

**Summary Minutes of the
U.S. Environmental Protection Agency Science Advisory Board
Lake Erie Phosphorus Objectives Review Panel
Public Teleconference
October 12, 2016**

Date and Time: Wednesday, October 12, 2016, 1:00 p.m. – 5:00 p.m.

Location: By teleconference

Purpose: To discuss the Science Advisory Board (SAB) Lake Erie Phosphorus Objectives Review Panel’s draft report on Lake Erie nutrient load reduction models and targets.

Participants:

Members of the U.S. Environmental Protection Agency Science Advisory Board Lake Erie Phosphorus Objectives Review Panel

(Panel roster is provided in attachment A):

Dr. William Schlesinger
Dr. Meryll Alber
Dr. James Ammerman
Dr. Steven Bartell
Dr. Hunter Carrick
Dr. Celia Chen
Dr. John Connolly
Dr. Robert Diaz
Mr. Douglas Endicott
Mr. James Fitzpatrick
Dr. Robert Heath
Dr. Lucinda Johnson
Dr. Douglas McLaughlin
Dr. Emma Rosi-Marshall
Dr. Eric Smith
Dr. William Stubblefield

EPA Science Advisory Board (SAB) Staff:

Dr. Thomas Armitage, Designated Federal Officer
Mr. Christopher Zarba, Director SAB Staff Office

EPA Representatives:

Ms. Santana Wortman, EPA Great Lakes National Program Office

Other Attendees:

(List of others who requested access to the teleconference)

Valerie Baron, NRDC
Jan Ciborowski, University of Windsor
Douglas P. Clark, City of Bowling Green, OH
Jean Chruscicki, EPA Region 5
Andrea Ferrenz, Innophos, Inc.
Ken Gibbons, Great Lakes Commission
Sandra Kosek-Sills, Ohio Lake Erie Commission
Russel Kreis, EPA/ORD
Jim Lang
Sandra A. Orlando, Ohio Sea Grant Program
Mekela Panditharatne
Michelle Seizer, Michigan Office of the Great Lakes
Craig Stow, NOAA
Don Tuxill, NYSDEC
Donald Wiggins, Ohio Environmental Council

Teleconference Summary:

Convene the Teleconference

Dr. Thomas Armitage, Designated Federal Officer (DFO) for the SAB Panel, convened the teleconference at 1:00 p.m. Eastern Time. He identified panel members who were on the call. He noted that the Panel operates as part of the EPA Science Advisory Board (SAB), which is a chartered Federal Advisory Committee under the Federal Advisory Committee Act (FACA) and is empowered by law to provide advice to the EPA Administrator. He stated that summary minutes of the teleconference would be prepared and posted on the SAB website after they were certified by the Chair. He noted the Panel's compliance with ethics requirements. Dr. Armitage indicated that meeting materials were available on the SAB web site. These meeting materials included: the Federal Register Notice announcing the teleconference,¹ teleconference agenda,² Panel roster,³ the Panel's draft (9-1-16) report to the EPA titled *SAB Review of Lake Erie Nutrient load Reduction Models and Targets*,⁴ compilation of Lake Erie Phosphorus Objectives Review Panel Member Comments on the Panel's Draft (9-1-16) Report (as of 9-27-16),⁵ and written public comments from David Baker, Heidelberg University.⁶ Dr. Armitage noted that time had been included on the agenda to hear oral public comments but no requests to speak had been received from members of the public. He also indicated that public access to the teleconference had been provided through a conference line and live audio webcast. He asked members of the public listening to the webcast to send him an email at armitage.thomas@epa.gov indicating that they were on-line.

Review of Agenda and Purpose of the Teleconference

Dr. William Schlesinger, Chair of the SAB Panel, reviewed the teleconference objectives and agenda. He stated that the Panel was holding teleconferences on October 12th and 13th to discuss its draft report on Lake Erie nutrient load reduction models, targets, and adaptive management. He noted that the Panel had held a meeting on June 21-22, 2016 to: (1) review modeling results that informed the development of binational phosphorus reduction targets, and (2) to discuss responses to EPA's six charge questions. He indicated that the Panel had reviewed two documents submitted by EPA: (1) the Great Lakes Water

Quality Agreement Annex 4 Ensemble Modeling Report; and (2) Recommended Phosphorus Loading Targets for Lake Erie.

He noted that after the June 21-22 meeting, lead writers assigned to each of the questions had developed written responses that were incorporated into the draft report (dated 9-1-16) to be discussed. Dr. Schlesinger indicated that the Panel would discuss each section of its draft report, focusing on points that may lack consensus, be inaccurate or problematic, need to be added, or need additional explanation. He indicated that; (1) an objective of the call was to reach agreement on changes to be made; (2) if changes were needed a Panel member would be identified to incorporate the necessary revision; and (3) in some cases the panel might agree that the chair would work with the DFO to incorporate changes.

Dr. Schlesinger reviewed the agenda, noting that: (1) the Panel would first hear brief remarks from EPA; (2) after EPA remarks there was time on the agenda for oral public comments, but no requests to speak had been received; (3) there was time on the agenda (on either October 12 or 13) to hear brief clarifying comments from EPA and the public; (4) if possible, the Panel would discuss the entire report, the executive summary, and letter to the Administrator on the October 12th call; and (5) if additional time was needed for the discussion, a call would be held the following day.

Dr. Schlesinger asked members to refer to the page and line numbers in the PDF version of the Panel's draft report. He also indicated that a compilation of comments on the report had been sent to Panel members and was available on the SAB website. He noted that after the teleconferences, the revisions discussed would be incorporated into another draft of the report. That draft would be sent to the Panel for review and concurrence before it was sent to the chartered SAB to for quality review.

Dr. Schlesinger called for questions from members. There were no questions so Dr. Schlesinger called for remarks from EPA.

Remarks from EPA

Ms. Santana Wortman from EPA's Great Lakes National Program Offices requested clarification of several recommendations in the Panel's draft report. In her remarks Ms. Wortman indicated that it would be helpful to clarify:

1. The priority of the recommendations in the panel's draft report.
2. Recommendations concerning the selection of models.
3. Recommendations concerning work that was needed to understand whether nitrogen control should be considered.

Dr. Schlesinger thanked Ms. Wortman for her comments.

Discussion of the Panel's Draft Report

Dr. Schlesinger called for discussion of the draft report. He noted that a member had suggested that a priority ranking of the recommendations be included in the report and he asked members to discuss whether the Panel should try to prioritize the recommendations.

A member commented that it would be useful to give some indication of the priority of recommendations. She noted that perhaps the Panel could identify categories of research that should be of the higher priority. She noted, however, that it might be difficult to do this.

Another member also suggested that, to the extent possible, the Panel should provide information about the relative priority of recommendations. Several members indicated that it would be difficult to rank the recommendations and suggested that this might not be necessary. Another member observed that some of the recommendations were repeated in several of the charge question responses. He indicated that this was not a problem, but noted that clarification of some of the recommendations was needed.

Dr. Schlesinger indicated that it would be useful to provide an indication of whether the Panel thought recommended work could be completed in near term, intermediate term, or long term. He asked members to keep this in mind as they discussed the report and noted that, after the call members should provide input about this to the DFO.

Section 3.1.1 – Response to Charge Question 1– evaluation of the models to inform interpretation of results

The Panel discussed the response to Charge Question 1. Members discussed whether the draft report should contain a recommendation indicating that the EPA should use a single process-based model. Members commented that the draft response to the charge question recommended that EPA focus on using a smaller number of models. Members discussed whether the Panel should recommend that EPA further develop and use the Western Lake Erie Ecosystem Model (WLEEM). A member commented that the original ensemble approach enabled use of the best aspects of different modeling approaches. He agreed with the suggestion to reduce the number of models used, but indicated that selecting one model for use would abandon the ensemble approach. Members further discussed revising the report to recommend that EPA consider using a single process-based model. A member suggested that the report could indicate that the WLEEM exemplified the kind of model that could be used. Another member commented that the EPA could draw upon the best process-based models to develop a new model or further develop the WLEEM. A member commented that the availability of funding should not be the primary driver decisions regarding model selection (e.g., a decision to reduce the number of models used). Another member commented that it was reasonable to recognize that the Panel's recommendations were provided in light of constraints on available resources.

The Panel discussed the benefits of using an ensemble approach. A member commented that the report should indicate that an ensemble approach had initially been considered but was no longer being used. Another member indicated that an ensemble approach had never been used. He noted that work had never been undertaken to combine models. Members commented that the EPA had used a multiple model approach. A member indicated that the report should recommend the use of one or two models. Another member commented that use of a single process-based model could be recommended if the model were enhanced to include missing components. Other members agreed that model enhancements were needed.

The Panel discussed and agreed upon report revisions that addressed: (1) the finding that goodness of fit of the models does not constitute the ability to predict, (2) a recommendation that the EPA should to provide an estimate of nutrient and total suspended loading from small tributaries, and (3) a recommendation that the EPA investigate when and where data collection was needed to inform models and reduce model uncertainty. Other editorial changes listed in the compilation of Panel member comments were also considered and agreed upon.

Section 3.1.2 – Response to Charge Question 2 - phosphorus loading targets

The Panel discussed members' comments on the response to Charge Question 2. A member commented that the Lake Erie models had been developed on the basis of data collected over the past 40 years. He noted that this could be problematic because the models may no longer represent the current Lake Erie ecosystem. Members discussed other modeling concerns. These included: (1) the need to account for legacy phosphorus in sediments, (2) the need to understand nitrogen and phosphorus co-limitation of harmful algal blooms, (3) the need to account for processes such as internal nutrient loading and recycling. Members agreed that the report should be revised to address these concerns.

The Panel discussed other issues that had been raised in the compilation of members' comments and agreed upon edits. These included edits that addressed: (1) sensitivity of ecological response indicators to nutrient inputs, (2) uncertainty associated with the prediction of hypoxia, (3) the predicted hypoxic area, (4) the role of dreissenid mussels, (5) discussion concerning the Great Lakes *Cladophora* model, (6) discussion of the importance of climate change events, (7) the addition of citations to support some statements in the report, (8) the effect of nutrient load reduction on fisheries, and (9) the statement of the Panel's findings concerning the proposed nutrient reduction target. Other edits and revisions of text in Section 3.1.2 of the report were discussed.

Section 3.2.1 – Response to Charge Question 3 – Cladophora growth

The Panel discussed and agreed upon clarifications in the text of the response to Charge Question 3. Panel members discussed several clarifying edits concerning recommended work to support the development of scientifically sound recommendations to reduce *Cladophora* growth. Members agreed to include text indicating that *Cladophora* management was a pressing regional issue in need of scientific and management attention. In addition, members discussed revising the report to clarify the role that *Cladophora* plays as an ecosystem engineer.

The Panel discussed report text that identified the levels of *Cladophora* dry weight that represented a degraded condition. A member commented that references were needed to support this text. Members also discussed incorporating a revision to clarify a recommendation to investigate the role that soluble reactive phosphorus plays in *Cladophora* growth. Members also discussed revising the report to identify other possible drivers of *Cladophora* growth (including substrate type and dreissenid mussel density).

Section 3.3.1 – Response to Charge Question 4 - nitrogen control

The Panel discussed and agreed upon revisions in the text of the response to Charge Question 4. A member suggested revising text that addressed the need for a dual nutrient strategy. He noted that there was increasing evidence of the need for a dual nutrient strategy, but indicated that it may be premature to recommend a dual nutrient strategy for Lake Erie. He noted that additional research was needed to answer some key questions. He further indicated that some limnologists had recommended phosphorus control in Lake Erie. He suggested revision of the text to reflect these comments. Members agreed with proposed revisions. Another panelist suggested that “nutrient control” should be characterized as a “nutrient reduction strategy.”

A member commented that phytoplankton biomass experienced co-limitation by nitrogen and phosphorus during late summer and early fall. He provided a reference to support this statement. The

Panel discussed how to describe dissimilatory nitrate reduction to ammonium. Members agreed that a footnote should be inserted in the report to indicate that it is a transformation process, not a removal process. A member commented that the report should indicate that nitrogen and phosphorus promote the growth of nuisance benthic green algae. Other revisions were considered and agreed upon. These included clarifying changes in the text addressing the potential for nitrogen removal by best management practices, and changes in the abundance of species of phytoplankton as a result of low availability of nitrogen.

Section 3.4.1 – Response to Charge Question 5 – assessing progress in reducing tributary loadings of phosphorus

The Panel discussed proposed revisions in the response to Charge Question 5. A member commented that flow-adjusted averages improved the accuracy of estimates of total load but could underestimate concentrations of nutrients. He noted that phytoplankton generally responded to concentrations of nutrients in the immediate environment. Members indicated that a brief discussion of the importance of concentration could be included in the report. Another member indicated that the report should call for collection of additional information on precipitation and flow. Members agreed to include this point in the report text that addressed climate change. The Panel agreed to incorporate other edits proposed in the compilation of member comments.

Section 3.4.2 – Response to Charge Question 6 – adaptive management

The Panel discussed proposed revisions in the response to Charge Question 6. Members expressed support for the recommendation that the EPA implement an adaptive management approach. Members commented on some of the suggested hypotheses and research needs that had been included in the response to the charge question. A member commented that some of the hypotheses did not seem to be appropriate (e.g., the effect of stratification and the effect of legacy carbon on dissolved oxygen). He noted that the state of the science was currently beyond the point of requiring the testing of these hypotheses.

A member commented that hypotheses should address plausible explanations and be oriented toward causality. He noted that the hypotheses presented in the draft report were really expected relationships. Another member commented that the suggested hypotheses in the draft report reflected discussion that had occurred at the Panel's previous meeting. She suggested that this section of the report be rewritten to indicate that the SAB had provided a list of issues that might be considered as part of an adaptive management program, along with accompanying research, monitoring, and modeling topics to be addressed under each issue. Other members agreed with this approach. The Chair asked the lead writer to incorporate the proposed revisions into this section of the report and send it to a subgroup of Panel members for review. He asked members to state whether they would like to be included in the subgroup. Six members (Drs. Alber, Bartell, Chen, Connolly Fitzpatrick, and Heath) indicated that they would be part of the subgroup.

Summary

Dr. Schlesinger noted that it was time to recess the teleconference. He thanked Panel members for their comments and noted that the Panel would continue discussing its draft report on a teleconference to be convened at 1:00 pm the following day. He indicated that the Panel would complete its discussion of the response to Charge Question 6 and then discuss the draft executive summary and letter to the Administrator.

Dr. Armitage then stated that the Panel would meet by teleconference the following day (October 13, 2016) at 1:00 p.m. Eastern Time to continue the discussion and he adjourned the teleconference.

Respectfully Submitted:

/s/

Dr. Thomas Armitage
Designated Federal Officer

Certified as Accurate:

/s/

Dr. William H. Schlesinger, Chair
SAB Lake Erie Phosphorus Objectives
Review Panel

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by Panel members during the course of deliberations within the meeting. Such ideas, suggestions and deliberations do not necessarily reflect consensus advice from Panel members. The reader is cautioned to not rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters or reports prepared and transmitted to the EPA Administrator following the public meetings.

ATTACHMENT A: PANEL ROSTER

U.S. Environmental Protection Agency Science Advisory Board Lake Erie Phosphorus Objectives Review Panel

CHAIR

Dr. William H. Schlesinger, President Emeritus, Cary Institute of Ecosystem Studies, Millbrook, NY

MEMBERS

Dr. Merryl Alber, Professor, Department of Marine Sciences, University of Georgia, Athens, GA

Dr. James Ammerman, Long Island Sound Study Science Coordinator, New England Interstate Water Pollution Control Commission, Stamford, CT

Dr. Steven Bartell, Principal, Vice President, and Technical Director, Cardno ENTRIX, Greenback, TN

Dr. Hunter Carrick, Professor, Biology, Central Michigan University, Mount Pleasant, MI

Dr. Celia Chen, Research Professor, Department of Biological Sciences, Dartmouth College, Hanover, NH

Dr. John P. Connolly, Principal, Anchor QEA, LLC, Woodcliff Lake, NJ

Dr. Richard Di Giulio, Professor, Nicholas School of the Environment, Duke University, Durham, NC

Dr. Robert Diaz, Professor Emeritus, Department of Biological Sciences, Virginia Institute of Marine Science, College of William and Mary, Gloucester Pt., VA

Mr. Douglas Endicott, P.E., Great Lakes Environmental Center, Traverse City, MI

Mr. James J. Fitzpatrick, Project Principal Engineer, HDR Engineering, Mahwah, NJ

Dr. Robert T. Heath, Professor Emeritus, Department of Biological Sciences, Kent State University, Kent, OH

Dr. Lucinda Johnson, Associate Director, Natural Resources Research Institute, University of Minnesota Duluth, Duluth, MN

Dr. J. Val Klump, Professor and Dean, School of Freshwater Sciences, Great Lakes Water Institute, University of Wisconsin-Milwaukee, Milwaukee, WI

Dr. Thomas W. La Point, Professor Emeritus, Department of Biological Sciences, University of North Texas, Denton, TX

Dr. Douglas McLaughlin, Principal Research Scientist, Northern Regional Center, National Council for Air and Stream Improvement, Mattawan, MI

Dr. Ramesh Reddy, Graduate Research Professor, Soil and Water Science, University of Florida, Gainesville, FL

Dr. Emma Rosi-Marshall, Senior Scientist, Cary Institute of Ecosystem Studies, Millbrook, NY

Dr. Eric P. Smith, Professor, Department of Statistics, Virginia Tech, Blacksburg, VA

Dr. William Stubblefield, Senior Research Professor, Department of Molecular and Environmental Toxicology, Oregon State University, Corvallis, OR

Dr. Maurice Valett, Professor of Systems Ecology, Division of Biological Sciences, University of Montana, Missoula, MT

SCIENCE ADVISORY BOARD STAFF

Dr. Thomas Armitage, Designated Federal Officer, U.S. Environmental Protection Agency, Washington, DC

Materials Cited

The following meeting materials are available on the SAB website, www.epa.gov/sab. Meeting materials for both the on the October 12th and 13th teleconferences of the Lake Erie Phosphorus Objectives Review Panel are on the October 12th meeting page of the SAB website.

<https://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/150AB78DDAB990B5852580180076194A?OpenDocument>

¹ Federal Register Notice

² Agenda

³ Panel Roster

⁴ SAB Review of Lake Erie Nutrient Load Reduction Models and Targets

⁵ Compilation of Lake Erie Phosphorus Objectives Review Panel Member Comments on the Panel's Draft (9-1-16) Report (As of 9-27-16)

⁶ Comments from David Baker, Heidelberg University