May 3rd, 2017

David L. Sedlak

Editor-In-Chief

Environmental Science & Technology

I am pleased to submit our manuscript, “Four decades of water quality change in the upper San Francisco Estuary,” to be considered as an original research article in Environmental Science & Technology.

The Delta region of the upper San Francisco Estuary is a complex mosaic of inflows where nutrients are received, processed, and exported to the larger bay. Routine monitoring data have been collected at several locations in the Delta for over four decades, yet a comprehensive evaluation of trends has not been conducted. This information is timely given recent changes in the Bay that suggest past conditions may not be the future norm. We applied a new statistical method, Weighted Regressions on Time, Discharge, and Season, to describe multi-decadal trends of water quality change at several locations in the Delta. We contrast the results with common approaches for trend analysis to demonstrate the potential for imprecise and potentially wrong conclusions from simpler methods. We conclude with two case studies to demonstrate how the results can generate additional hypotheses for further evaluation.

Findings from this work are relevant for this important ecosystem and the application of trend analyses to evaluate multi-decadal trends in aquatic environments. We are confident that readers of ES&T will find this information useful. All authors are aware of and accept responsibility for this manuscript. No data in the manuscript have been previously published. Graphics, including TOC art, comply with the journal requirements for submission. We appreciate the opportunity to publish our work with ES&T.

Marcus W. Beck ([beck.marcus@epa.gov](mailto:beck.marcus@epa.gov)) Thomas W. Jabusch ([thomasj@sfei.org](mailto:thomasj@sfei.org))

U.S. Environmental Protection Agency San Francisco Estuary Institute

1 Sabine Island Drive 4911 Central Ave

Gulf Breeze, FL 32561 Richmond, CA 94804

Philip R. Trowbridge ([philt@sfei.org](mailto:philt@sfei.org)) David B. Senn ([davids@sfei.org](mailto:davids@sfei.org))

San Francisco Estuary Institute San Francisco Estuary Institute

4911 Central Ave 4911 Central Ave

Richmond, CA 94804 Richmond, CA 94804