Nutrient Stakeholder & Technical Advisory Group (STAG) Meeting

3 November 2015

1:00 PM – 5:00 PM

Regional San Office

10060 Goethe Road, Sacramento

Agenda

Item 1 – Introduction & Announcements

Item 2 – Administrative Subcommittee Report Out

Item 3 – Finalize Governance and Ground Rules document

Item 4 – Accept the Macrophyte White Paper

Item 5 – Review the Macrophyte Knowledge Gap Document

Item 6 – Presentation of the Modeling White Paper

Item 7 – BREAK

Item 8 – Accept the Cyanobacteria Knowledge Gap document

Item 9 – Update on the Ammonia Paradox and Ecological Stoichiometry Workshop

Item 10 – Update on the Nutrient Research Ranking Process

Item 11 – Next Steps and Wrap Up

Agenda Item #1

Introductions & Announcements
Establish Quorum

Brock Bernstein

Agenda Item #2

Administrative Subcommittee Report Out

No slides just a verbal update

Lynda Smith

Agenda Item #3

Finalize the Governance & Ground Rules Document

Motion for STAG to accept the document

Brock Bernstein

What is Acceptance?

Did we follow the process outlined in the Charter?

- Open and transparent process?
- Opportunity for stakeholder input and comments?

Review Revisions

During September meeting:

- STAG discussed proposed new language (Page 2 under “Governance Principles”)
- STAG concurred with proposed revisions
- Andria Ventura requested clarification on interpretation of “consensus with accountability” (Page 1 under “Governance Principles”)
- STAG concurred that language should be revised and final document be reconsidered for approval at next STAG meeting

Revised language:

“It is agreed that the process will operate under a consensus seeking paradigm, based on principles of “consensus with accountability.” *STAG participants will be responsible for expressing the core interests of their constituency, while at the same time working toward solutions that address multiple interests.* ~~Consensus with accountability requires that all designated STAG representatives try to reach consensus while at all time supporting and expressing their self interest.~~ *For example*, in the event a representative *has concerns with or* rejects a proposal, they are ~~then that STAG members is~~ expected to *suggest an alternative that attempts to bridge the gap among interests.* ~~provide a counter proposal that attempts to achieve their interest and the interests of the other STAG members.~~ “

Motion for STAG Consideration:

Did we follow the process outlined in the Charter?

Does the STAG accept the Governance & Ground Rules document as final?

Agenda Item #4

Macrophyte White Paper

Motion for STAG to accept the document

Christine Joab

What is Acceptance?

Did we follow the process outlined in the Charter and the Science Work Group Charge?

- Open and transparent process?
- Opportunity for stakeholder input and comments?
- Develop credible, feasible, scientific recommendations through collaborative discussions?
- Present draft Science Work Group products to STAG for review and comment?

Charge to the Science Work Group

Convene a group of experts to review and comment on white paper and prepare a prioritized list of recommendations for future research.

Prepare a white paper that represents our current state of knowledge on factors controlling submersed and floating macrophytes in the Sacramento-San Joaquin Delta.

Macrophyte Science Work Group

Dr. Kathy Boyer – White Paper author *(S.F. State University)*

Dr. Martha Sutula – Facilitator and co-author *(SCCWRP)*

Science Work Group Members:

Dr. Louise Conrad – *Department of Water Resources*

Dr. Jeff Cornwell – *Horn Point Laboratory, Univ. of Maryland*

Dr. John Durand – *U.C. Davis*

Dr. Diana Engle – *Larry Walker and Associates*

Dr. Shruti Khanna – *LAWR, U.C. Davis*

Dr. Angela Llaban – *Dept. Parks & Rec, Div. Boating & Waterways*

Dr. John Madsen – *U.C. Davis/USDA, Ag. Research Service*

Dr. Patrick Moran – *USDA, Agricultural Research Service*

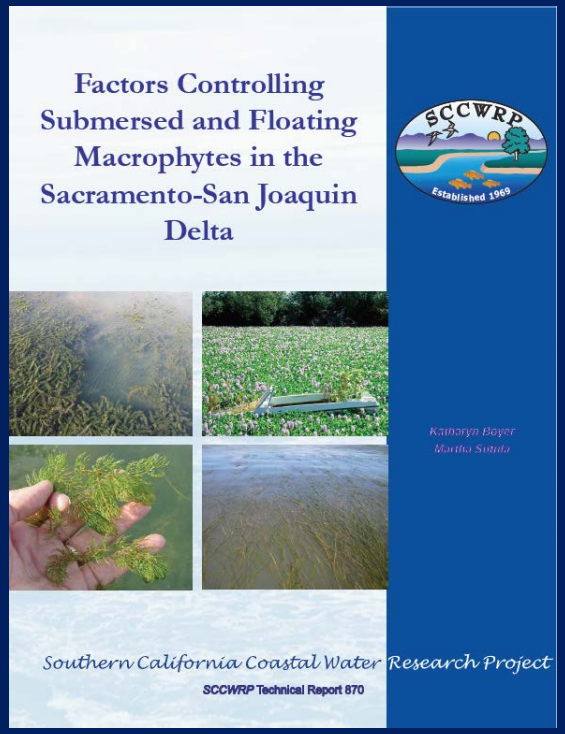
Macrophyte White Paper

Two Science Work Group Meetings

- April Meeting
  - Reviewed Charge and draft White Paper
  - Comments received & addressed
  - Meeting open to STAG & interested parties
- July Meeting
  - Reviewed revised white paper
  - Additional comments received & addressed
  - Meeting open to STAG & interested parties
  - SWG accepts the white paper

STAG Presentation

- September STAG Meeting
  - White Paper presentation by author
  - Presented key findings & recommendations
  - Comments accepted and appended to white paper
  - White Paper Final



Motion for STAG Consideration:

Did we follow the process outlined in the Charter and the Science Work Group Charge?

Does the STAG accept the Macrophyte White Paper?

Agenda Item #5

Macrophyte Knowledge Gap Document

Chris Foe

Purpose

Present & solicit comments on the draft document. Document will be brought back at the next STAG meeting, after all comments have been addressed, for STAG approval.

Outline

- Macrophyte Science Work Group
- Tables 1 and 2
- Next Steps

Macrophyte Science Work Group

Individual	Agency
Dr. Louise Conrad	Department of Water Resources
Dr. Shruti Khanna	LAWR, U C Davis
Dr. Patrick Moran	USDA, Agricultural Research Service
Dr. John Madsen	U C Davis/USDA, Leader Agricultural Research Service
Dr. Kathy Boyer	San Francisco State University
Dr. Martha Sutula (Facilitator)	Southern California Coastal Water Research Project
Dr. John Durand	U C Davis
Dr. Diana Engle	Larry Walker Associates
Dr. Jeff Cornwell	Horn Point Laboratory, U Maryland

Table 1. Summary of the areas of agreement among the Science Work Group about macrophytes in the Delta. The list was developed by members after review and discussion of the white paper.

Issue	Topic	Agreement
1	Macrophyte species	*Egeria densa* (brazilian waterweed) and *Eichhornia crassipes* (water hyacinth) are currently widely distributed, dominant, non-native macrophytes in the delta. *Ludwigia* spp. (water primrose) is another invasive aquatic weed that has increased in biomass and distribution. Other invasive species [*Cabomba caroliniana* (Carolina fanwort), *Limnobium laevigatum* (South American sponge plant), *Myriophyllum spicatum* (Eurasian watermilfoil), *Potamogeton crispus* (curly leaf pondweed), and *Hydrilla verticillata* (hydrilla)] are located in or near the Delta and have the potential to become future problems.
2	Impacts to physical & chemical environment	Invasive macrophytes have the potential to deplete oxygen, reduce turbidity and water flow, increase water temperature, and cause wide pH fluctuations in the beds and surrounding water.
3	Economic impacts	At high biomass macrophyte colonies obstruct water conveyance for agricultural, industrial, and domestic use; impede recreational and commercial navigation, obstruct agricultural and drinking water intake pipes, and can impede flood control channels.
4	Trends in biomass & distribution	*E. densa, E. crassipes, and Ludwigia* spp. have increased in abundance since the middle of the last century in the Delta. Surveys show that between 2008 and 2014 there has been a two-fold increase in submerged aquatic vegetation (SAV) and a five-fold increase in floating aquatic vegetation (FAV).
4	Drivers	Several factors have been identified that likely influence the abundance and distribution of *E. densa* and *E. crassipes* in the Delta. They are light, temperature, salinity, flow, residence time, water velocity, nutrients and chemical/mechanical control efforts. Less is known about the factors controlling populations of other species.
5	Control	Present control methods are useful for reducing the annual size of macrophyte colonies but have not kept up with inter annual population increases.
6	Nutrient Management	The Science Work Group is unsure whether nutrient management can control macrophytes. There is no precedence from other ecosystems that nutrient management alone will be an effective control option. Nutrient management may reduce plant viability and increase the effectiveness of chemical and mechanical control efforts.

Table 2. Summary of knowledge gaps identified by the Macrophyte Science Work Group after review and discussion of the white paper. Issues 1 to 6 might best be addressed by a combination of monitoring and special studies. Monitoring and special studies should be closely coordinated to simultaneously address multiple issues at the same time.

Issues	Management Question	Knowledge Gap	Research Recommendation
1	Have all macrophyte species causing water quality problems in the Delta been identified?	Yes, but other invasive aquatic plant species have colonized nearby waters and may successfully invade the Delta. No comprehensive early detection and rapid response monitoring program exists to identify new invasive species before they become a problem.	Implement a comprehensive multi-year monitoring program to detect new aquatic plants before they become widespread and conduct studies to evaluate whether early control is feasible and desirable.
2	Is the abundance and distribution of *E. crassipes*, *E. densa* and *Ludwigia* spp. increasing in different Delta habitats and will it continue to expand in the future?	Uncertain as no comprehensive monitoring program exists that measures change in biomass and distribution on a reoccurring annual basis.	A comprehensive multi-year monitoring program needs to be implemented to determine changes in seasonal and annual biomass of all dominant macrophyte species.
3	Should the State promote native macrophytes and reduce non-native invasive species abundance? What is the effect of native and non-native macrophyte species on pelagic and littoral fish abundance?	Limited information exists about the effect of macrophyte species composition and abundance on fish population levels. Dense macrophyte beds reduce dissolved oxygen and restrict the distribution of aquatic organisms. Intermediate bed densities are hypothesized to be beneficial to larval fish by providing refuge from predators and increased planktonic and epiphytic food resources while maintaining higher oxygen levels.	Conduct fish surveys to evaluate the effect of native and non-native aquatic plant density on fish species composition and abundance. Consider using the fish survey results to develop goals for acceptable macrophyte species percent cover for use in aquatic plant control programs.
4	What factors limit the growth and maximum size of macrophyte beds on a seasonal, annual and inter-annual basis? Are any of these factors controllable?	Most of the primary factors controlling macrophyte production and distribution are known. Less information is available about their relative importance in different delta habitats.	Measure instantaneous, annual & inter annual production rates in representative Delta habitats. Simultaneously, assess the magnitude of all factors thought responsible for controlling production to determine their relative importance.

Table 2. (Continued)

Issues	Management Question	Knowledge Gap	Research Recommendation
5	Can nutrient analyses of macrophyte tissue be used as a cost-effective method for assessing the nutrient status of plants in the field?	At present there is no robust method for rapidly assessing *in situ* nutrient limitation in the field. A novel method would be valuable for ascertaining nutrient limitation of both FAV and SAV in the Delta.	Culture macrophytes in the laboratory at varying nutrient levels to determine growth rates as a function of ambient nutrient levels in water and sediment. Simultaneously, collect and analyze tissue to determine whether there is a predicable relationship between tissue growth, nutrient uptake rates & nutrient concentrations. Confirm relationships in the field by simultaneously measuring tissue growth, nutrient status and ambient nutrient concentrations.
6	Can nutrient management alone, including the lower concentrations expected in the future as a result of revised NPDES permits and municipal water recycling reduce or control the abundance of macrophyte species?	Limited information exists on the range of ambient nutrient concentration in water and sediment that might restrict or control macrophyte growth in the Delta.	Conduct field experiments to determine nutrient concentrations at increasing distance from & into macrophyte beds. Use this data in combination with results from Issue #5 to determine seasons and locations in the Delta when nutrient concentrations might be restricting growth. If funding is limited, initial evaluations should emphasize FAV species. Use biogeochemical models (Issue 8 below) to forecast future nutrient concentrations after implementation of revised NPDES permits and water recycling projects. Determine whether future nutrient levels will reduce aquatic plant growth. If not, predict nutrient levels that might do so.
7	Can nutrient management improve the efficacy of mechanical & herbicide control practices in the Delta?	It is uncertain whether nutrient management might increase the effectiveness of present mechanical & herbicide control practices.	If nutrient management is demonstrated to be a viable option for reducing macrophyte growth (Issues 5 and 6), then mesocosm studies should be conducted to determine whether the results of mechanical & chemical control would be improved at lower nutrient levels. What is the optimal nutrient range for each aquatic plant species?

Table 2. (Continued)

Issues	Management Question	Knowledge Gap	Research Recommendation
8	How important are aquatic plants in the nutrient and carbon cycle in the Delta?	It is unclear how much of the synthesis of organic material in the Delta is coming from aquatic plants. It is also unknown what the rate of carbon, nitrogen and phosphorus turnover from aquatic plants is in the Delta.	Use surveillance monitoring results of aquatic plant biomass (issue 2), nutrient content, and instantaneous and net tissue growth rates (issue 5) to estimate production and cycling rates for both nutrients and carbon. Compare these values with similar estimates for pelagic and benthic algae to determine the relative importance of aquatic vegetation processes in the Delta.
9	Can biogeochemical models help evaluate the relative importance of different macrophyte drivers, test management scenarios & evaluate the redirected negative effects of nutrient management?	Ecosystem water quality models are not available for the Delta although a Modeling Science Work Group is being formed to make recommendations on model development. The proposed model should include nutrient and macrophyte sub models.	Develop an ecosystem model that includes both a nutrient and macrophyte sub model. Macrophyte monitoring and modeling should be closely coordinated with model development to provide model coefficients and inform model calibration and validation efforts. Conversely, modelers should attempt to develop models that will inform critical questions posed by macrophyte researchers.

Next Steps

- **STAG review & provide comments by 17 November.**
- **Science Work Group addresses comments.**
- **Document brought back to STAG for final approval at next meeting.**

Comments??

Agenda Item #6

Modeling White Paper Presentation

Phil Trowbridge

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

Modeling Science Workgroup

November 2015

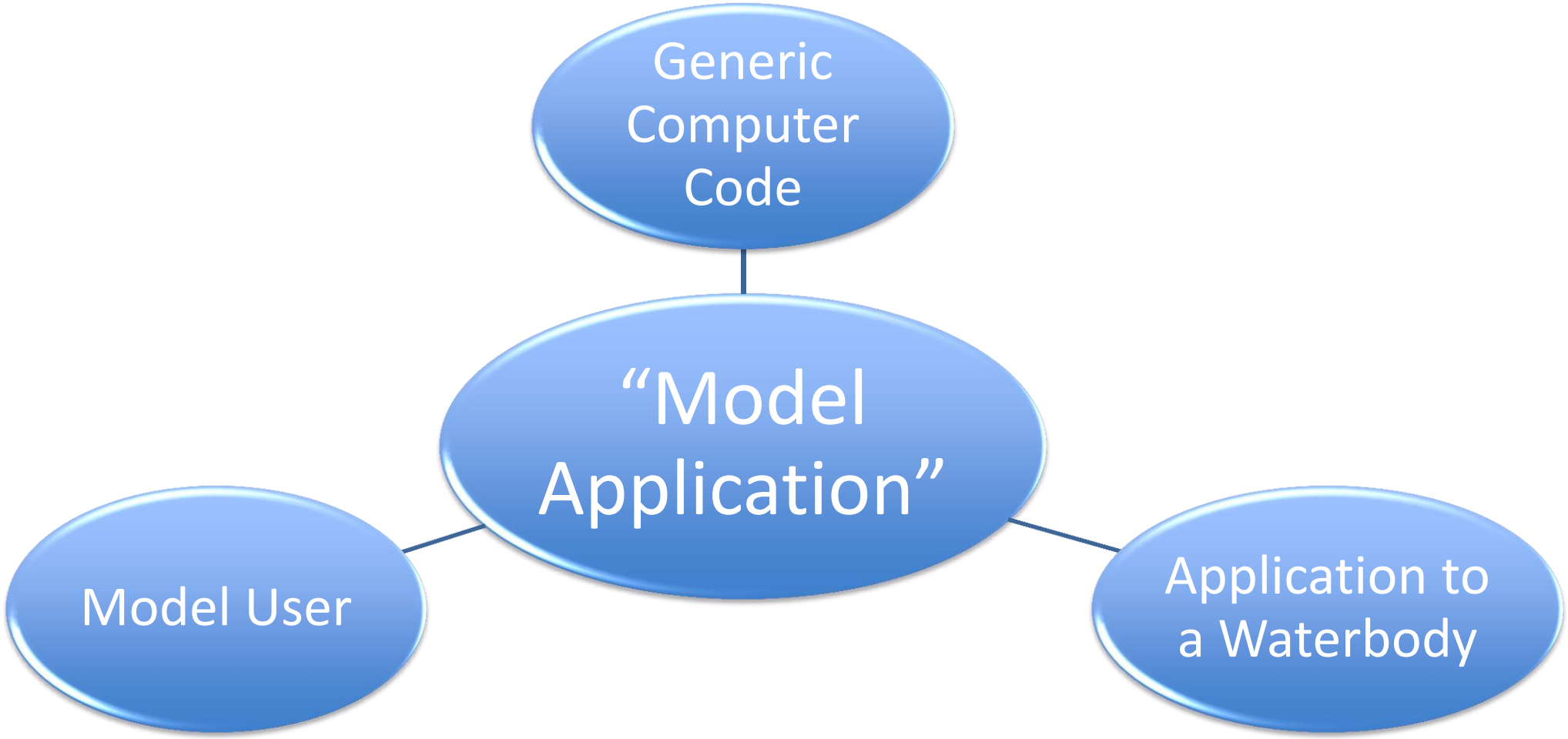
Modeling Science Workgroup

- Mike Deas (Watercourse Eng.)
- Eli Ateljevich (DWR)
- Eric Danner (NOAA)
- Joe Domagalski (USGS)
- Chris Enright (DSP)
- Bill Fleenor (UC Davis)
- Chris Foe (RB5)
- Marianne Guerin (RMA)
- David Senn (SFEI-ASC)
- Lisa Thompson (Regional San)
- Phil Trowbridge (SFEI-ASC)

Charge to the Workgroup

- Types of models needed to answer nutrient management questions
- Organizational arrangements
- Cost estimates and phasing

Definition of a Model Application



Strengths and Weaknesses of Modeling

“All models are wrong. Some are useful.” - Box

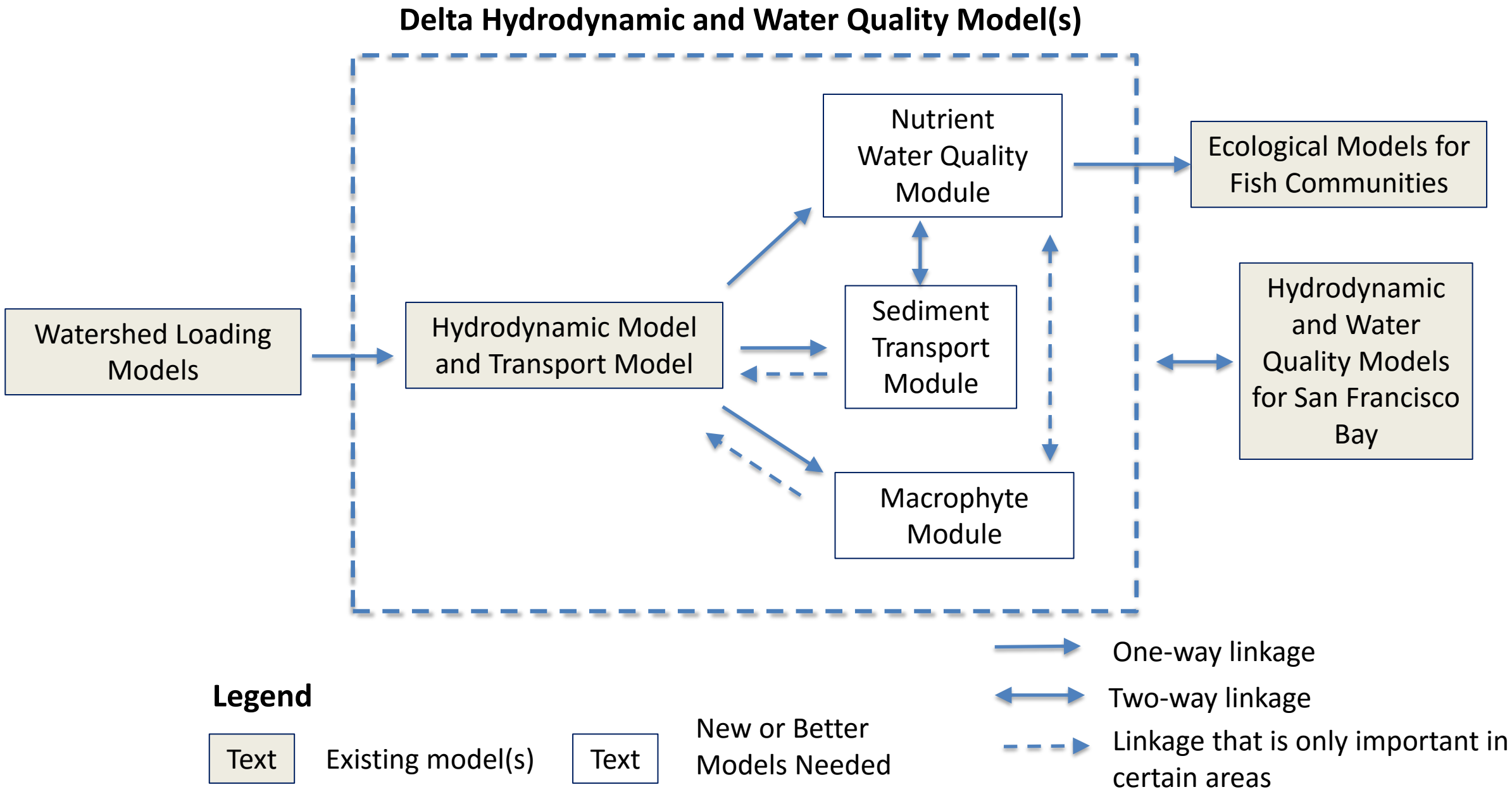
Modeling Objectives

- Definition: the type of output desired from the model
  - Needed to establish desired technical characteristics
- Determined from management questions/scenarios

Desired General Characteristics

- Accessibility
- Credibility
- Scalability
- Large (enough) user group

Desired Technical Characteristics



Existing Model Applications to the Delta

- SCHISM
- Suntans
- CASCaDE
- DSM2
- RMA-2
- EFDC
- UnTRIM
- CE-QUAL-W2
- SI-3D

Some of these models get us close to the desired characteristics, but not all the way.

Key Recommendations

- Invest in a team approach
- Set up good governance
- Phased implementation using existing models
- Use multiple models
- Robust QA
- Annual Workshop

Schedule and Cost

- 10 years to fully answer management questions
  - Phase I: 2016-2020
  - Phase II: 2021-2025
- $1.7 million per year

Program Component	# FTEs	Cost per Yr
Steering Committee	0	$0
Interdisciplinary Science Team	2	$500,000
Model Development Staff	2	$500,000
Data Informatics Staff	0.5	$125,000
External Advisors (Peer Review)	0	$50,000
Modeling Program Subtotal	**4.5**	**$1,175,000**
Increased Monitoring	0	$500,000
Total Cost per Year		**$1,675,000**

Agenda Item #7

5 minute

BREAK

Agenda Item #8

Finalize the Cyanobacteria Knowledge Gap Document

Motion for STAG to accept the document

Christine Joab

What is Acceptance?

Did we follow the process outlined in the Charter and the Science Work Group Charge?

- Open and transparent process?
- Opportunity for stakeholder input and comments?
- Develop credible, feasible, scientific recommendations through collaborative discussions?
- Present draft Science Work Group products to STAG for review and comment?

Charge to the Science Work Group

Convene a group of experts to review and comment on white paper and prepare a prioritized list of recommendations for future research.

Prepare a knowledge gaps document that includes the Science Work Group's recommendations for future research to resolve management questions, including the efficacy of nutrient management to control/minimize cyanoHAB biomass and toxin formation.

Cyanobacteria Science Work Group

Mine Berg – White Paper author
Martha Sutula – Facilitator and co-author

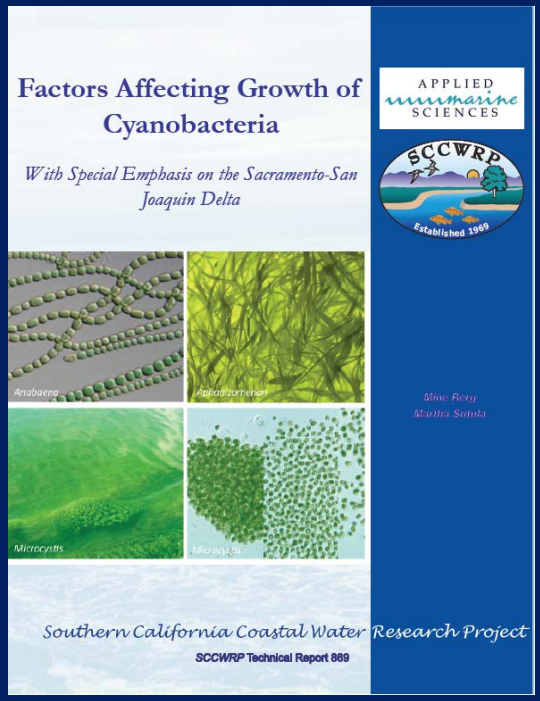
Science Work Group Members:

Stephanie Fong – ***State and Federal Contractors Water Agency***
Raphe Kudela – ***U.C. Santa Cruz***
Peggy Lehman – ***Department of Water Resources***
Tim Mussen – ***Sacramento Regional County Sanitation District***
Daniel Orr – ***California Department of Fish & Wildlife***
Alex Parker – ***California Maritime Academy***
David Senn – ***San Francisco Estuary Institute***
Karen Taberski – ***San Francisco Regional Water Board***
Lisa Thompson – ***Sacramento Regional County Sanitation District***
Kim Ward – ***State Water Resources Control Board***

Cyanobacteria White Paper

Two Science Work Group Meetings

- April Meeting
  - Reviewed Charge and draft White Paper
  - Comments received & addressed
  - Meeting open to STAG & interested parties
- May Meeting
  - Reviewed revised white paper
  - Additional comments received & addressed
  - Meeting open to STAG & interested parties
  - SWG accepts the white paper



STAG Presentation

- July STAG Meeting
  - White Paper presentation by author
  - Presented key findings & recommendations
  - Comments accepted and appended to white paper
  - White Paper Final

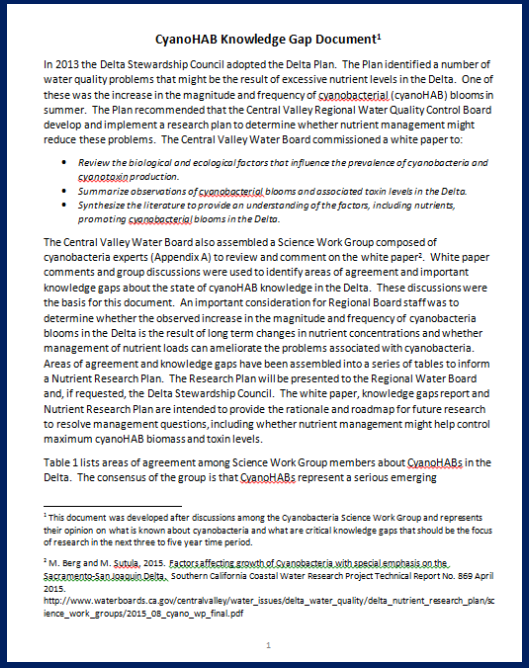
Cyanobacteria Knowledge Gaps Document

Science Work Group Review

- June - August
  - Reviewed draft knowledge gaps document
  - Comments received & addressed
  - SWG accepts the knowledge gaps document

STAG Presentation

- September STAG Meeting
  - Knowledge Gaps presentation
  - Presented Tables 1 and 2 with recommended research
  - Comments accepted and appended to document



CyanoHAB 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 magnitude and frequency of cyanobacterial (cyanoHAB) blooms in summer. The Plan recommended that the Central Valley Regional Water Quality Control Board develop and implement a research plan to determine whether nutrient management might reduce these problems. The Central Valley Water Board commissioned a white paper to:

- *Review the biological and ecological factors that influence the prevalence of cyanobacteria and cyanotoxin production.*
- *Summarize observations of cyanobacterial blooms and associated toxin levels in the Delta.*
- *Synthesize the literature to provide an understanding of the factors, including nutrients, promoting cyanobacterial blooms in the Delta.*

The Central Valley Water Board also assembled a Science Work Group composed of cyanobacteria 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 knowledge gaps about the state of cyanoHAB knowledge in the Delta. These discussions were the basis for this document. An important consideration for Regional Board staff was to determine whether the observed increase in the magnitude and frequency of cyanobacteria blooms in the Delta is the result of long term changes in nutrient concentrations and whether management of nutrient loads can ameliorate the problems associated with cyanobacteria. 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 gaps report and Nutrient Research Plan are intended to provide the rationale and roadmap for future research to resolve management questions, including whether nutrient management might help control maximum cyanoHAB biomass and toxin levels.

Table 1 lists areas of agreement among Science Work Group members about CyanoHABs in the Delta. The consensus of the group is that CyanoHABs represent a serious emerging

[1] This document was developed after discussions among the Cyanobacteria Science Work Group and represents their opinion on what is known about cyanobacteria and what are critical knowledge gaps that should be the focus of research in the next three to five year time period.

[2] M. Berg and M. Sutula, 2015. Factors affecting growth of Cyanobacteria with special emphasis on the Sacramento-San Joaquin Delta. Southern California Coastal Water Research Project Technical Report No. 869 April 2015.
http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/delta_nutrient_research_plan/science_work_groups/2015_08_cyano_wp_final.pdf

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Motion for STAG Consideration:

Did we follow the process outlined in the Charter and the Science Work Group Charge?

Does the STAG accept the Cyanobacteria Knowledge Gaps document as final?

Agenda Item #9

Ammonia Paradox and Ecological Stoichiometry Workshop Update

Chris Foe

Objectives

- Background on Workshop
- Update on Planning Sub Committee work
  - Workshop questions
  - Panel Expertise
- Finances
- Next Steps

Joint San Francisco Bay/Delta Workshop

The workshop will take place over two days. The first day will be devoted to oral presentations by researchers. Additional oral presentations may occur during the morning of the second day. The afternoon of the second day will be a closed session for panelists and white paper author to discuss the presentations and the contents of the white paper.

A month before the workshop presenters will provide a PDF of their reports & other published information that they wish considered at the workshop. Two weeks before the workshop, panel members & other presenters will forward questions to the presenters based upon the submitted reports. At the workshop each presenter will provide a 30 minute summary of their research findings with an emphasis on answering the overarching and sub questions for the workshop & also questions submitted to them by others. Twenty minutes will be reserved after each presentation for answering additional questions posed by panelists and presenters.

Stakeholder Participation

- The workshop will be advertised & open to Bay Area NMS & Delta STAG members.
- One or more 30-minute periods will be set aside during the first day for Stakeholders to question presenters.
- In the morning of the second day, Stakeholders will be given an opportunity to discuss their impressions and overall conclusions about the material presented at the workshop with the panel and white paper author.
- Stakeholders may also submit written comments to the panel after the workshop. Written comments will be answered as much as possible and attached as an appendix to the white paper.

Planning Sub Committee

Name	Affiliation
Lisa Thompson	SRCSD
Linda Dorn	SRCSD
Stephen Louie	CDF&W
Stephanie Fong	SFCWA
Marie Lou Esparza	CCCSD
Ian Wren	S.F. Baykeeper
Jim Erwin	BACWA
David Senn	SFEI
Christine Joab	CVRWQCB
Chris Foe	CVRWQCB

Overarching Question

TN and NH4 loads are expected to decrease in the Delta over the next one to two decades because of upgrades to Publically Owned Wastewater Treatment Plants and new water recycling projects. This expected nutrient state change may present a unique opportunity to test the NH4 Paradox and Nutrient Stoichiometry hypotheses in the field. What questions and research strategies should be employed to evaluate the results of the nutrient state change in the Delta and in Suisun Bay?

Projected decrease in nutrients between 2010 and 2030 in Delta because of already permitted NPDES upgrades

Water Year	TP	TN	NH4
Wet	-3 %	-5 %	
Dry	-6 %	-11 %	
Normal			-23 %

Projected decrease in nutrients in summer between 2010 and 2030 in Delta from both permitted NPDES upgrades & municipal water recycling.

Water Year	TP	TN	NH4
Wet	-8 %	-12 %	
Dry	-16 %	-26 %	
Normal			-24 %

Overarching Question

TN and NH4 loads are expected to decrease in the Delta over the next one to two decades because of upgrades to Publically Owned Wastewater Treatment Plants and new water recycling projects. This expected nutrient state change may present a unique opportunity to test the NH4 Paradox and Nutrient Stoichiometry hypotheses in the field. What questions and research strategies should be employed to evaluate the results of the nutrient state change in the Delta and in Suisun Bay?

Sub Set Questions

- Presenters for NH4 paradox and nutrient stoichiometry hypotheses will be asked to make predictions in their oral presentations about how the Delta and Suisun Bay will respond to the expected nutrient state change and to describe experiments to test their predictions. The panel will review and comment on the appropriateness of both the predictions and experimental design.

- What nutrient monitoring, special studies, and modeling should be conducted to track the change in nutrient levels in the Delta?

- Conflicting results have been presented for the NH4 Paradox. What factors (e.g. light levels, temperature, duration of experiment, pH, salinity, grazing, initial conditions) may explain the different results? What strategy should be employed to resolve differing inter-laboratory results?

Sub Set Questions Continued

- **What bench-scale/mesocosm/field experiments should be conducted to test the NH4 paradox hypothesis in the Delta and in Suisun Bay? Could these experiments be used to inform nutrient management?**
- **What bench-scale/mesocosm/field experiments should be conducted to test the ecological stoichiometry hypothesis in the Delta and in Suisun Bay? Could these experiments be used to inform nutrient management?**
- **What are the ecologically relevant time scales (hours, days, weeks) to evaluate the NH4 Paradox and Nutrient Stoichiometry hypotheses in the Delta?**
- **What other hypotheses/models should be evaluated to explain future changes in phytoplankton biomass and community composition?**

Sub Set Questions Continued

- **What is the desired outcome, regarding biological impacts, of future management in the Delta? i.e., what does success look like, in terms of phytoplankton abundance, biomass, species composition, and what are the justifications for this outcome? What does success look like in terms of higher levels of the food web such as zooplankton and native fish species?**

- **How do the Delta-Bay fit into the global spectrum of high-nutrient estuary systems based on our unique combination of characteristics (e.g., habitat types, morphology, flow/tidal flux/retention time, light/turbidity, seasonal nutrient loads and forms, food web components)? What can be anticipated about the system's response, in comparison with responses to changes in nutrient loads observed in other estuaries?**

Primary Area of Expertise for Review Panel

Phycologist: Algal species composition; biomass in the Bay-Delta Estuary; understands how both have changed over the last half century knowledge of harmful algal blooms.— 2 Individuals

Phycologist: Biochemistry and physiology of nutrient uptake; effect of nutrient concentrations, forms and ratios on carbon synthesis and biomass production; laboratory culture of algae and measurement of primary production; phytoplankton nutrient uptake rates; knowledge of harmful algal blooms; Individual with big picture expertise on likely ecological response at base of food web to a state change in nutrient concentrations.— 12 Individuals

Phycologist: Measurement of primary production in the laboratory and field; knowledgeable about how physical and chemical factors influence production and species composition in the field; knowledgeable of how phytoplankton community is likely to change in response to nutrient concentration changes— 11 Individuals

Ecologist: Zooplankton culture and zooplankton nutrition; capable of evaluating the effect of changing N:P ratios on algal food quality for zooplankton production and recommending follow up studies to resolve uncertainties.— 15 Individuals

Local Expert: Knowledgeable about the Delta including its hydrology, lower food chain, Cal Water Fix, and Ecorestore; but "*Individual should be perceived as neutral and unbiased*".— 4 Individuals

What the Planning Sub Committee did not do

STAG gave permission to identify and contact potential White Paper Authors and Review Panel members to determine their interest and availability but not make anyone an offer. The goal was to develop a small suite of potential candidates.

Budget

Item	Responsible Party	Amount
Facilitation	Regional San	$5,000
White Paper Author	SFCWA	$10,000-$15,000
Review Panel	State Board/NMS	$30,000

Next Steps

Authorize sub committee to:

- Rank candidate White Paper Authors & have Regional Board staff contact candidates
- Allow sub committee to make final selection in November
- Allow White Paper Author and Sub Committee to jointly select Panel.

December STAG meeting:

- Report names and expertise of White Paper Author & Review Panel
- Discuss date and location of joint workshop

Discussion??

Agenda Item #10

Nutrient Research Prioritization and Ranking Process Update

No slides just a verbal discussion

This item was not heard as we ran out of time

Terrie Mitchell

This item was not heard as we ran out of time.

However, Tom Grovhaug requested the list of subcommittee members so he can begin organizing a group meeting.

Ranking Subcommittee Members are:

Agenda Item #11

Update on the Drinking Water Science Work Group

No slides just a verbal update

This item was not heard as we ran out of time

Tom Grovhaug

Agenda Item #12

Next Steps and Wrap Up

Brock Bernstein

Action Items

Macrophytes Knowledge Gaps Document

- **STAG comments due by November 17**

Modeling White Paper

- **STAG comments due by December 4**

Cyanobacteria Knowledge Gaps Document

- **Paul Bedore will send revised comments to RB staff**

Ammonium Workshop Planning

- **RB staff send STAG workshop questions, areas of expertise, names of local experts**
    - **STAG send comments and concerns to RB staff**

Wrap Up

- **Next Meeting Date –** ***possibly December (may be a conference call)***

End of Presentation