

**Summary Minutes of the
U.S. Environmental Protection Agency Science Advisory Board
Panel for the Review of the EPA Water Body Connectivity Report
Public Teleconference
May 2, 2014**

Date and Time: Friday, May 2, 2014, 1:00 – 5:00 p.m.

Location: By teleconference

Purpose: To discuss the Panel’s draft report (4/23/14) on the review of the EPA document *Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence (September, 2013 External Review Draft, EPA/600/R-11/098B)*

Participants:

Members of the EPA Science Advisory Board (SAB) Panel for the Review of the EPA Waterbody Connectivity Report (Panel roster is provided in attachment A):

Dr. Amanda Rodewald
Dr. Allison Aldous
Dr. Genevieve Ali
Dr. J. David Allan
Dr. Lee Benda
Dr. Emily Bernhardt
Dr. Robert Brooks
Dr. Kurt Fausch
Dr. Siobhan Fennessy
Dr. Michael Gooseff
Dr. Lucinda Johnson
Dr. Michael Josselyn
Dr. Latif Kalin
Dr. Kenneth Kolm
Dr. Judith Meyer
Dr. Mark Murphy
Dr. Mark Rains
Dr. K. Ramesh Reddy
Dr. Emma Rosi-Marshall
Dr. Jack Stanford
Dr. Mazeika Sullivan
Dr. Jennifer Tank
Dr. Maurice Valett

SAB Staff:

Dr. Thomas Armitage, Designated Federal Officer
Ms. Iris Goodman, Designated Federal Officer
Mr. Christopher S. Zarba, Acting Director, EPA SAB Staff Office
Mr. Thomas Brennan, Deputy Director, EPA SAB Staff Office

EPA Representatives:

Dr. Laurie Alexander
Dr. Jeffrey Frithsen

Other Attendees:

A list of others who requested access to the meeting by teleconference or webcast is provided in attachment B.

Teleconference Summary:

Convene the meeting

Dr. Thomas Armitage, Designated Federal Officer (DFO) for the Panel, convened the teleconference at 1:00 p.m. Eastern Time. He identified the Panel members who were on the call. He stated that the Panel had held a teleconference on April 28th to discuss its draft report and that discussion of the report would continue on this teleconference. Dr. Armitage stated that meeting materials were available on the SAB website. These materials included: the Federal Register Notice announcing the meeting¹, meeting agenda,² Panel roster³, two drafts of the Panel's report⁴, and individual comments on the report from Panel members⁵. Members of the public had provided oral comments to the Panel on the April 28th teleconference. The list of public speakers⁶ had been posted on the SAB website. In addition, written public comments had been received through the EPA docket and the written comments were available to the public on the EPA docket website⁷

Review of Agenda and Purpose of the Teleconference

Dr. Amanda Rodewald, Chair of the SAB Panel, welcomed the Panel members, EPA staff, and others to the call and reviewed the teleconference objectives and agenda. She indicated that the Panel was holding the teleconference to continue discussing its draft report. The report provided responses to the charge questions for the review of the EPA document *Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence*. She noted that the Panel had held a teleconference on April 28th and had discussed Sections 3.1 and 3.2 of its report. She indicated that the Panel would next discuss Sections 3.3 – 3.8 (the responses to EPA charge questions 3a, 3b, 4a, 4b, 5a, and 5b) and the executive summary and the letter to the EPA Administrator. She noted that the purpose of the teleconference was to discuss the report and reach agreement on any changes that were needed. Dr. Rodewald indicated that the discussion should focus on issues that may: 1) lack consensus, 2) be inaccurate or problematic, 3) need additional explanation or context, or 4) need to be added to the report.

Dr. Rodewald indicated that Panel members had received the markup draft of the report (dated 4-23-14) which included the written comments and revisions suggested by members of the Panel. She noted that lead writers and members of Panel subgroups had worked on various sections of the draft. She indicated

that in the discussion of sections of the report, subgroup members would first provide comments and then all members of the Panel would discuss the draft and come to agreement on any revisions needed. She asked Panel members to refer to page and line numbers in the April 23rd draft during the discussion. Dr. Rodewald noted that if the Panel needed more time to discuss the draft report another teleconference would be scheduled.

A member asked Dr. Rodewald for further explanation of the process for incorporating changes into the Panel's report. Dr. Rodewald indicated that: 1) she would keep track of the revisions discussed on the call; 2) after the teleconference, the DFO would contact members of the Panel who had been assigned to provide revisions and would ask them to send revised text for incorporation into the report; and 3) She would then work with the DFO to prepare the revised draft of the report which would be sent to the Panel for review.

There were no further questions so Dr. Rodewald called for the discussion of the report.

Discussion of the Panel's Draft Report

Discussion of Sections 3.3 and 3.4 (Response to Charge Questions 3a and 3b – Ephemeral, Intermittent, and Perennial Streams – Literature Review and Findings and Conclusions)

Panel members discussed Section 3.3 of the report. Some members suggested that subsections 3.3.8 and 3.3.9 (which addressed the effects of streamside vegetation and connections to the riparian landscape) should be revised or moved to the adjacent waters and wetlands section. Other members commented that subsections 3.3.8 and 3.3.9 focused on topics relevant to headwater streams should therefore be kept in the streams section. Members noted that, although streams and floodplains were an ecological unit, it was necessary to discuss these landscape settings separately in responses to different charge questions. Panelists agreed to combine subsections 3.3.8 and 3.3.9 and revise the heading to indicate that the combined subsection addressed the effects of riparian zones on headwater streams.

Panel members discussed the recommendations in Section 3.3. Members indicated that an expanded discussion of cumulative and aggregate effects of tributaries on downstream waters was needed in the EPA Report. A member commented that the EPA Report also needed further discussion (and literature citations) on the connectivity of effluent dependent waters, human modified headwater streams and the importance of changes in flow to connectivity. The Panel discussed moving the text in subsection 3.3.12 of the report into previous subsections. Some members commented that the EPA's Report needed additional information on the effects of beaver dams on connectivity of streams and wetlands to downstream waters.

The Panel discussed Section 3.4 of its report. The Panel discussed clarifying revisions in the recommendations. Members commented that it was important to emphasize that biological connectivity should be considered. Panel members also indicated that EPA's report should discuss how differences in flows affect connectivity. Members discussed specific edits and revisions for the case studies in the EPA Report. The Panel also discussed combining and reordering some recommendations. In addition, The Panel discussed EPA's conclusion that tributary streams are physically, chemically, and biologically connected to downstream rivers. Panel members generally agreed that the EPA Report provided strong support for this conclusion, but members indicated that the EPA should recognize that there is a gradient of connectivity that is a function of the frequency, duration, magnitude, predictability, and consequences of physical, chemical, and biological processes.

Discussion of Sections 3.5 and 3.6 (Response to Charge Questions 4a and 3b — Waters and Wetlands in Floodplain Settings - Literature Review and Findings and Conclusions)

The Panel discussed Section 3.5 of its report. Members indicated that in EPA's Report, the discussion of the riparian literature should be moved from Chapter 5 to Chapter 4. The Panel also discussed recommendations concerning terminology in the EPA Report. Members indicated that the terms "bidirectional" and "unidirectional" waters and wetlands should not be used in the EPA's Report. Members also noted that this terminology should not be used in the Panel's report. Members recommended use of alternative terminology (i.e., waters and wetlands in floodplain settings and waters and wetlands in non-floodplain settings).

The Panel discussed the recommendation that the EPA emphasize the importance of the temporal dimension of floodplain systems as guided by the "flood pulse" concept. Members suggested clarifying revisions. Members noted that the EPA Report should contain additional references to the literature on the spatial and temporal features of connectivity. Panelists noted that in this regard it was important to focus on the flood pulse concept. The Panel agreed that Section 3.5 of its report should include a short subsection on relevant spatial and temporal scales of connectivity. The Panel discussed including additional literature citations on the importance of groundwater connectivity and residence time. The Panel also discussed combining and reordering some of the recommendations.

The Panel discussed Section 3.6 of its report. Members commented that the EPA report provided support for the conclusion that floodplain waters and wetlands were connected to downstream waters. However, members noted that additional literature should be reviewed and cited. The Panel discussed how floodplain waters and wetlands should be defined. Some members commented that using ordinary high water mark to define waters could exclude much of the riparian zone. Members commented that the EPA Report should discuss rivers and floodplains as integrated ecological units. Members also commented that in the EPA should address how the role of wetlands and waters in storing and transforming chemical constituents could be linked to the regulation and management of chemical contaminants.

The chair next called for the discussion of Sections 3.7 and 3.8 of the Panel's report.

Discussion of Sections 3.7 and 3.8 (Response to Charge Questions 5a and 5b – Waters and Wetlands in Non-floodplain settings – Literature Review and Findings and Conclusions)

The Panel discussed Section 3.7 of its report. Members suggested revisions in the recommendations. Members again discussed the importance of biological connections and indicated that the EPA Report should contain more information on this topic. A member noted that he had compiled additional literature citations on biological connectivity for inclusion in the Panel's report. The Panel further discussed recommendations concerning the terminology used in EPA's Report and agreed that it was important to provide clear and consistent recommendations. Members again indicated that the Panel's report should recommend use of the term "waters and wetlands in non-floodplain settings."

Members noted that in EPA's Report, the discussion of the connectivity of non-floodplain wetlands seemed to emphasize the importance of hydrologic connectivity. Members commented that the Panel's report should clearly indicate that chemical, biological, and hydrologic connectivity were important.

The Panel discussed the importance of considering the aggregate effects of non-floodplain wetlands. Members commented that an expanded discussion of aggregate effects of non-floodplain wetlands was needed in the EPA Report. Members suggested additional literature citations to better address cumulative and aggregate effects. Other editorial changes in Section 3.7 were discussed. These included reordering and combining recommendations.

The Panel discussed human altered and created waters and wetlands. Members noted that this was an important topic that needed further attention in the EPA Report.

The panel discussed Section 3.8 of its report. Panel members discussed specific edits in the findings and recommendations. Members recommended replacing the word “survival” with “survival and persistence” in caption of Figure 1. Members also noted that chemical transformation was not represented in Figure 1 and recommended that the text in subsection 3.7.3 be revised to address this issue. Members suggested that Section 3.8 be revised to recommend that the EPA Report provide information about the level of uncertainty associated with some statements in the document. Some members also noted that they had provided additional references that should be included in Section 3.8

There was no further discussion of Section 3.8 so Dr. Rodewald indicated that she wanted to discuss action items and next steps.

Action Items and Next Steps

Dr. Rodewald thanked the Panel for two productive teleconferences. She stated that she wanted to revise the report as discussed on the calls and then hold another teleconference to reach consensus on the report. She asked the DFO to schedule this call. Dr. Rodewald indicated that she wanted to defer discussion of the executive summary and letter to the Administrator until the next call. Dr. Rodewald then asked the DFO to send lists of action items to the lead writers and other Panel members who had agreed to provide revisions. She indicated that she would work with the DFO to incorporate the revisions into the revised draft of the report that would be sent to the Panel before the next teleconference.

Dr. Rodewald then asked members if they had questions or additional issues to be discussed. There were no questions so she asked the DFO to adjourn the teleconference. The DFO then thanked the members for their participation, reminded them that he would be sending specific action items to those Panel members with assignments, and that he would contact them to schedule another call to discuss the next draft of the report. He then adjourned the call.

Respectfully Submitted:

/signed/

Dr. Thomas Armitage
Designated Federal Officer

Certified as Accurate:

/signed/

Dr. Amanda D, Rodewald, Chair
SAB Panel for the Review of the EPA Water Body
Connectivity Report

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 Panel for the Review of the EPA Water Body Connectivity Report

CHAIR

Dr. Amanda D. Rodewald, Director of Conservation Science, Cornell Lab of Ornithology and Associate Professor, Department of Natural Resources, Cornell University, Ithaca, NY

PANEL MEMBERS

Dr. Allison Aldous, Freshwater Scientist, The Nature Conservancy, Portland, OR

Dr. Genevieve Ali, Junior Chair, Manitoba's Watershed Systems Research Program, Department of Geological Sciences, University of Manitoba, Winnipeg, MB, Canada

Dr. J. David Allan, Professor, School of Natural Resources & Environment, University of Michigan, Ann Arbor, MI

Dr. Lee Benda, Research Geomorphologist, Earth Systems Institute, Mt. Shasta, CA

Dr. Emily S. Bernhardt, Associate Professor of Biogeochemistry, Department of Biology, Duke University, Durham, NC

Dr. Robert P. Brooks, Professor of Geography and Ecology, Department of Geography, Pennsylvania State University, University Park, PA

Dr. Kurt Fausch, Professor, Department of Fish and Wildlife and Conservation Biology, Colorado State University, Fort Collins, CO

Dr. Siobhan Fennessy, Jordan Professor of Environmental Science, Biology Department, Kenyon College, Gambier, OH

Dr. Michael Gooseff, Associate Professor, Department of Civil and Environmental Engineering, Colorado State University, Fort Collins, CO

Dr. Judson Harvey, Research Hydrologist, National Research Program, U.S. Geological Survey, Reston, VA

Dr. Charles Hawkins*, Professor, Department of Watershed Sciences, and Director, Western Center for Monitoring and Assessment of Freshwater Ecosystems, Quinney College of Natural Resources, Utah State University, Logan, UT

Dr. Lucinda B. Johnson, Center Director, Center for Water and the Environment, Natural Resources Research Institute, University of Minnesota Duluth, Duluth, MN

* Resigned from Panel March 2014

Dr. Michael Josselyn, Principal and Senior Scientist, Wetlands Research Associates, Inc., San Rafael, CA

Dr. Latif Kalin, Associate Professor, School of Forestry and Wildlife Sciences, Auburn University, Auburn, AL

Dr. Kenneth Kolm, President and Senior Hydrogeologist, Hydrologic Systems Analysis, LLC, Golden, CO

Dr. Judith L. Meyer, Professor Emeritus, Odum School of Ecology, University of Georgia, Lopez Island, WA

Dr. Mark Murphy, Principal Scientist, Hassayampa Associates, Tucson, AZ

Dr. Duncan Patten, Professor Emeritus, School of Life Sciences, Arizona State University, Bozeman, MT

Dr. Mark Rains, Associate Professor of Ecohydrology, School of Geosciences, University of South Florida, Tampa, FL

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

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

Dr. Jack Stanford, Jessie M. Bierman Professor of Ecology, Flathead Lake Biological Station, University of Montana, Polson, MT

Dr. Mazeika Sullivan, Associate Professor, School of Environment & Natural Resources, The Ohio State University, Columbus, OH

Dr. Jennifer Tank, Galla Professor, Department of Biological Sciences, University of Notre Dame, Notre Dame, IN

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

Dr. Ellen Wohl, Professor of Geology, Department of Geosciences, Warner College of Natural Resources, Colorado State University, Fort Collins, CO

SCIENCE ADVISORY BOARD STAFF

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

Ms. Iris Goodman, Designated Federal Officer, U.S. Environmental Protection Agency, Washington,

ATTACHMENT B: OTHER ATTENDEES

List of others who requested access to the April 28th or May 2nd teleconferences or webcasts.

NAME	AFFILIATION
Don Anderson	Bureau of Reclamation
Paul Anderson	
Sarah Ball	
Henri Bartholomot	Edison Electric Institute
Erin K. Bartlet	VanNess Feldman, LLP
Karen Bennett	
Susan Bodine	Barnes and Thornburg, LLP
Wyatt Boutwell	
Bridget Brown	U.S. Army Corps of Engineers
Tim Capps	Alan Plummer Associates, Inc.
Tricia Carmody	3M
Kenny Carothers	SWCA Environmental Consultants
Kevin Carter	
Jeanne Christie	Association of State Wetland Managers
James N. Christman	
Jean Coleman	Minnesota Pollution Control Agency
Molly Connerton	U.S Army Corps of Engineers
Beth Connors	Maine Department of Environmental Protection
Claudia Copeland	Congressional Research Service, U.S. Library of Congress
Stephen A. Covell	USDA Forest Service
C. M. Crawford	
Brian Dailey	
Jill Davidson	Archer Daniels Midland Company
Richard S. Davis	
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Chuck Lane	
Keith Larick	
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Steve List	NewPage Corporation
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John M. Lowenthal	CardnoTec
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Carie Mathison	3M
Lahne Mattas-Curry	U.S. EPA
Julia McCarthy	
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Mike McManus	U.S. EPA
Susanne K. Meidel	Maine Department of Environmental Protection
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Hadas Raanan-Kiperwas	
Robin Reash	American Electric Power
Thomas Repp	Douglas County Department of Public Works Engineering
Julie Rimbault	
Pam Russell	
Amena Saiyid	Bloomberg BNA
Andrew Sayers-Fay	
Abby Schneider	
Mindy Scott	
Pat Showalter	Santa Clara Valley Water District
Michelle Simms	Mosaic Fertilizer, LLC
William Skaff	NEI
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Brad Venman	
Paul Wetzel	
Mindy Wheeler	
Linda M. Wilson,	New York State Office of the Attorney General
Jerry D. Worsham II	Ridenour, Hienton and Lewis, PLLC
Sally Yost	

Materials Cited

The following meeting materials for both the April 28 and May 2, 2014 public teleconferences of the Science Advisory Board (SAB) Panel for the Review of the EPA Water Body Connectivity Report are available on the SAB Web site at the URL listed below:

<http://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/F11684C10D9F699285257CA2005EA581?OpenDocument>

¹ Federal Register Notice

² Agenda

³ Panel Roster

⁴ Draft Panel report, *SAB Review of the Draft EPA Report Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence* (March 25, 2014 draft and April 23, 2014 draft).

⁵ Individual Comments from Panel Members on the Panel's Report

⁶ List of Public Speakers

⁷ Public Comments received

- Availability of Public Comments.
- Public comment transmitted through the EPA docket
- Table of public comments received by the EPA Docket as of April 18, 2014.
- Table of additional public comments received by the EPA Docket as of April 25, 2014.
- Table of additional public comments received by the EPA Docket as of May 1, 2014