

A photograph of a forest stream with green foliage and trees in the background. The stream flows through a dense forest, surrounded by lush green plants and trees. The water is clear and reflects the surrounding greenery. The overall scene is peaceful and natural.

# Science Advisory Board Report

## Connectivity of Streams and Wetlands to Downstream Waters

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# What is the EPA SAB

- Science Advisory Board (SAB) Established by Congress in 1978
- Broad Mandate
  - *“To advise the Agency (EPA) on technical matters.”*
    - reviewing the quality and relevance of the scientific and technical information being used or proposed as the basis for Agency regulations
    - reviewing research programs and the technical basis of applied programs
    - reviewing generic approaches to regulatory science, including guidelines governing the use of scientific and technical information in regulatory decisions, and critiquing such analytic methods as mathematical modeling
    - advising the Agency on broad scientific matters in science, technology, social and economic issues, and
    - advising the Agency on emergency and other short-notice programs
- Most preliminary work is done by subcommittees focused on specific topics. Recommendations from subcommittees are sent through the full SAB, and then to EPA when appropriate.



# Timeline

- February 2011 – October 2011: Early Drafts of water body connectivity report by EPA ORD, and reviewed by EPA, USACE, and external topic experts
- July 2013: Formation of SAB Panel for the Review of EPA's Water Body Connectivity Report





# Panel for the Review of the EPA Water Body Connectivity Report

- July 2013: Formation of SAB Panel for the Review of EPA's Water Body Connectivity Report
  - Charged with providing advice on the scientific soundness of the draft report
  - Composed of 27 members, primarily affiliated with universities





# Purpose of the Report

- To summarize the current scientific understanding of broadly applicable ecological relationships that affect the condition or function of downstream aquatic ecosystems.
- Focus on small or temporary streams, wetlands, and open waters.
- Findings in this report will help inform EPA and USACE to clarify what waters are covered by the Clean Water Act (CWA).



# Methods

- Review and evaluation of evidence from peer-reviewed sources, published through August 2012.
  - 1,000+ publications
- Case studies





# Draft Report

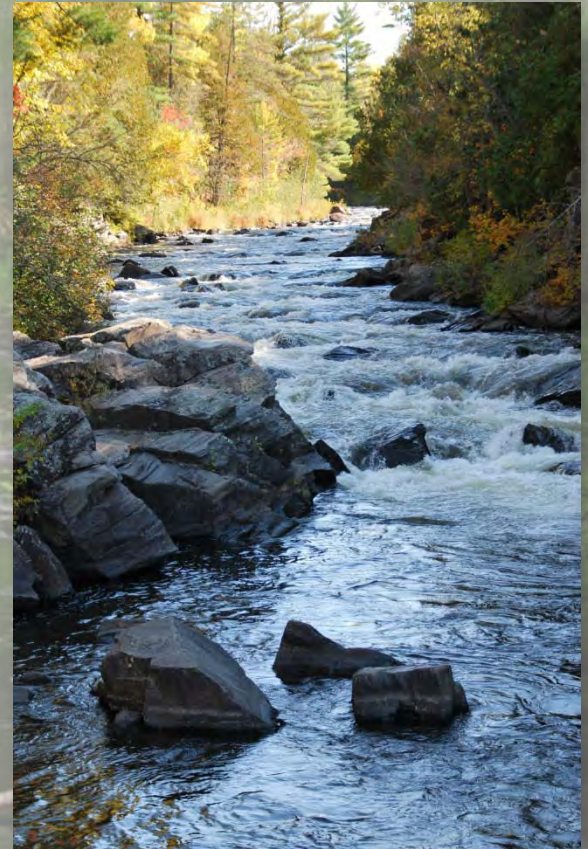
- *Chapter 1:* Executive Summary
- *Chapter 2:* Introduction
- *Chapter 3:* Conceptual Framework





# Draft Report

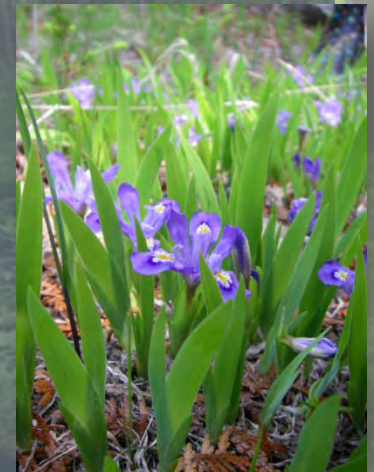
- *Chapter 4: Streams:*  
Physical, Chemical, and  
Biological Connections to  
Rivers
  - Case Study: Prairie Streams
  - Case Study: Southwestern  
Intermittent and Ephemeral  
Streams





# Draft Report

- *Chapter 5: Wetlands: Physical, Chemical, and Biological Connections to Rivers*
  - Riparian and Floodplain Wetlands
  - Unidirectional Wetlands
  - Case Study: Oxbow Lakes
  - Case Study: Carolina and Delmarva Bays
  - Case Study: Prairie Potholes
  - Case Study: Vernal Pools
- *Chapter 6: Conclusions and Discussion*





# Summary of Conclusions

- Streams

“The scientific literature demonstrates that streams, individually or cumulatively, exert a strong influence on the character and functioning of downstream waters. All tributary streams, including perennial, intermittent, and ephemeral streams are physically, chemically, and biologically connected to downstream rivers...”



# Summary of Conclusions

- Streams

- Channels associated with alluvial deposits where water and other materials are concentrated, mixed, transformed, and transported
- Headwater streams supply most of the water in rivers
- Dispersal and migration of aquatic and semi-aquatic organisms including fish, amphibians, plants, microorganisms, and invertebrates
- Nutrient spiraling in which stream communities assimilate and chemically transform large quantities of nitrogen (N) and other nutrients



# Summary of Conclusions

- Wetlands and Open Waters – Bidirectional/Riparian and Floodplains

“Wetlands and open-waters in landscape settings that have bidirectional hydrologic exchanges with streams or rivers are physically, chemically, and biologically connected with rivers...”





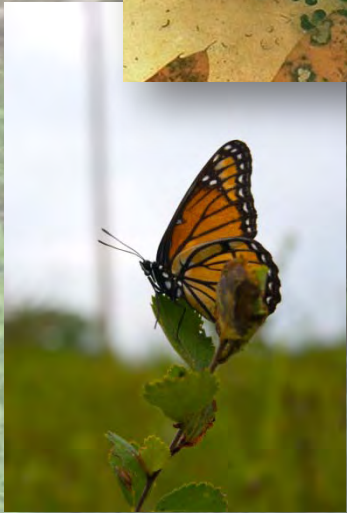
# Summary of Conclusions

- Wetlands and Open Waters – Bidirectional/Riparian and Floodplains
  - Channel-forming sediment and woody debris,
  - Temporary storage of local groundwater that supports baseflow in rivers,
  - Transport of stored organic matter,
  - Nursery habitat for breeding fish,
  - Colonization opportunities for stream invertebrates,
  - Maturation habitat for stream insects.



# Summary of Conclusions

- Wetlands – Unidirectional  
“Wetlands in landscape settings that lack bidirectional hydrologic exchanges with downstream waters (e.g. many prairie potholes, vernal pools, playa lakes) provide numerous functions that can benefit downstream water quality and integrity.”





# Summary of Conclusions

- Wetlands – Unidirectional

- Storage of floodwater
- Retention and transformation of nutrients, metals, and pesticides
- Recharge of groundwater sources of river baseflow

*“Gradient of connectivity”*

- Difficult to generalize about their effects on downstream waters,
- Insufficient information
- Case by Case Analysis of individual or groups of wetlands



# Request for Public Comment

- Currently Open for Public Comment
  - Comments prior to November 6 will be provided to SAB Panel for consideration in advance of the December 16-18 Meeting
  - Comments still accepted after November 6, but not guaranteed
- December 16-18, 2013 – Public Meeting of the SAB Panel





# How Will Comments Be Used

- EPA and USACE have sent a draft rule to clarify jurisdiction of the Clean Water Act to the Office of Management and Budget for interagency review (limited to clarification)
- Any final regulatory action related to jurisdiction of the CWA in a rulemaking will be based on the final version of this report, and will reflect EPA's consideration of the public comments and independent peer review



# Michigan

- Section 404 Program – Michigan administers the federal Section 404 authority in most of the state
- Clarification of federal CWA jurisdiction will ensure Michigan's administration of this program is consistent with the federal requirements





# For More Information

[www.epa.gov/sab](http://www.epa.gov/sab)

[www.aswm.org](http://www.aswm.org)

