

## Nutrient Forms and Ratios White Paper Reading List and Bibliography

### Primary Review Material

Berg, G.M. .2014. Literature review on factors influencing phytoplankton nutrient uptake and metabolism: molecular and phytoplankton ecology perspectives. Suisun Synthesis 1 Report Section 2. Prepared for the San Francisco Bay Nutrient Management Strategy.  
[http://sfbaynutrients.sfei.org/sites/default/files/SuisunSynthesisI\\_Final\\_March2014.pdf](http://sfbaynutrients.sfei.org/sites/default/files/SuisunSynthesisI_Final_March2014.pdf)

Berg, G.M. 2015. Impact of Nutrient Concentrations and Ratios on Phytoplankton Community Composition, With Special Emphasis on the San Francisco Estuary. Suisun Synthesis II Report Section 4. Prepared for the San Francisco Bay Nutrient Management Strategy.

Brown, L., W. Kimmerer, J. L. Conrad, S. Leismeister, and A. Muller-Solger. 2016. Food webs of the Delta, Suisun Bay, and Suisun Marsh: An update on current understanding and possibilities for management. San Francisco Estuary and Watershed Science 14(3) 41 pages  
[file:///C:/Users/jcooke/Downloads/eScholarship%20UC%20item%204mk5326r%20\(1\).pdf](file:///C:/Users/jcooke/Downloads/eScholarship%20UC%20item%204mk5326r%20(1).pdf)

Cloern, J.E., A. Malkassian, R. Kudela, E. Novick, M. Peacock, T. Schraga, D. Senn. 2015. The Suisun Bay Problem: Food Quality or Food Quantity? Suisun Synthesis II Report Section 2. Prepared for the San Francisco Bay Nutrient Management Strategy. (Note: previously published Interagency Ecological Program for the San Francisco Estuary (IEP) Newsletter. Volume 27, No. 1, pp. 15-33)

Dugdale, R., F. Wilkerson, and A. E. Parker. 2015. The “Ammonium Paradox”: A Summary of More than a Decade of Research into Phytoplankton Processes and Nitrogen Relationships in the Northern San Francisco Estuary. Suisun Synthesis II Report Section 2. Prepared for the San Francisco Bay Nutrient Management Strategy.

Glibert, P.M. 2015. Re-examining the paradigm of lack of nutrient regulation of primary productivity and trophodynamics of the San Francisco Bay Delta: The view beyond classic nutrient limitation and the importance of dynamic metabolic regulation, the “paradox of enrichment,” and ecological stoichiometry. Suisun Synthesis II Report Section 3. Prepared for the San Francisco Bay Nutrient Management Strategy.

Kraus, T. E.C., K. D. Carpenter, B. A. Bergamaschi, A. E. Parker, E. B. Stumpner, B. D. Downing, F. P. Wilkerson, C. Kendall, and T. D. Mussen. 2016. Divers of phytoplankton in the Sacramento River: Comparing phytoplankton abundance and composition in the presence and absence of treated wastewater effluent. Abstract for the Bay Delta Science Conference November 15-17, 2016 Sacramento. [Note: paper in review. The presentation abstract will be replaced with the paper when available.]

Senn, D, E. Novick, and T. Jabusch. 2014. Research on NH<sub>4</sub><sup>+</sup> inhibition of primary production in Suisun Bay. Suisun Synthesis 1 Report Section 3. Prepared for the San Francisco Bay Nutrient Management Strategy.  
[http://sfbaynutrients.sfei.org/sites/default/files/SuisunSynthesisI\\_Final\\_March2014.pdf](http://sfbaynutrients.sfei.org/sites/default/files/SuisunSynthesisI_Final_March2014.pdf)

Strong, A. 2016. The response of San Francisco-Bay Delta phytoplankton to ammonium, nitrate, and wastewater effluent additions under different light conditions. Chapter 5 Dissertation, Stanford University. [The dissertation is publicly available. A paper for Chapter 5 is in prep]

## **Supplementary Material**

### Delta Water and Ecosystem Background

California Department of Water Resources, 2013. California Water Plan Update 2013, Volume 2 Regional Reports: Sacramento-San Joaquin Delta.

[http://www.water.ca.gov/waterplan/docs/cwpu2013/Final/Vol2\\_DeltaRR.pdf](http://www.water.ca.gov/waterplan/docs/cwpu2013/Final/Vol2_DeltaRR.pdf) *This report provides background information on Delta hydrology, ecosystems, land and water uses, and ecology. Relevant sections and pages: Statewide Significance pg. D-9 and D-10; Unique Characteristics pg. D-16 through D-26.*

### Nutrients Status, Trends, and Mass Balances

Novick, E., R. Holleman, T. Jabusch, J. Sun, P. Trowbridge, D. Senn, M. Guerin, C. Kendall, M. Young, and S. Peek. 2015. Characterizing and quantifying nutrient sources, sinks, and transformation in the Delta: synthesis, modeling, and recommendations for monitoring. Report prepared for the California Dept. Water Resources. <http://sfbaynutrients.sfei.org/books/dwr-contract-deliverable> Recommended for panel review is the main report and Appendices 2 (Nutrient Variability) and 3 (Nutrient Loads and Transformations).

### Delta-Estuary Nutrient Research

Dugdale, R. C., F. P. Wilkerson, and A. E. Parker. 2013 A biogeochemical model of phytoplankton productivity in an urban estuary: The importance of ammonium and freshwater flow. *Ecological Modeling* 263:291-307.

Dugdale, R.C., F.P. Wilkerson, A.E. Parker, A. Marchi and K. Taberski. 2012. River flow and ammonium discharge determine spring phytoplankton blooms in an urbanized estuary. *Estuarine and Coastal Shelf Science* 115: 187-199

Glibert P.M., R. C. Dugdale, F. Wilkerson, A. E. Parker, J. Alexander, E. Antell, S. Blaser, A. Johnson, J. Lee, T. Lee, S. Murasko, and S. Strong. 2014a. Major – but rare – spring blooms in 2014 in San Francisco Bay Delta, California, a result of the long-term drought, increased residence time, and altered nutrient loads and forms. *Journal of Experimental Marine Biology and Ecology* 460: 8–18. doi: [10.1016/j.jembe.2014.06.001](https://doi.org/10.1016/j.jembe.2014.06.001).

Glibert P.M., F. P. Wilkerson, R. C. Dugdale, A. E. Parker, J. Alexander, S. Blaser, and S. Murasko . 2014b. Phytoplankton communities from San Francisco Bay Delta respond differently to oxidized and reduced nitrogen substrates - even under conditions that would otherwise suggest nitrogen sufficiency. *Frontiers in Marine Science*. doi: [10.3389/fmars.2014.00017](https://doi.org/10.3389/fmars.2014.00017)

Glibert, P.M., D. Fullerton, J.M. Burkholder, J.C. Cornwell, and T. M. Kana. 2011. Ecological stoichiometry, biogeochemical cycling, invasive species, and aquatic food webs: San Francisco Estuary and Comparative Systems. (review paper)

Lee, J., A. E. Parker, F. P. Wilkerson, and R. C. Dugdale. 2015. Uptake and inhibition kinetics of nitrogen in *Microcystis aeruginosa*: Results from cultures and field assemblages collected in the San Francisco Bay Delta, CA. *Harmful Algae* 47:126-140.

Lucas, L.V. and J.K. Thompson. 2012. Changing restoration rules: Exotic bivalves interact with residence time and depth to control phytoplankton productivity. *Ecosphere* 3(12)117. DOI: 10.1890/ES12-00251.1

Parker, A. E., V.E. Hogue, F.P. Wilkerson and R.C. Dugdale. 2012a. The effect of inorganic nitrogen speciation on primary production in the San Francisco Estuary. *Estuarine Coastal and Shelf Science* 104: 91-101.

Parker, A. E., R. C. Dugdale and F.P. Wilkerson. 2012b. Elevated ammonium concentrations from wastewater discharge depress primary productivity in the Sacramento River and the Northern San Francisco Estuary. *Marine Pollution Bulletin* 64:574-586.

Van Nieuwenhuysse, E., R. Dahlgren, B. Bridges, and H. Horner. 2011. Nutrient enrichment experiments in the Delta-Mendota Canal. Final Report prepared for the US Bureau of Reclamation, Sacramento. April.

Van Nieuwenhuysse, E. 2007. Response of summer chlorophyll concentration to reduced total phosphorus concentration in the Rhine River (Netherlands) and the Sacramento-San Joaquin Delta (California, USA). *Can. J. Fish. Aquat. Sci.* 64: 1529-1542. Doi: 10.1139/F07-121.

Wilkerson, F. P., R. C. Dugdale, A. E. Parker, S. Blaser, A. Pimenta 2015. Nutrient uptake and primary productivity in an urban estuary: using rate measurements to evaluate phytoplankton response to different hydrological and nutrient conditions. *Aquatic Ecology*. 49(2): 211-233. Doi:10.1007/s10452-015-9516-5.

#### Previous Syntheses of Delta Nutrients and Ecosystem Drivers

Meyer, J.S., P.J. Mulholland, H.W. Paerl, A.K. Ward. 2009. A Framework for Research Addressing the Role of Ammonia/Ammonium in the Sacramento-San Joaquin Delta and the San Francisco Bay Estuary Ecosystem. A final report to the CALFED Science Program, Sacramento, CA. April . *Note: the Panel will be updated regarding the progress that has been made since this Framework was written.*

[http://www.science.calwater.ca.gov/pdf/workshops/workshop\\_ammonia\\_research\\_framework\\_final\\_041609.pdf](http://www.science.calwater.ca.gov/pdf/workshops/workshop_ammonia_research_framework_final_041609.pdf)

National Research Council (2012). Sustainable Water and Environmental Management in the California Bay-Delta.. Committee on Sustainable Water and Environmental Management in the California Bay-Delta,. March. Available: <http://dels.nas.edu/Report/Sustainable-Water-Environment/13394> Chapter 3 of the report is a particularly helpful reference for the multiple, interacting drivers that affect phytoplankton and the Delta food web.

Reed, D., J.T. Hollibaugh, J. Korman, E. Peebles, K. Rose, P. Smith, and P. Montagna. 2014. Workshop on Delta Outflows and Related Stressors: Panel Summary Report. Prepared for the Delta Stewardship Council and Delta Science Program, May.

<http://deltacouncil.ca.gov/sites/default/files/documents/files/Delta-Outflows-Report-Final-2014-05-05.pdf>

*This report was prepared as part of the process for revising flow objectives for the Bay-Delta. Flow objectives are still under development. The Delta Flows panel was asked about the interactions of outflow and other processes. The authors wrote about the data gaps related to drivers of benthos and turbidity and the need to recognize the roles of gradual as well as rapid ecosystem change (examples: decreasing turbidity and spread of Corbula clams). The authors commented on the literature regarding ammonia in the low salinity zone, pg. 44-61.*

Senn D.B. and E. Novick. 2014. Executive Summary: Suisun Synthesis 1 Report. Prepared for the San Francisco Bay Nutrient Management Strategy. *Note to panel: The Executive Summary describes recommended next steps for furthering understanding of the roles of nutrients, particularly ammonia in Suisun Bay.*

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