Stormwater Runoff Water Quality Newsletter
Devoted to Urban/Rural Stormwater Runoff
Water Quality Management Issues

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This issue of the Newsletter presents information on the US EPA's current efforts to develop **nutrient criteria for phosphorus** in streams based on a "**conditional probability**" approach. Current activities related to managing nutrient discharges that are causing water quality problems in the Gulf of Mexico, California's coastal waters, and in the Central Valley of California are noted. Information is provided on the next meeting of the **Coastal Stakeholder Advisory Group** for the State Water Board's **Numeric Nutrient Endpoints** project next Wednesday, August 26, 2009 at 9:30 at SFEI in Oakland. Finally, nutrient and toxicity issues of ammonia that were discussed at the **Central Valley Delta - Ammonia Summit** are reviewed.

US EPA Proposed Phosphorus Criteria for Streams

The US EPA Science Advisory Board (SAB) Staff Office has issued "*Notification of an Upcoming Meeting of the Science Advisory Board; Ecological Processes and Effects Committee*" that will be devoted to the review of an empirical approach for developing nutrient criteria. Information on that meeting is available at,
http://yosemite.epa.gov/sab/sabproduct.nsf/WebBoard/252B592016186655852576100055CBDF?OpenDocument and
http://www.epa.gov/fedrgstr/EPA-SAB/2009/August/Day-18/sab19759.htm

The SAB announcement included the following information:
"SUMMARY: The Environmental Protection Agency (EPA or Agency) Science Advisory Board (SAB) Staff Office announces a public meeting of the SAB Ecological Processes and Effects Committee to conduct a review of EPA's draft guidance document, Empirical Approaches for Nutrient Criteria Derivation.

DATES: The meeting dates are Wednesday, September 9, 2009 from 9 a.m. to 5 p.m. (Eastern Time), Thursday, September 10, 2009 from 8:30 a.m. to 5 p.m. (Eastern Time) and Friday, September 11, 2009 from 8:30 a.m. to 12 noon (Eastern Time).

ADDRESSES: The meeting will be held at the Marriott at Metro Center Hotel, 775 12th Street, NW., Washington, DC 20005.

FOR FURTHER INFORMATION CONTACT: Members of the public who wish to obtain further information about this meeting must contact Dr. Thomas Armitage, Designated Federal Officer (DFO). Dr. Armitage may be contacted at the EPA Science Advisory Board (1400F), U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW., Washington, DC 20460; or via telephone/voice mail; (202) 343-9995; fax (202) 233-0643; or e-mail at armitage.thomas@epa.gov. Any inquiry regarding EPA's draft guidance document, Empirical

Approaches for Nutrient Criteria Derivation, should be directed to Ms. Ifeyinwa Davis of EPA's Office of Water at davis.ifeyinwa@epa.gov or (202) 566-1096. General information about the EPA SAB, as well as any updates concerning the meeting announced in this notice, may be found on the SAB Web site at http://www.epa.gov/sab."

"*Background: EPA's Office of Water (OW) is responsible for deriving national recommended water quality criteria that serve as guidance to States to assist them in establishing water quality standards. Nutrients (i.e., nitrogen and phosphorus) have been one of the leading causes of surface water quality impairment in the U.S. Therefore, development of numeric nutrient criteria and assisting States in the adoption of numeric nutrient criteria into their water quality standards is a high priority for OW. EPA published peer reviewed technical guidance for developing nutrient criteria for lakes and reservoirs in April 2000, rivers and streams in July 2000, estuaries and coastal marine waters in October 2001, and Wetlands in June 2008. These guidance documents are available at the following Web site at, http://www.epa.gov/waterscience/criteria/nutrient/guidance/index.html. The basic analytical approaches for nutrient criteria derivation described in these previously published guidance documents include: (1) The reference condition approach, (2) stressor-response analysis, and (3) mechanistic modeling. Because many states are currently pursuing the use of empirically-derived stressor-response relationships as the basis for developing numeric nutrient endpoints for water quality standards, OW has developed the draft guidance document, Empirical Approaches for Nutrient Criteria Derivation, to augment EPA's published guidance manuals. OW has asked the Science Advisory Board to review the draft guidance document and comment on the technical soundness of proposed empirical approaches as the basis for future development of numeric nutrient criteria.*

On April 27, 2009 the SAB Staff Office published a Federal Register Notice (74 FR 19084-19085) requesting public nominations of scientists in fields such as ecology, biology, environmental science, risk assessment, statistics, and zoology to augment the SAB Ecological Processes and Effects Committee. In particular, the SAB Staff Office requested nominations of scientists with specialized knowledge and expertise in the use of empirically-derived stressor-response relationships to develop nutrient assessment endpoints. The augmented Ecological Processes and Effects Committee will conduct the review of EPA's draft Empirical Approaches for Nutrient Criteria Derivation.

Availability of Meeting Materials: The meeting agenda, SAB Committee roster, charge to the Committee, and other meeting material will be posted on the SAB Web site at http://www.epa.gov/sab in advance of the meeting.

Procedures for Providing Public Input: Interested members of the public may submit relevant written or oral information on the topic of this advisory activity, and/or the group conducting the activity, for the SAB to consider during the advisory process.

Oral Statements: In general, individuals or groups requesting an oral presentation at a public meeting will be limited to five minutes per speaker. Interested parties should contact Dr. Armitage, DFO, in writing (preferably via e-mail) at the contact information noted above by September 1, 2009 to be placed on a list of public speakers for the meeting. Written Statements: Written statements should be received in the SAB Staff Office no later than September 4, 2009 so that the information may be made available to the SAB Committee members for their consideration. Written statements should be supplied to the DFO in the following formats: One

hard copy with original signature, and one electronic copy via e-mail (acceptable file format: Adobe Acrobat PDF, WordPerfect, MS Word, MS PowerPoint, or Rich Text files in IBM-PC/ Windows 98/2000/XP format). Submitters are requested to provide two versions of each document submitted with and without signatures, because the SAB Staff Office does not publish documents with signatures on its Web sites.

Accessibility: For information on access or services for individuals with disabilities, please contact Dr. Armitage at the phone number or e-mail address noted above, preferably at least ten days prior to the meeting to give EPA as much time as possible to process your request.

Dated: August 11, 2009. Anthony F. Maciorowski, Deputy Director, EPA Science Advisory Board Staff Office. [FR Doc. E9-19759 Filed 8-17-09; 8:45 am] BILLING CODE 6560-50-P"

The September 23, 2008 Stormwater Runoff Water Quality Newsletter NL 11-9 [available at http://www.gfredlee.com/newsindex.htm] was devoted to problems with the technical reliability of US EPA's "conditional probability" approach for water quality criteria/standards for phosphorus. That issue contained a report by Lee and Jones-Lee,

> Lee, G. F., and Jones-Lee, A., "Comments on US EPA's Conditional Probability Approach for Developing Phosphorus Nutrient Criteria," Report of G. Fred Lee & Associates, El Macero, CA, September 26 (2008).
> http://www.gfredlee.com/Nutrients/PCriterionCondProb.pdf

that discussed aspects of the technical unreliability of using "conditional probability" as a basis for developing nutrient criteria/standards that would be used to regulate phosphorus in domestic wastewater, and urban and stormwater runoff discharges. As discussed in that report, Drs. Lee and Jones-Lee, as well as others, have found that the US EPA's "conditional probability" approach for developing phosphorus nutrient criteria is not technically valid for establishing limitations on phosphorus discharges to waterbodies.

Dr. G. Fred Lee has been involved in evaluating the impact of aquatic plant nutrients (N and P compounds) on waterbodies' water quality since the 1960s. He and Dr. Anne Jones-Lee and their associates have published extensively on these issues with particular reference to assessing and controlling impacts of nutrients on nutrient-related water quality. Their work has included studies of waterbodies in the US, Canada, Western Europe, Japan, and elsewhere. Many of their papers and reports are available on their website (www.gfredlee.com) in the "Excessive Fertilization" section [http://www.gfredlee.com/pexfert2.htm].

It will be important for those who are knowledgeable in the aqueous environmental chemistry and fate of aquatic plant nutrients and how they impact water quality, and those who are potentially impacted by the use of conditional probability to establish nutrient discharge limitations to participate in this SAB review. According to SAB staff, it will be possible for interested parties to listen to the SAB meeting review of this issue on the phone through a call-in number for the meeting, which is 866-628-8629, access code 478054.

Managing Nutrient Discharges/Impacts in the Mississippi River Watershed

Previous Newsletters (NL-9-1/2, and 9-10, available at http://www.gfredlee.com/newsindex.htm) provided information on the role of nutrients (N and P compounds) in stimulating sufficient algal growth in the nearshore waters of the northern Gulf of Mexico to give rise to large-scale oxygen

depletion (hypoxia). Available nutrients stimulate the growth of algae in surface waters; when the algae die, they settle in the water column where they undergo bacterial decomposition which utilizes dissolved oxygen (DO). When nutrient inputs stimulate sufficient algal growth in the surface waters, decomposition of those algae can use sufficient oxygen to deplete the DO in the lower waters of the water column. A US EPA SAB review of this issue, entitled, "Hypoxia in the Northern Gulf of Mexico: Scientific Assessment of Causes and Options for Mitigation" is available at
http://yosemite.epa.gov/sab/sabproduct.nsf/02ad90b136fc21ef85256eba00436459/6f6464d3d773a6ce85257081003b0efe!OpenDocument. The Mississippi River/Gulf of Mexico Watershed Nutrient Task Force, composed of 5 federal agencies and 10 state agencies, is developing approaches to limit nutrient discharges to the Mississippi River and its tributaries to address the hypoxia problem. The Task Force holds public meetings throughout the Mississippi River Basin to inform the public of the progress being made to control Gulf hypoxia; the 18th Public Task Force Meeting will be held September 23-24, 2009 in Des Moines, Iowa. Information on that meeting is available at, http://www.tetratech-ffx.com/tfmeeting/tfmeeting18/index.htm
Information on that task force is available at http://www.epa.gov/msbasin/.

The National Academies of Science and Engineering's Division on Earth and Life Sciences has announced that a meeting devoted to "Clean Water Act Implementation across the Mississippi River Basin" will be held on September 1 and 2, 2009 in Moline, IL. Information on that meeting is available at,
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=3620. Contact Ellen de Guzman (email: edguzman@nas.edu.phone 202-334-3422 fax: 202-334-1961) for more information on the meeting. According to the agenda, the open session of the meeting will include a presentation by Mike Sullivan, Mississippi River Basin Coordinator, USDA Natural Resources Conservation Service, Little Rock, Arkansas entitled, "USDA Nutrient Management Programs, Progress, and Future Directions;" a presentation by Dale Robertson, Research Hydrologist, U.S. Geological Survey, Middleton, Wisconsin entitled, "Recent Results from SPARROW Water Quality Modeling;" as well as other presentations on nutrient management issues in the Mississippi River watershed.

Previous Newsletters NL-9-1/2, and 9-10 have addressed an important issue for the development of phosphorus control programs, namely the need to control particulate, inorganic phosphorus in agricultural stormwater runoff. The US EPA has adopted the policy of requiring the control of total phosphorus, rather than algal-available phosphorus, from all sources. However, as discussed in the Newsletters cited above and in papers and reports on the Lee and Jones-Lee website, at, http://www.gfredlee.com/pexfert2.htm there is a substantial body of technical literature that demonstrates that inorganic phosphorus in agricultural runoff is largely unavailable to support algal growth and does not convert to algal-available P. The focus of evaluation and control programs for nutrients in agricultural land runoff should be on algal-available P rather than on total phosphorus.

Development of Nutrient Criteria for Regulating Nutrient Discharges to California Enclosed Bays and Estuaries

The California State Water Resources Control Board (SWRCB) is developing water quality criteria for nutrients for the California enclosed bays and estuaries. This effort is required under

the US EPA as part of Water Quality Criteria for Nitrogen and Phosphorus Pollution control. The US EPA's "Criteria Development Guidance, Estuarine and Coastal Waters Nutrient Criteria Technical Guidance Manual: Estuarine and Coastal Marine Waters EPA-822-B-01-003; October 2001" is available at
http://www.epa.gov/waterscience/criteria/nutrient/guidance/marine/index.html.

Information on the US EPA Region 9 Nutrient Criteria Program for California is provided at, http://rd.tetratech.com/epa/.

The SWRCB has organized a Coastal Stakeholder Advisory Group to review the development of nutrient criteria for enclosed bays and estuaries. The next meeting of the Coastal Stakeholder Advisory Group for the State Water Board's Numeric Nutrient Endpoints project will be next Wednesday, August 26, from 9:30 to no later than 3:30, at the San Francisco Estuary Institute in Oakland. According to the SWRCB, it will be possible to follow the activities of the SWRCB and this Advisory Group by teleconference and the Internet links. Meeting agenda and background materials and the information on remote access to this meeting are presented below.

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Coastal Science Advisory Group to the State Water Resource Control Board's Estuarine Nutrient Numeric Endpoint Project

Meeting Agenda

8-26-2009, 9:30 am – 3:30 pm

Location: San Francisco Estuary Institute, 7770 Pardee Ln Oakland, CA (see directions on 3rd page)

Meeting Goals:

1) Comment on SWRCB/STRTAG definition of target population of "estuaries" for E-NNE project
2) Provide feedback to Technical Team on types of indicators that should be considered for E-NNE development
3) Discuss classification study plan

Meeting Materials:

- 7-20-2009 STRTAG meeting notes
- 8-17-2009 STRTAG meeting notes (to be distributed)
- Tech team memo on recommendation of interpretation of SWRCB definition of "enclosed bays" and "estuaries"
- Indicator discussion document
- Classification study design

Agenda:

9:30 – 10:00 Introductions, meeting goals, and follow up on questions from previous meeting [Brock Bernstein, Martha Sutula, Rik Rasmussen]

Follow up questions from 6/30/2009 Coastal SAG Meeting to SWRCB/STRTAG:

- Is E-NNE indicators assessing nutrient overenrichment or eutrophication?
- Could STRTAG/SWRCB articulate how NNE will be incorporated into RWQCB basins plans? What will be incorporated into actual permits?
- How would RWQCB deal with actual versus potential beneficial uses?

Background materials for discussion:

- **8-17-2009 STRTAG meeting notes (to be distributed 8/21/2009)**

10:00 – 11:30 Discussion and feedback on SWRCB/STRTAG definition of target population of "estuaries" for E-NNE project

Background materials for discussion:

- **Tech team memo on recommendation of interpretation of SWRCB definition of "enclosed bays" and "estuaries"**
- **7-20-2009 STRTAG meeting notes**

11:30—12:00 Lunch

12:00 – 2:00 Provide feedback to Technical Team on types of indicators that should be considered for E-NNE development

Discussion Questions:

- Is indicator list complete? Is there anything that needs to be added?
- SCCWRP recommends that the emphasis of Tech Team time be spent on the primary biological response and secondary abiotic response indicators. Do you agree?
- Should the Tech Team consider indicators (otherwise referred to as secondary biological response indicators) that respond to other common estuarine stressors, eg.
  - Eelgrass cover (which responds to turbidity from excessive sedimentation, temperature, water depths)
  - Benthic macroinvertebrate community structure (which responds to contaminants, excessive sedimentation, etc.)?
- Should Tech Team consider indicators that explicitly tie the "impairment" to nutrients, if science supports that this can be done reliably?

Background materials for discussion:

- **Indicator discussion document**
- **8-17-2009 STRTAG meeting notes**

2:00-2:15 Break

2:15 – 3:15 Provide feedback on classification study design

Background materials for discussion:

- **Classification study design**

Remote Access:

To join the online meeting

1. Go to https://waterboards.webex.com/waterboards/j.php?ED=99877362&UID=0&PW=cbb3bcbbf63f27222d
2. Enter your name and email address.
3. Enter the meeting password: tmdl
4. Click "Join Now".

To join the teleconference only:

Call-in toll-free number (Verizon): 1-866-876-1507
Call-in number (Verizon): 1-203-480-4225
Attendee access code: 6555305

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Brock B. Bernstein, Ph.D. 308 Raymond St., Ojai, CA 93023, Phone (805) 646-8369, Fax (805) 646-3849, email brockbernstein@sbcglobal.net is the chair of the Stakeholder Advisory Group. Anyone wishing to be placed on the email list to receive information on the activities of the Coastal Stakeholder Advisory Group and to receive further information on the August 26 meeting should contact Dr. Bernstein.

The state of California (SWRCB) and the US EPA have been meeting periodically as the California State Regional Technical Assistance Group (STRTAG) to discuss developing numeric nutrient endpoint criteria. The SWRCB Coastal SAG's efforts to develop numeric nutrient criteria are focused on a comprehensive examination of how nutrient enrichment of waterbodies impacts the aquatic ecosystem. A summary of the SWRCB Coastal SAG approach is presented in a set of PowerPoint slides [SWRCB, "Estuarine NNE Project - NNE STRTAG Meeting Conference Call August 17, 2009," California State Water Resources Control Board (SWRCB) Coastal Nutrient Development Program Sacramento, CA, August 17 (2009)] available at www.gfredlee.com/Nutrients/STRTAG8-17-09Mtg.pdf in the Excessive Fertilization section [http://www.gfredlee.com/pexfert2.htm]. The SWRCB approach considers the impacts of nutrients enrichment as described on a PowerPoint slide presented at the August 17 STRTAG meeting, which stated:

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Indicators Types

- Causal indicators (focused on nutrients)
- Response indicators
  - Primary Biological Response (increased primary producer biomass and/or change in species composition; e.g., macroalgae)
  - Secondary Response
    - Physiochem – System metabolism (surface water DO, Productivity: Respiration Ratio), Water Clarity
    - Biological Response – Change in biomass or species composition as a result of primary biological response; e.g., eelgrass decline, benthic macroinverts

[from: SWRCB, "Estuarine NNE Project - NNE STRTAG Meeting Conference Call August 17, 2009," California State Water Resources Control Board (SWRCB) Coastal Nutrient Development Program Sacramento, CA, August 17 (2009).

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At that meeting, the US EPA representatives expressed the view that the SWRCB's proposed approach for developing numeric nutrient criteria for enclosed bays and estuaries is too comprehensive and that is will take too long to develop the information needed to implement this approach. The US EPA representatives indicated that the focus of the SWRCB numeric nutrient endpoint efforts should be on relating nutrient concentrations to readily observable water quality impacts, i.e., traditional water quality impacts of nutrients on water quality. The US EPA headquarters again reminded the SWRCB of the US EPA's ability to develop nutrient criteria for the state if the state does not develop criteria in a timely manner. These issues will be reviewed at the August 26 meeting of the Coastal Stakeholder Advisory Group.

Information on the SWRCB's approach for developing nutrient criteria for enclosed bays and estuaries is available on the Southern California Coastal Water Research Project website, http://www.sccwrp.org/view.php?id=79 under the title, "Project: Technical Support for Nutrient Numeric Endpoint and TMDL Tool Development" and at, http://www.gfredlee.com/Nutrients/CoastalSAGMeeting5-1-2009.pdf.

Ammonia Nutrient and Toxicity Issues in the Central Valley Delta - Ammonia Summit

Associated with work on the Pelagic Organism Decline (POD) in California's Central Valley/Sacramento San Joaquin Delta (http://calwater.ca.gov/science/pod/pod_review.html) has been an attempt to determine the cause of the decline of certain fish species in the Delta. (Newsletters 10 -10/11, 10-12, 11-5, 11-7/8 provide information on Delta water quality issues.) One of chemicals that has been suggested as a factor in the POD is ammonia that is discharged primarily by the Sacramento Regional County Sanitation Districts (SRCSD) to the Sacramento River at the north end of the Delta. The District's wastewater treatment plant serves about 1.3 million people in Sacramento and neighboring communities, and has an average dry weather flow of 127 million gallons/day. CALFED Science Program conducted a workshop entitled, "The Development of a Research Framework to Assess the Role of Ammonia/Ammonium on the Sacramento-San Joaquin Delta and Suisun Bay Ecosystem." The results of that workshop are available at, http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/ambient_ammonia_concentrations/index.shtml

According to the CALFED Science Program website,
"Recent studies and analyses indicate ammonia may be impacting Delta species. The Regional Water Quality Board, in cooperation with multiple agencies and interested stakeholders, is evaluating the role of ammonia on the Sacramento-San Joaquin Delta and Suisun Bay ecosystem."
The issues of concern are whether ammonia, at concentrations below the US EPA water quality criteria for ammonia, is toxic to some forms of aquatic life in the Delta and thereby could be impacting the POD. There is also concern that the ammonia discharged to the Delta is adversely impacting the species composition of phytoplankton, leading to bluegreen algal blooms. A finding that the SRCSD ammonia discharge is adversely impacting the Delta water quality and/or resources could mean the expenditure of about $700 million for the nitrification of the District's treatment plant effluent to reduce the ammonia concentrations in the effluent, and almost a billion dollars to nitrify/denitrify the effluent to reduce the total nitrogen discharged to the Sacramento River.

The California Central Valley Regional Water Quality Board (CVRWQCB) and the CALFED Science Program held an "Ammonia Summit" workshop on August 18 & 19, 2009 to review the current information on the impacts of ammonia on Delta water and resource quality. Information on that two-day summit is available on the CALFED Science webpage, "Delta Water Quality - Effects of Ambient Ammonia Concentrations" located at http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/ambient_ammonia_concentrations/index.shtml. The workshop included scientific presentations and discussions among presenters and the audience on various topic areas, including: sources, concentrations,

fate and transport; food web dynamics; and toxicology. The abstracts of the presentations are posted on the CALFED Science ammonia webpage presented above. The PowerPoint slides for the presentations at the Summit will be posted on the CALFED Science webpage in the near future. To follow CVRWQCB activities in the investigation and management of the water quality issues associated with ammonia in the Delta, contact Stephanie Fong (swfong@waterboards.ca.gov or 916-464-4822) or Adam Ballard (aballard@waterboards.ca.gov or 916-464-4649).