permits, and other water quality regulations
- Risk assessments and responses for Delta levee failures
- Delta levee investment policies and decisions
- Emergency planning for responses to levee breaches
- Installation, and operation of barriers for drought, water quality, and fish movement
- Delta-wide water quality impacts of local habitat restoration activities
- Local, state, and federal planning and permitting for wastewater discharges and water diversions for a range of plausible conditions
- Integrated analysis for management of flows for fish
- Adaptive management of habitat restorations and water supplies

This recommendation was prompted in part by two excellent talks at the October 2015 meeting of the Delta ISB on hydrodynamic model applications to explore salinity and flow impacts of drought barriers and Delta island flooding. Flow barriers (e.g., to prevent salinity intrusion) and island flooding (e.g., from levee breaks or restoration) can have widespread impacts on water quality, driven by complex interactions of tidal and stream flows with bathymetry, water bodies, run off, soils, and mixing. These

Mr. Mark Cowin, Ms. Felicia Marcus, Mr. Randy Fiorini

February 18, 2016

Page 2

effects and interactions are most reliably predicted through hydrodynamic modeling, particularly for future conditions.

State, federal, and local agencies, universities, and consulting firms have substantial hydrodynamic and water quality modeling capabilities that could be employed to address broad management and policy questions for a range of Delta problems. Understandably, almost all modeling efforts are currently focused on urgent project-specific management and regulatory needs, but this comes at the expense of broad system-level understanding and management of Delta water flows and quality.

The shared effort that we recommend should include knowledgeable State, federal, and local agencies and stakeholders, as well as academic and independent experts in its planning, funding, and peer-review. The study should consider Delta salinity and flow effects for a variety of locations and water years under both current and future conditions (e.g., with sea-level rise and varied inflow levels). Where possible, it would be useful to employ publicly available open-source models, with results and model output made available for additional analysis (such as transport of additional water quality constituents).

The cost and duration of an initial systematic study need not be large. The study can largely use existing data and modeling capabilities (the best available science). The analysis should yield a shared, coherent, and transparent scientific basis for many important Delta decisions, and would better focus (and often obviate) further project-specific studies. A peer review and assessment of uncertainty of model predictions, and attention to model testing and validation would support this work.

This is an opportunity for agencies and others to jointly conduct technical work of mutual importance to provide a common and more coherent knowledge base for making a range of important Delta decisions.

All involved in the Delta realize the arduous demands on agencies, experts, and stakeholders. Policy issues are multi-faceted and decisions are far reaching. The approach we suggest is an opportunity to consolidate and build understanding across agencies, and will lead to broader and more far-reaching policy insights.

Thank you for considering our recommendation for a project that seems both timely and broadly important. We can gladly discuss details of our recommendation.

Sincerely,



Jay Lund, Chair

Delta Independent Science Board

cc: Charlton Bonham, Director, California Department of Fish and Wildlife  
Campbell Ingram, Executive Officer, Delta Conservancy  
Erik Vink, Executive Director, Delta Protection Commission,  
Mark Sogge, Regional Director, US Geological Survey