Nutrient Stakeholder & Technical Advisory Group (STAG) Meeting

15 December 2015

1:00 PM – 4:00 PM

Central Valley Regional Water Quality Board

11020 Sun Center Dr. Suite #200, Rancho Cordova

Agenda

Item 1 – Introduction & Announcements

Item 2 – Ammonium Workshop Planning

Item 3 – BREAK

Item 4 – Update on the Cyanobacteria Knowledge Gaps document and its Acceptance

Item 5 – Update on the Macrophyte Knowledge Gaps document

Item 6 – Update on the Modeling White Paper

Item 7 – Update on the Drinking Water Work Group Effort

Item 8 – Update on the Nutrient Research Prioritization Process

Item 9 – Update on the Mass Balance Report

Item 10 – Next Steps and Wrap Up

Agenda Item #1

Introductions & Announcements
Establish Quorum

Brock Bernstein

Agenda Item #2

Ammonium Workshop Planning

Janis Cooke

Background

Delta Science Plan – Chapter 6, Recommendation #8

…the Central Valley Regional Water Quality Control Board should prepare and begin implementation of a study plan for the development of objectives for nutrients in the Delta …

Excerpt from the Charter

The Central Valley Water Board has initiated a process to develop a nutrient management strategy for the surface waters of the Delta. This process has begun with an effort to define and guide scientific research and planning to make appropriate policy determinations. Nutrient objectives for surface waters and an implementation plan would be developed after completion of the research, if the science suggests they are needed.

Potential Nutrient Related Concerns

- Increase in the abundance & distribution of macrophytes.
- Increase in the frequency & magnitude of cyanobacteria blooms.
- Shifts in abundance & algal species composition
- Low dissolved oxygen in back sloughs

Workshop Goals

(excerpt from 9 Sept 2015 Workshop Proposal to the STAG)

<u>Goals:</u> The purpose of the Workshop is to review studies conducted in the Bay-Delta Estuary and summaries of the peer reviewed literature to determine areas of agreement and disagreement related to the two nutrient hypotheses; identify key unresolved science questions; and recommend follow up studies to answer the science questions. The key findings from the workshop will be captured in a white paper that will guide development of the Delta Nutrient Research Strategy as well as science and monitoring activities in the Delta and San Francisco Bay.

Proposed White Paper Content
(excerpt from 9 September 2015 Proposal)

The paper will describe the problem, summarize the main observations of the reports and presentations, and areas of agreement and disagreement based upon the presentations and reports submitted for the workshop and the best professional judgment of the panel.

The white paper will precisely articulate key science questions and mechanisms that need to be tested, and to the extent possible, identify the types of follow-up studies needed to resolve differences and to guide research to inform management on whether additional nutrient control actions might be needed in the Bay-Delta Estuary.

Conceptual List of Workshop Presenters

Individual	Agency/Institution	Research Area
Patricia Glibert	U. Maryland	**Ecological Stoichiometry** —Literature review of N:P ratios.
Katie Bentley (Glibert graduate student)	U. Maryland	**Ecological Stoichiometry**— Lab results of culture study with zooplankton Acartia and Eurytemora fed on diatom Thalassiosira at different N:P ratios
Dick Dugdale/Frances Wilkerson	Romberg Tiburon Center	**NH_4 Paradox** -- Review of 10 years of Romberg Tiburon work
Alex Parker	California Maritime Academy	Has lab grow out results with Microcystis amended with increasing concentrations of NH_4
Raphael Kudela	UC Santa Cruz	**NH_4 Paradox**--Summary of lab and field experiments conducted with Mine Berg. Stephanie Fong has draft report
Mine Berg	Applied Marine Sciences	**NH_4 Paradox** —Literature review of effect of NH_4 on algal growth
Tamara Kraus	U.S. Geological Survey	Sacramento River Lagrangian study measuring change in nutrients and algal biomass and species composition between City of Sacramento and Rio Vista with and without discharge from Regional San
Richard Connon	U.C. Davis	**NH_4 Paradox** Review paper
James Cloern	U.S. Geological Survey	**NH_4 Paradox** —Recent IEP newsletter article
Thomas Grovhoug / Chris Foe	LWA/CVRWQCB	**Nutrient mass balance**
Erin Strong	Stanford	Should provide presentation after Dr. Mine Berg
David Senn	SFEI	Reevaluation of changes in algal species composition in Suisun bay over time.
Mary Lou Esparza	Contra Costa Sanitary District	Suisun Bay/Creeks - Algal response to discharge in local creeks

Agenda Item #3

5 min
Break

Agenda Item #4

Update on the Cyanobacteria Knowledge Gaps Document

Christine Joab

Update

Action Item

- At Nov 3 STAG meeting, SWG member commented on STAG comment in Table 3
- STAG requested comment be revised with assistance of SWG member, Tim Mussen
- STAG agreed to accept Cyano Knowledge Gaps with understanding Table 3 comment be revised
- Revised language due Nov 13
- Revisions received Nov 6
- Document updated and posted to SWG webpage

Action Item complete

STAG comment revised with assistance of Science Work Group Member

Table 3 (Continued)

Topic	Management Question	Knowledge Gap	Recommendation
4	The City of Stockton waterfront, among other areas utilized for non-contact recreation, is known to be impaired annually during the dry months from dense Microcystis surface scums that create not only unsafe conditions for contact recreation (REC-1), but objectionable odors and aesthetics that result in impairment of non-contact recreation uses (REC-2). ~~Do the~~What ~~mechanisms~~conditions ~~that control open water Microcystis blooms differ from those that control and~~ promote the formation of Microcystis surface scums in regions of the Delta with high water residence times and low tidal energy, such as within boating marinas and along the Stockton waterfront? ~~What~~How effective would nutrient or other management techniques be in reducing Microcystis blooms within these societally-important locations? ~~are the various measures that are available and effective at addressing impairments of marinas, waterfronts, and other waterways from cyanobacteria surface scums? Will nutrient management enhance these control efforts?~~	The white paper focused primarily on aquatic life and contact recreation beneficial use impairments. The current extent of REC-2 beneficial use impairments is unknown and efforts to address these impairments were not reviewed for the white paper. It is not known whether the factors controlling Microcystis blooms in open water river channels differ from those ~~that promote surface scums~~within marinas and waterfronts, which may frequently experience high water residence times and low tidal energy.	As part of a robust field ~~surveillance~~monitoring program, areas known to be impaired with regard to non-contact recreation should be identified and included. Waterfront, waterway, marina, and port managers should be solicited for information regarding measures that have been effective at addressing the impairments. The Delta nutrient / ecosystem management model should determine ~~whether~~ the importance of various factors that control the initiation, magnitude, and duration of ~~open water~~ Microcystis ~~blooms differ from those promoting~~ surface scums at identified REC-2 locations.

Questions?

Agenda Item #5

Update on the Macrophyte Knowledge Gaps Document

Christine Joab

Status & Next Steps

STAG Review and Comments

- Distributed Nov 3
- Comments due Nov 17
- Two STAG members provided comments
  - Paul Bedore
  - Andria Ventura

Science Work Group Review and Comment

- Distributed Nov 23
- Comments due Dec 14
- Three SWG members provided comments
  - Dr. Angela Llaban
  - Dr. Patrick Moran
  - Dr. Louise Conrad
- One SWG member requested extension to end of year
  - Dr. John Madsen

Next Steps - STAG Presentation

- Bring back revised document early 2016

Draft **Macrophyte Knowledge Gap Document[1]**

In 2013 the Delta Stewardship Council adopted the Delta Plan. The Plan identified a number of water quality problems that might be the result of excessive nutrient levels in the Delta. One of these was the increase in the abundance and distribution of invasive aquatic plants in the Delta. The Plan recommended that the Central Valley Regional Water Board develop and implement a research plan to determine whether nutrient management might reduce the problem. The Regional Water Board commissioned a white paper to determine:

- *How submersed and floating aquatic vegetation support or adversely affect ecosystem services and related beneficial uses*
- *What is known about the spatial and temporal trends in submersed and floating aquatic vegetation in the Delta*
- *What is the relative importance of nutrients versus other factors in promoting observed trends in submersed and floating aquatic vegetation in the Delta*

The Regional Water Board also assembled a Science Work Group composed of macrophyte experts (Appendix A) to review and comment on the white paper[2]. White paper comments and group discussions were used to identify areas of agreement and important information gaps about the state of macrophyte knowledge in the Delta. These discussions were the basis for this document. An important consideration for Regional Board staff was to determine the role that nutrients might play in the abundance and distributions of macrophytes and whether nutrient management might reduce the severity of the problem. Areas of agreement and knowledge gaps have been assembled into a series of tables to inform a Nutrient Research Plan. The Research Plan will be presented to the Regional Water Board and, if requested, the Delta Stewardship Council. The White Paper, Knowledge Gap Report, and Nutrient Research Plan are intended to provide the rationale and roadmap for future research to resolve management issues, including whether nutrient objectives might help control the abundance and distribution of macrophytes.

Table 1 lists areas of agreement among Science Work Group members about macrophytes in the Delta. The consensus of the group is that invasive aquatic plants represent a serious water

[1] This document was developed after discussions among the Macrophyte Science Work Group and represents their opinion on what is known about invasive aquatic plants and what are critical knowledge gaps that should be the focus of research in the next 3 to 5-year time period.

[2] Boyer, K. and M. Sutula 2015. Factors controlling submersed and floating macrophytes in the Sacramento-San Joaquin Delta. Southern California Coastal Water Research Project Technical Report No. 870 October 2015 http://www.swrcb.ca.gov/rwqcb5/water_issues/delta_water_quality/delta_nutrient_research_plan/science_work_groups/2015_0723_macro_wp_draft.pdf

Questions?

Agenda Item #6

Update on the Modeling White Paper

Christine Joab

Status & Next Steps

STAG Review and Comments

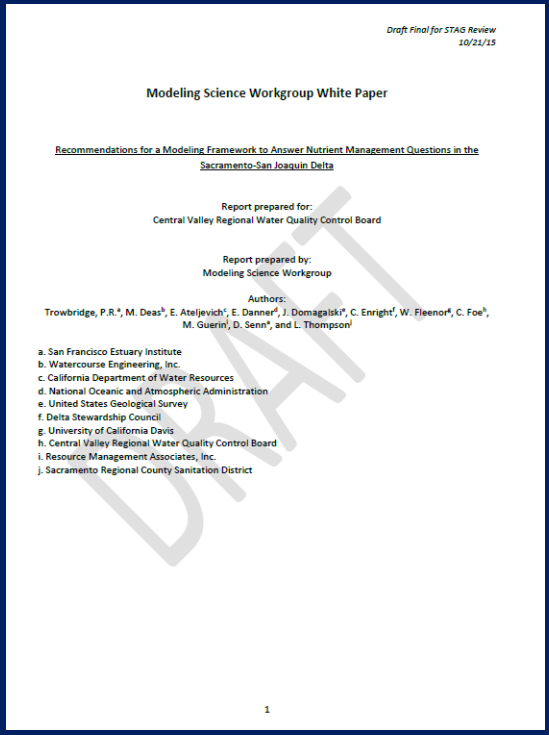
- Distributed Nov 3
- Comments due Dec 4
- One STAG member provided comments
  - ❖ Jon Rosenfield

Science Work Group Review

- Meeting Dec 9
- Reviewed comments with SWG
- Revised White Paper due Jan 4

Next Steps - STAG Presentation

- Bring back revised document early 2016



Draft Final for STAG Review
10/21/15

Modeling Science Workgroup White Paper

Recommendations for a Modeling Framework to Answer Nutrient Management Questions in the Sacramento-San Joaquin Delta

Report prepared for:
Central Valley Regional Water Quality Control Board

Report prepared by:
Modeling Science Workgroup

Authors:
Trowbridge, P.R.[a], M. Deas[b], E. Ateljevich[c], E. Danner[d], J. Domagalski[e], C. Enright[f], W. Fleenor[g], C. Foe[h], M. Guerin[i], D. Senn[a], and L. Thompson[j]

a. San Francisco Estuary Institute
b. Watercourse Engineering, Inc.
c. California Department of Water Resources
d. National Oceanic and Atmospheric Administration
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f. Delta Stewardship Council
g. University of California Davis
h. Central Valley Regional Water Quality Control Board
i. Resource Management Associates, Inc.
j. Sacramento Regional County Sanitation District

DRAFT

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Questions?

Agenda Item #7

Update on the Drinking Water Work Group Effort

No slides just a verbal discussion

Tom Grovhaug

Agenda Item #8

Update on the Nutrient Research Prioritization and Ranking Process

No slides just a verbal discussion

Tom Grovhaug

Agenda Item #9

Update on the Mass Balance Report

No slides just a verbal discussion

Tom Grovhaug

Agenda Item #10

Next Steps and Wrap Up

Brock Bernstein

Next Steps & Wrap Up

- Identify Next Steps
- Identify Action Items
- Discuss Next Meeting Date
- Post Meeting Summary

End of Presentation