

Agenda Item #1

Introduction and Announcements

USDA-ARS Meeting Announcement

13 July 2015 STAG meeting

MEETING NOTICE

WHAT: Project Progress Meeting of the USDA-Agricultural Research Service funded Area-wide Pest Management Project:
Improved Control of Water Hyacinth, Brazilian Waterweed, Arundo and Associated Pests in the Sacramento-San Joaquin Delta

WHEN: Friday, August 28, 2015

WHERE: Robert J. Cabral Building (Assembly Room 1)
San Joaquin County Agricultural Center
2101 E. Earhart Avenue, Suite 100, Stockton, CA 95206
(Plenty of free parking adjacent to the building)

Federal and university scientists and state and county agencies who are carrying out the USDA-ARS Areawide Project will provide updates on their efforts to develop and implement new and improved monitoring and control methods for invasive aquatic plants in the Delta. Time will be allotted for questions after each presentation, and there will be a general discussion session focused on project outcomes and plans.

The agencies presenting information will include:

- USDA-Agricultural Research Service, Exotic and Invasive Weeds Research Unit
- National Aeronautics and Space Administration, Biospheric Research Branch, Earth Science Division, Ames Research Center
- Division of Boating & Waterways, California Department of Parks & Recreation
- Sacramento-San Joaquin Delta Conservancy
- University of California-Davis, Department of Entomology and Nematology
- University of California-Davis, Department of Plant Sciences
- University of California-Davis, Agricultural Issues Center
- Contra Costa Mosquito Vector Control District
- San Joaquin County Mosquito Vector Control District

If interested in attending, please RSVP to Patrick Moran

Patrick.Moran@ars.usda.gov

Agenda Item #2

Update on Drinking Water Effort By Tom Grovhoug and Elaine Archibald

No slides just verbal update

13 July 2015 STAG meeting

Agenda Item #3

Finalize Charter and Ground Rules documents

By Brock Bernstein

13 July 2015 STAG meeting

Late Revision to the Charter

(Page 6 of the Charter, 2nd paragraph under section 5.0)

5.0 Nutrient-related Concerns in the Delta

The initial nutrient related work will focus on addressing concerns about decreases in phytoplankton biomass and changes in species composition, harmful algal blooms, non-native aquatic macrophytes and the development of robust computer modelling tools. The nutrient work has been restricted to these four topics because of limited Water Board staff resources. After completion of a Nutrient Research Plan for these topics, Water Board staff will organize, with input from the STAG, Science Work Groups for low dissolved oxygen in ~~back~~303(d) listed sloughs and other water bodies and for the potential effect of nutrients on drinking water supplies. White papers and research recommendations for these two topics will be reviewed by the STAG and Independent Science Review Panel and amended into the Nutrient Research Plan. In preparation for these follow-on efforts, a subcommittee of the STAG has organized itself to begin laying necessary groundwork for the drinking water issue. Membership in this subcommittee will be coordinated through the facilitator and the subcommittee will report periodically to the STAG on its efforts.

Governance Revision 1

(Page 2 of Governance)

Majority Rule Decision Method – Administrative Decisions

Administrative decisions are about the day-to-day activities of the Steering Committee (including but not limited to: logistics, meeting dates and times, agenda revisions, schedules, etc). All administrative decisions will be made on a simple majority vote. Administrative decisions will be made by the STAG using a simple majority of all Participants present (51 percent or more) at any given meeting.

However, the Administrative Subcommittee is now making some administrative decisions between meetings.

Proposal: Add standing item to all future STAG agendas for an update/briefing from the Admin Subcommittee to provide opportunity for full STAG to provide feedback and guidance. The Admin Subcommittee could also contact the STAG as a whole between meeting in cases where decisions are more substantive than administrative.

Governance Revision 2

(Page 2 of Governance)

Majority Rule Decision Method – Policy/Science/Resource Decisions

- Policy/Science/Resource Decisions – Such decisions are made by the STAG using the above-described consensus rule after sufficient discussion and deliberation has been conducted. In the event consensus cannot be achieved, a final decision will be made by the Regional Board representative and the dissenting opinion may be documented by the participant(s) endorsing that opinion.
- The STAG shall refer significant differences of scientific opinion to the Independent Science Review Panel. The ISRP shall provide objective input to clarify understanding of the issue. Such information will be used by the STAG in seeking to resolve significant differences of opinion.

However, these two bullets contradict each other re scientific differences.

Proposal: The Regional Board, not staff, will have the final say on such issues. Regional Board staff commit to request advice from the State Board External Review Panel on conflicting scientific issues and will present both sides of the controversy, including the Review Panel's suggestion, to the Board. Staff reserves the right to make their own recommendation to the Board but, of course, would have to justify their recommendation.

Agenda Item #4

Status Report on Cyanobacteria Work **By Chris Foe**

13 July 2015 STAG meeting

Purpose of Presentation

Review

- Process
- Findings

Seek Advice

- **Should Water Board accept white paper as final product?**

Goals and Objectives

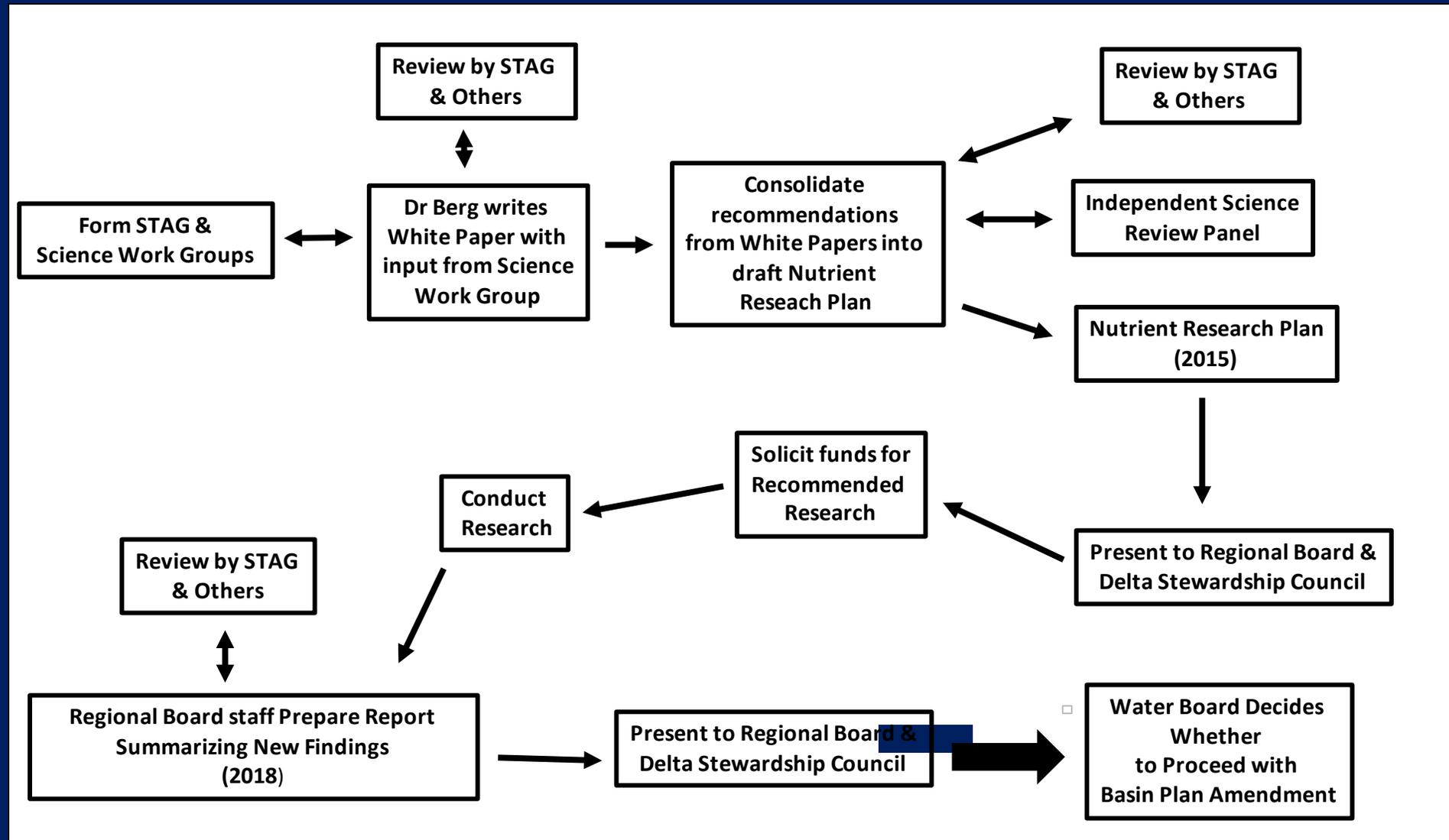
- **Implement a transparent process that provides for robust stakeholder input, effective decision making, and independent peer review of science and policy determinations, with Science Work Group draft products presented to the STAG for review and comment.**
- **Take scientifically defensible steps to develop a Delta nutrient management strategy that will provide reasonable protection of beneficial uses by developing attainable management goals.**
- **Fulfill the requirements of the California Water Code and address State and Federal anti-degradation policies.**

Roles and Responsibilities

Central Valley Water Board & staff

Staff will be responsible for implementing the process described in this charter... maintaining the integrity of the stakeholder process, and ensuring active information sharing to enable stakeholder review of and input to key documents produced within the process...

Schedule for Development of Nutrient Research Plan



Cyanobacteria Work Group

Individual	Agency/Institution	Cyanobacteria Work Group
David Senn	San Francisco Estuary Institute	X
Lisa Thompson	Sacramento Regional Combined Sanitation District	X
Tim Mussen	Sacramento Regional Combined Sanitation District	X
Alex Parker	California Maritime Academy	X
Stephanie Fong	State and Federal Contractors Water Agency	X
Peggy Lehman	Department of Water Resources	X
Rafael Kudela	U.C. Santa Cruz	X
Mine Berg	Applied Marine Sciences	X
Martha Sutula (Facilitator)	Southern California Coastal Water Research Project	X
Karen Taberski	San Francisco Regional Water Quality Control Bd	X
Kim Ward	State Water Resources Control Board	X
Daniel Orr	California Department of Fish and Wildlife	X

Cyanobacteria Schedule

Task	Spring	Summer	Fall	Winter	Spring
	2015				2016
Final Charge document	X				
Science Work Group Meetings	X	X			
Draft final white paper		X			
Information gaps document		X	?		
Draft nutrient research plan				?	
Independent Science Review Panel				?	
Regional Board Hearing					?

Goals for White Paper

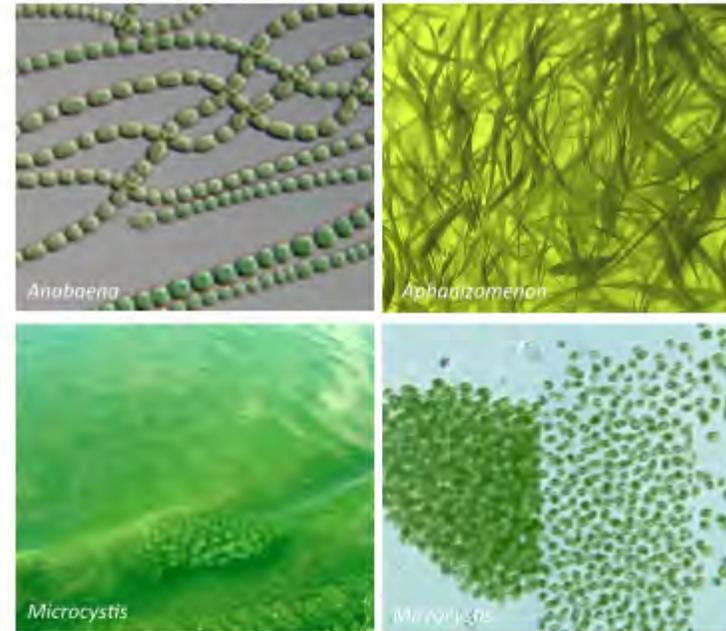
- **Review the biological and ecological factors that influence the prevalence of cyanobacteria and cyanotoxin production.**
- **Summarize observations of cyanobacterial blooms and associated toxin levels in the Delta.**
- **Synthesize the literature to provide an understanding of the factors, including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

Cyanobacteria White Paper

- Final draft completed June 2015
- Revised based on Science Work Group and STAG comments
- Science Work Group agreed that white paper represented an accurate assessment of the current state of our knowledge on factors affecting the growth of Cyanobacteria in the Delta and recommended that it be accepted as a final product
- Science Work Group also concluded that Cyanobacteria were an emerging concern that deserved additional attention in Delta

Factors affecting Growth of Cyanobacteria

With Special Emphasis on the Sacramento-San Joaquin Delta



Prepared for:

The Central Valley Regional Water Quality Control Board

And

The California Environmental Protection Agency

State Water Resources Control Board

(Agreement Number 12-135-250)

Mine Berg
Applied Marine Sciences

Martha Sutula
Southern California Coastal
Water Research Project

Technical Report 869

June 2015

Table 1. The areas of agreement for cyanoHAB impairment in the Delta were developed by the Science Work Group after review and discussion of the white paper.

Issue #	Topic	Agreement
1	Cyanoblooms	<i>Microcystis</i> is the most common cyanoHAB genus in the Delta although cyanoblooms of <i>Aphanizomenon</i> and <i>Anabaena</i> have also been documented.
2	Toxicity	CyanoHAB blooms can cause adverse impacts for people, livestock and aquatic wildlife because the metabolic byproducts are liver and nerve toxins. Humans and livestock concerns include degradation of drinking water and contact recreation. Impacts to aquatic wildlife include acute and chronic toxicity and bioconcentration of toxins in the food chain.
3	Toxins	Microcystin is the primary toxic cyanoHAB byproduct detected in the Delta. There are numerous types of microcystins. Microcystin LR is believed to be the most toxic of these byproducts and is consistently measured in the Delta.
4	Risk	The risk of microcystin exposure to people and wildlife has not been well quantified in the Delta although potentially toxic concentrations to both people and wildlife have been detected. Additional monitoring will be needed to ascertain the extent, magnitude, duration and frequency of these episodes.

Table 1. (Continued)

Issue #	Topic	Agreement
5	Toxicological guidelines	The California Office of Health Hazard Assessment, World Health Organization and the U.S. EPA have published human and some domesticated animal health guidelines for some microcystins. These congeners have been measured in water and organisms in the estuary. No toxicological guidelines are available for wildlife, making a robust aquatic life risk assessment difficult without additional toxicological studies to establish no effect and low effect levels.
6	Hot Spots	The San Joaquin River in the Central Delta has experienced reoccurring cyanoHAB blooms. High concentrations may also have occurred in other unmonitored locations in the Delta.
7	Trends	Visible <i>Microcystis</i> blooms were first observed in the late 1990s and are now common in the Delta during the summer and fall.
8	Drivers	Seven water quality drivers have been identified that likely control the production of <i>Microcystis</i> biomass in the Delta. These are temperature, high irradiance, water clarity, flushing time, a stratified water column, salinity, and nutrients.

Table 1. Continued.

Issue #	Topic	Agreement
9	Delta Heterogeneity	The absolute magnitude of the drivers may change independently of each other in different areas of the delta resulting in changes in their relative importance and in the probability of <i>Microcystis</i> blooms.
10	Bloom initiation	Present bloom initiation may be triggered by higher water temperatures, increased residence time and/or increased water clarity in the Central Delta. There is no evidence that nutrient concentrations, forms or ratios trigger bloom initiation.
11	Bloom size	It is uncertain which driver limits maximum <i>Microcystis</i> bloom biomass and toxin concentration in the Central Delta.
12	Maximum potential bloom size	If other drivers do not limit production, <i>Microcystis</i> growth will continue until the available nutrient pool is exhausted.
13	Nutrient Limitation	Further research is necessary to evaluate whether <i>Microcystis</i> bloom growth reduces ambient nutrient concentrations and whether final biomass is constrained by the available nutrient pool.

Table 2. Summary of information gaps identified by the Cyanobacteria Science Work Group for the Delta after review and discussion of the cyanobacteria white paper. Topics 1 through 6 may best be addressed by a combination of monitoring and special studies. The two efforts should be closely coordinated to simultaneously inform multiple issues at the same time.

Topic	Management Question	Knowledge gap	Recommendation
1	Have the major hotspots where cyanoHAB blooms occur and/or where people & wildlife are at greatest risk from exposure been identified?	Uncertainty exists whether the location & magnitude of hotspots in the Delta have been identified because of a lack of a comprehensive surveillance program.	Develop a comprehensive multi-year monitoring program
2	What risk do cyanoHAB toxin levels pose for human drinking water & contact recreation?	The risk of exposure has not been adequately characterized because there is no monitoring program in the Delta measuring bloom formation and toxin levels in a manner appropriate for determining human health impacts and because relevant exposure thresholds such as Maximum Contaminant Level Goals for cyanotoxins in drinking water have not been developed.	The expanded monitoring program should include surface scum monitoring to evaluate potential human health impacts.
3	What risk do cyanoHAB toxin levels pose for aquatic wildlife in the Delta?	The risk to wildlife has not been adequately characterized because of the absence of a Delta-wide monitoring program. In addition, there are no accepted aquatic life benchmarks for comparing toxin levels against.	Develop a monitoring program to measure dissolved & particulate cyanoHAB toxin concentrations. Develop appropriate suite of wildlife biometrics including tissue concentrations. Let others determine appropriate toxicological endpoints.

Table 2. Continued

Topic	Management Question	Knowledge gap	Recommendation
4	Chlorophyll is the most common measurement of algal abundance in the Delta. Relationships have been observed elsewhere between chlorophyll & toxin levels. Do similar relationships exist in the Delta which would allow a preliminary assessment of the risk to humans and wildlife?	Is there a consistent relationship between chlorophyll and cell abundance/toxin levels in different seasons and locations in the Delta? Does the relationship change during bloom development and senescence? Could these relationships be used to predict human and wildlife health impacts?	See recommendations for topic #1 above.
5	What factor(s) limit the growth rate and ultimate maximum size of a bloom & its toxin level? Are these factor(s) controllable?	No information exists on which factor(s) control cyanoHAB growth rates and limit final bloom biomass in the Delta. It is also not known whether these factors differ by season and location.	Monitor multiple blooms at different stages of development and at different locations in the Delta to determine what controls growth rate, maximum biomass & toxin level. Evaluate the importance of other factors in addition to those identified in the white paper.
6	Can nutrient management reduce the magnitude & frequency of blooms and the risk of elevated toxin levels anywhere in the Delta?	Do nutrient concentrations decline as blooms develops & does a lack of nutrients arrest bloom growth & determine final bloom biomass? What nutrient levels are predicted to constrain bloom biomass below a level that poses a risk to people & wildlife? Do these concentrations change in different areas of the Delta? How would low nutrient concentrations affect the growth of other beneficial phytoplankton species?	Conduct high frequency temporal monitoring in combination with special studies to determine whether nutrients affect maximum bloom biomass & toxin level. Research should be closely coordinated with topic #5 above.

Table 2. Continues

Topic	Management Question	Knowledge gap	Recommendation
7	Can models help evaluate the relative importance of different cyanoHAB drivers, test management scenarios & evaluate additional ecological effects of nutrient management?	Algal and cyanoHab ecosystem models are not available for the Delta although a Modeling Science Work Group is being formed to make recommendations on model development.	Develop an ecosystem model that includes a cyanoHAB component. All cyanoHAB monitoring and special studies should be coordinated with model development to inform model calibration and validation.

Present Cyanobacteria Conclusions

Regional Board Question: Would nutrient management reduce/eliminate the threat posed by Cyanobacteria in the Delta?

Science Work Group Response: Bloom initiation is not a function of nutrients. Factor(s) that control the final maximum bloom biomass and toxin concentration are not known at present.

Question for STAG

Should Regional Board staff accept white paper as final with attached comments by Science Work Group and STAG?

Agenda Item #5

Break

13 July 2015 STAG meeting

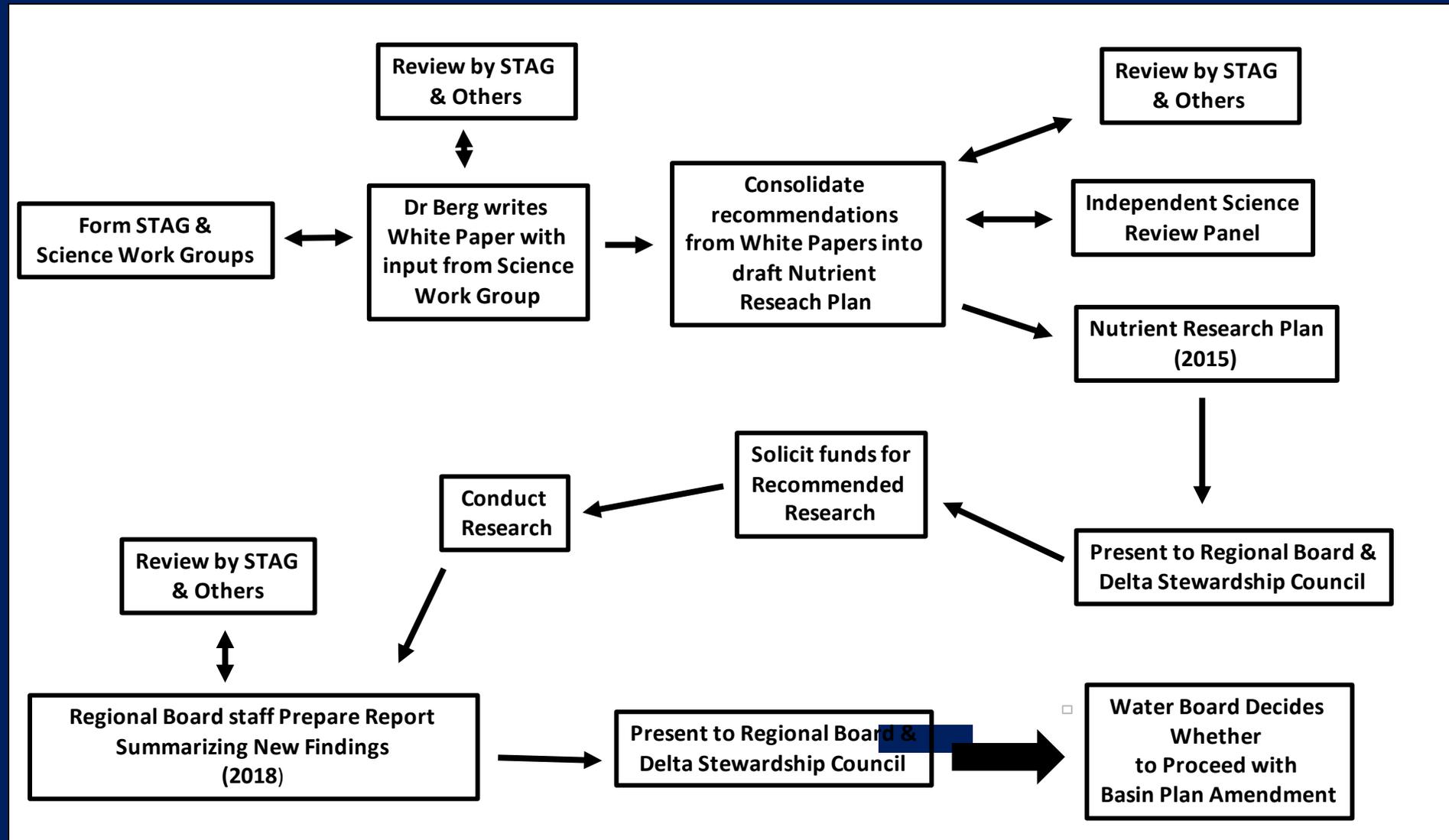
Agenda Item #6

Status Update for Other Science Work Groups

By Chris Foe

13 July 2015 STAG meeting

Schedule for Development of Nutrient Research Plan



Macrophyte Science Work Group Roster

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

Macrophyte Schedule

Task	Spring	Summer	Fall	Winter	Spring
	2015				2016
Final Charge document	X				
Science Work Group Meetings	X	X			
Draft final white paper		?			
Information gaps document		X	?		
Draft nutrient research plan				?	
Independent Science Review Panel				?	
Regional Board hearing					?

Modeling Science Work Group Roster

Individual	Agency	Modeling Work Group
David Senn	San Francisco Estuary Institute	X
Joe Domagalski	US Geological Survey	X
Chris Enright	Delta Stewardship Council	X
Lisa Thompson	Sac Regional County Sanitation District	X
Bill Fleenor	UC Davis	X
Phil Trowbridge	San Francisco Estuary Institute	X
Edward Gross or Marianne Guerin	Resource Management Associates	X
Michael Deas	Watercourse Engineering, Inc	X
Eli Ateljevich	Department of Water Resources	X
Paul Hutton	Metropolitan Water District	X
Eric Danner	NOAA Fisheries	X

Modeling Schedule

Task	Spring	Summer	Fall	Winter	Spring
	2015				2016
Final Charge document	X				
Science Work Group Meetings		X	X	X	
Draft final white paper			?		
Information gaps document					
Draft nutrient research plan				?	
Independent Science Review Panel				?	
Regional Board hearing					?

NH4 Paradox and N:P Ratio Science Work Group Schedule

Task	Spring	Summer	Fall	Winter	Spring
	2015				2016
Final Charge document		X			
Science Work Group Meetings			X		
Draft final white paper				?	
Information gaps document					
Draft nutrient research plan				?	
Independent Science Review Panel				?	
Regional Board hearing					?

Conclusions

- **Making reasonable progress addressing questions about nutrient management in the Delta**
- **Behind schedule**

Agenda Item #7

Discussion with STAG on Process

13 July 2015 STAG meeting

Goals and Objectives

- **Implement a transparent process that provides for robust stakeholder input, effective decision making, and independent peer review of science and policy determinations, with Science Work Group draft products presented to the STAG for review and comment.**
- **Take scientifically defensible steps to develop a Delta nutrient management strategy that will provide reasonable protection of beneficial uses by developing attainable management goals.**
- **Fulfill the requirements of the California Water Code and address State and Federal anti-degradation policies.**

Roles and Responsibilities

Science Work Groups will prepare white papers that summarize current understanding and recommend further research needed to resolve unanswered questions

Roles and Responsibilities

Central Valley Water Board & staff

Staff will be responsible for implementing the process described in this charter... maintaining the integrity of the stakeholder process, and ensuring active information sharing to enable stakeholder review of and input to key documents produced within the process...

Science assessment

Science Work Groups, so far, have done a good job and are providing a valuable service to Water Board and STAG in answering questions about what we now know about nutrients and what we will need to learn before we can answer questions about whether nutrient management is likely to correct the identified water quality problems in the Delta.

Asked Administrative Subcommittee how to improve process

Their recommendations were:

- Have more frequent focused STAG meetings**
- Invite white paper authors to give summaries of their work**

Question For STAG:

What are your recommendations to improve process both scientifically and to make it a more transparent stakeholder endeavor?

Agenda Item #8

Next Steps and Wrap Up

No slides for this item

13 July 2015 STAG meeting