

# **Delta Flow Criteria Informational Proceeding**

Before the

State Water Resources Control Board

Scheduled to Commence

March 22, 2010

## **Exhibit CCWD-3**

Statement of Qualifications of Deanna Sereno

Associate Water Resources Specialist

Contra Costa Water District

Submitted on behalf of

Contra Costa Water District

P.O. Box H2O

Concord, CA 94524

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Exhibit CCWD-3  
Statement of Qualifications of Deanna Sereno  
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### **EDUCATION:**

- Ph.D. Civil & Environmental Engineering, **University of California, Berkeley**, expected 2010  
Environmental Fluid Mechanics
- M.S. Civil Engineering, **University of Kansas**, 1996, with honors  
Water Resources Engineering
- B.S. Civil Engineering, **University of Kansas**, 1992

### **DISSERTATION:**

*"Turbulent mixing and circulation in shallow, subtidal habitats"*  
Advisor: Prof. Mark T. Stacey

This work examined the influence of wind and submerged aquatic vegetation on the hydrodynamics and mixing in two shallow, subtidal flooded islands in the Sacramento-San Joaquin Delta. Timeseries of velocity, suspended sediment, and temperature were collected and analyzed to extract mean flow and turbulent characteristics, thermal stratification, and suspended particle dynamics. Synoptic velocity mapping with repeated water quality sampling was processed to determine exchange dynamics between the lake and surrounding channels.

Although tidal velocities are relatively low, mixing in both environments, together with nighttime cooling, is sufficient to prevent persistent stratification. Bed stress and suspended sediment concentrations during a spring storm were nearly an order of magnitude greater than typical values produced by the tidal flows. Velocities and turbulence within and above submerged aquatic vegetation resembled the structure of a mixing layer rather than a bottom boundary layer. These results were used to calibrate a water column model and evaluate different parameterization methods for submerged vegetation.

### **CURRENT POSITION**

2006-present **Associate Water Resources Specialist**  
Contra Costa Water District

- Represent the District and review technical studies in support of statewide planning activities, such as the Bay Delta Conservation Plan.
- Analysis of real-time hydrodynamic and water quality conditions in the Sacramento-San Joaquin Delta to inform water supply operations.
- Perform modeling of California hydrology and water operations and of Delta hydrodynamics, water quality, and fisheries for District capital projects such as the Alternative Intake Project on Victoria Canal and the Los Vaqueros Reservoir Expansion Project

- Conduct scientific studies and investigations in areas such as the effect of operational decisions on water quality, salmon, and smelt in the Delta.
- Development and maintenance of a suite of modeling tools to evaluate transport and residence time in the Sacramento-San Joaquin Delta as a proactive approach to emergency spill response.
- Manage tasks associated with a state-funded water quality project under contract to Reclamation District No. 800 to implement a bio-filter on Lower Kellogg Creek.

**RESEARCH EXPERIENCE:**

1999-2005     **Research Assistant**

Civil and Environmental Engineering, University of California at Berkeley

- Designed and led several data collection efforts in the Sacramento-San Joaquin Delta. Collaborated and coordinated with other institutions and agencies to organize and optimize resource utilization.
- Analyzed field observations and developed analytical models to evaluate exchange dynamics, determine the impact of aquatic macrophytes, and assess the effect of wind-driven currents and mixing in shallow, subtidal basins.
- Evaluated parameterization methods for incorporating submerged aquatic vegetation into numerical models, considering the physical dynamics and vertical structure as well as the numerical implementation issues.
- Performed extensive calibrations of acoustic and optical instruments to evaluate the use and limitations of backscatter data as a sediment surrogate for the particles found in shallow systems in the San Francisco Estuary.

1993-1994     **Research Assistant**

Civil Engineering, University of Kansas

- Conducted laboratory experiments and numerical simulations to determine the angle of attack at bridge piers. Numerical models employed the pseudo-two-dimensional stream-tube approach (incorporated in WSPRO) and a two-dimensional finite element model (FESWMS-2DH).
- Determined the effects of angle of attack on the depth of local scour conditions at bridge piers using the methodology presented in FHWA-IP-90-017 “Evaluating Scour at Bridges”

**TEACHING EXPERIENCE:**

Spring 2001     **Teaching Assistant**

Civil and Environmental Engineering, University of California at Berkeley

- Led a weekly discussion section for “Hydrologic Mixing Processes” consisting of a 45 minute lecture followed by interactive discussion. Graduate course explored transport and mixing in surface water systems.

Fall 1993,     **Teaching Assistant and Lab Instructor**

Spring 1994     Civil Engineering, University of Kansas

- Led a weekly discussion section and instructed the laboratory section for “Fluid Mechanics”, an undergraduate introduction to the dynamics of incompressible fluids.
- Worked with water resource faculty to re-design many laboratory experiments on various topics in fluid dynamics, including both free-surface and pressurized flow.

- Summer 1993      **Lecturer**  
Civil Engineering, University of Kansas
- Taught a summer class titled “Strength of Materials.” Course is an undergraduate requirement for all civil and mechanical engineers that covers the principles of stress and deformation in structures and machines.

### **CONSULTING EXPERIENCE:**

- 1994 – 1998      **Implementation Specialist and Project Engineer**  
George Butler Associates, Inc., Lenexa, KS
- Served on the GBA Master Series Design Team, assisting in the design and development of the GBA Infrastructure Management software.
  - Designed, created, and implemented a GIS – AM/FM-MMS integrated system. The system uses ARC/INFO, ArcView, and the GBA Infrastructure Management software packages.
  - Organized, developed and instructed training workshops.
  - Responsible for data collection and analysis, computer modeling, development of implementation plans, and the preparation of reports and design documents for a variety of infrastructure system improvement projects.

### **PUBLICATIONS:**

Lucas, L., D.M. Sereno, J.R. Burau, T.S. Schraga, C.B. Lopez, M.T. Stacey, K.V. Parchevsky and V.P. Parchevsky. High frequency variability in a small tidal habitat: indications of underlying processes. (In press) *Estuaries and Coasts* 29(4) 2006.

Musiak, J. D., M. T. Stacey, D. Sereno, T. M. Powell, S. G. Monismith, D. A. Fong, M. Purcell. Vertical and Horizontal Transport in Stratified Flow at a Near Coastal Site, Stratified Flows. Proceedings of the Fifth International Symposium on Stratified Flows. Department of Civil Engineering, University of British Columbia. G. A. Lawrence, R. Pieters and N. Yonemitsu (editors). Vol. II, pp. 989-994, 2000.

Sereno, D.M. “Learning by Experience – the tribulations and triumphs of developing an AM/FM Infrastructure Management System” In Proceedings from Computer Technologies for the Competitive Utility. Water Environment Federation. 1997

### **INVITED PRESENTATIONS:**

“Spill Response Strategy,” presented at Municipal Water Quality Investigations (MWQI) Real Time Data & Forecasting (RTDF) Steering Committee Meeting, June 2008.

“Emergency Spill Response, Delta Contaminant Discharge Response (DCDR) Modeling with DSM2,” presented at California Urban Water Agencies (CUWA) Water Quality Committee, March 2007.

“Using Hydrodynamics to Examine Differences in Flooded Island Environments – Lessons Learned, Questions Raised,” presented at CALFED Ecosystem Restoration Program (ERP) Brown Bag Seminar, March 2003.

“Circulation and Exchange in Shallow, Subtidal Habitats – Effects of Submerged Aquatic Vegetation (SAV),” presented at Estuarine Research Federation, September 2003.

**CONFERENCE PRESENTATIONS:**

Sereno, D.M. and M.T. Stacey. “Hydrodynamics in Franks Tract – Observations and Modeling on the Influence of Submerged Aquatic Vegetation (SAV),” presented at CALFED Science Conference, October 2004.

Sereno, D.M., D.K. Ralston and M.T. Stacey. “Observations of Optical and Acoustic Backscatter – Particle Size Effects,” presented at Hydroacoustics Workshop 2004, Sponsored by Office of Surface Water, USGS.

Sereno, D.M. and M.T. Stacey. “Turbulence, Bottom Boundary Conditions, and Sediment Transport in a Shallow Water Habitat,” presented at Hydraulic Measurements & Experimental Methods (HMEM) 2002, Jointly Sponsored by the Environmental & Water Resources Institute (EWRI) of ASCE and the International Association of Hydraulic Engineering and Research (IAHR).

Sereno, D.M. and M.T. Stacey. “Transport and Mixing in Shallow Water Habitats in the Sacramento – San Joaquin Delta: Mildred Island,” poster at the University of California Toxic Substance Research and Teaching Program (UCTSR&TP) 2002.

Sereno, D.M. and M.T. Stacey. “Hydrodynamics of Shallow Water Habitats in the Sacramento – San Joaquin Delta: Sherman Lake,” poster at the University of California Toxic Substance Research and Teaching Program (UCTSR&TP) 2001.

Sereno, D.M. “Learning by Experience – the tribulations and triumphs of developing an AM/FM Infrastructure Management System” presented at Computer Technologies for the Competitive Utility. Water Environment Federation. 1997