

Preparer Information

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Project Information

ProjectNo_2C RSF8 StartDate_3a August 31, 2005 EndDate_3b August 31, 2008
ProjectTitle_4 Modeling nutrient and organic carbon loads and sources: taking existing monitoring data to the next stage
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CALFed Fellow contact information

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Research Mentor (for additional please see #8)

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Community Mentor (for additional please see #9)

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Additional Research Mentors and Community Mentors

Additional Research Mentors_8

Additional Community Mentors_9

Project Objectives: Please type your responses, and answer the questions in a style appropriate for laymen.

ProjectObjectives_10

I initially proposed to address the following research questions:
i What are the relative contributions of various land-based sources of dissolved inorganic nitrogen (DIN), dissolved inorganic phosphorus (DIP), and dissolved organic carbon (DOC) to the Sacramento and San Joaquin River systems?
i How can we improve our ability to predict river DOC, DIN, and DIP concentrations, export, and sources?
i How are river DOC, DIN, and DIP concentrations, loads, and sources likely to change as a function of climate, population growth, water demand, and land-use change in the next few decades?
Due to data availability and initial promising modeling results, I have decided to focus my energy on refining the DOC and DIN models and developing 2030 projections for these constituents while de-emphasizing the DIP export modeling.

Summary of progress in meeting each of these goals and objectives

ProgressSummary_11

i Acquisition and pre-processing of requisite datasets, including basin delineations, river network representations, water discharge data, solute concentration data, and historic land-use data.

i Application of the Global Nutrient Export from Watersheds (NEWS) models at 1km, mean annual resolution for Sacramento and San Joaquin Rivers and their tributaries. This work will be presented as a research talk at the 4th Biennial CALFED Bay-Delta Program Science Conference (abstract accepted).

i Analysis of historic and modern nutrient transport through the Sacramento and San Joaquin Rivers and their tributaries.

i Presentation of early results at the 2006 CALFED Science meeting in Sacramento, CA.

In addition, to the Central Valley river nutrient modeling work, the CBDA fellowship has facilitated my participation in a number of related and synergistic activities. These activities have included participation in biogeochemical research related to nutrient transport through constructed wetlands in California's Central Valley, research related to understanding sources and transport of DOC and precursors of disinfection byproducts, and research on global patterns of denitrification and nutrient delivery to coastal waters.

PROJECT MODIFICATIONS: Please explain any substantial modifications in research plans, including new directions pursued. Describe major problems encountered, especially problems with experimental protocols and how they were resolved. Describe any ancillary research topics developed.

Modifications_12

Due to data availability and initial promising modeling results, I have decided to focus my energies on refining the DOC and DIN models and developing 2030 projections for these constituents and to de-emphasize the DIP export modeling.

Also, moving to a new institution and starting a tenure-track job has delayed this research somewhat. However, I believe I have a postdoctoral researcher identified now, and anticipate that this work will proceed rapidly from this point forward.

PUBLICATIONS: List any publications, presentations, or posters that have resulted from this funded research. Give as many details as possible, including status of paper (e.g., in review; in press), journal name, conference location and date of presentation. Please note (as outlined in the conditions of the award) that each fellow is required to submit an abstract for an oral or poster presentation at each State of the Estuary conference and CALFED Science Conference during the duration of the fellowship.

Publications_14

Published

Glibert, P. M., J. A. Harrison, C. Heil and S. P. Seitzinger (2006) Escalating worldwide use of urea: a global change contributing to coastal eutrophication, *Biogeochemistry*, doi:10.1007/S10533-3070-0, 1-23.

Seitzinger, S. P., J. A. Harrison, J. K. Bohlke, A. F. Bouwman, R. Lowrance, B. J. Peterson, C. Tobias, and G. Van Drecht (2006) Denitrification across landscapes and waterscapes: a synthesis, *Ecological Applications*, 16 (6), 2064-2090.

In Press

Seitzinger, S. P. and J. A. Harrison (In Press) Sources and Delivery of Nitrogen to Coastal Systems, Chapter 8 in *Nitrogen in the Marine Environment*, 2nd edition. D. Capone, D.A. Bronk, M. R. Mullholland, E. Carpenter Eds., Academic Press, New York.

Submitted

Dahlgren, R.A., J.A. Harrison, S.S. Henson, A.T. O'Geen, E.E. Van Nieuwenhuysse, P.W. Lehman, and E. Gallo (Submitted) Diel phytoplankton dynamics in a eutrophic river resulting from growth and transport.

Chow, A.T., R.A. Dahlgren, and J.A. Harrison (Submitted) Patterns and sources of DOC and DBP formation potential in California's Central Valley River systems, *Environmental Science and Technology*.

Wollheim, W. M., C. J. Vanni, A. F. Bouwman, P. Green, J. A. Harrison, M. Meybeck, B. J. Peterson, S. P. Seitzinger and J. P. Syvitski. (Submitted) A spatially distributed framework for aquatic modeling of the earth system (FrAMES), *Global Biogeochemical Cycles*.

Ahrens, T., J.A. Harrison, P.A. Matson, J.M. Beman, I.O. Monasterio, and P. Jewett (Submitted) Nitrogen in the Yaqui Valley: sources, transfers, and consequences, Chapter in *Mexico's Yaqui Valley: A Synthesis of a Decade of Interdisciplinary, Place-based*

Research, NRC Press.

In Preparation.

Henson, S.S., Dahlgren, R.A., and J.A. Harrison., In Preparation, Patterns, magnitudes and controls of phytoplankton growth and transport through the San Joaquin River, For J. Freshwater Biol.

COOPERATING ORGANIZATIONS: List those agencies and/or persons who provided financial, technical or other assistance to your project since inception. Describe the nature of their collaboration.

CoopOrganiz_15

UC Davis: provided office and laboratory space, research facilities, access to critical data
California Bay Delta Authority: provided access to some data
USGS: provided access to extremely useful spatial datasets

AWARDS: List any special awards or honors that you, or mentor or members of the research team, have received during the duration of this project.

Awards_16

Advisor Randy Dahlgren elected fellow of the Soil Science Society of America

KEYWORDS: List keywords that will be useful in indexing your project.

Keywords_17

nitrogen, dissolved organic carbon, nutrient transport modeling, nutrients, land use, climate change

PATENTS: List any patents associated with your project.

