

**Society of Wetland Scientists Comments on “Connectivity of Streams  
And Wetlands to Downstream Waters**

**TO:** Science Advisory Board Review Panel  
Attn; Dr. Thomas Armitage, Designated Federal Officer  
EPA Science Advisory Board Staff Office  
USEPA  
1200 Pennsylvania Ave NW  
Washington, DC 20460

**RE: Society of Wetland Scientists** Comments on “Connectivity of Streams and Wetlands to Downstream Waters”. Doc. ID No. EPA-HQ-OA-2013-0582.

The Society of Wetland Scientists is an international organization of ~3200 wetland professionals working in the wetland fields of private consulting, regulatory, government advisory/research, and academics. Our members are interested in, and work in, both coastal and inland wetlands. Recently much concern has been expressed at our annual meetings in reference to the loss or degradation of headwater and isolated wetlands. Therefore, we are pleased to see the thorough, factual review presented by the EPA Scientific Advisory Board (SAB) in the draft document **Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence** (here after referred to “Report”). Furthermore, we applaud the Science Advisory Boards use of the peer review process.

The SAB outlined 3 objectives for the study:

- 1) Identify physical, chemical, and biological connections to, and effects of ephemeral, intermittent, and perennial streams on downstream waters;
- 2) Identify the physical, chemical, and biological connections to, and effects of riparian /floodplain wetlands and open-water;
- 3) Identify the physical, chemical, and biological connections to, and effects of unidirectional wetlands and open-waters that lack bidirectional hydrologic exchanges with downstream waters.

Furthermore, the SAB has requested that reviewers address four points:

- 1) Clarity and technical accuracy of the draft Report overall and its conceptual framework;
- 2) Does the literature cited, findings, and conclusions reflect the best available science with respect to stream connectivity;
- 3) Does the literature cited, findings, and conclusions reflect the best available science with respect to downstream connectivity and effects of floodplain wetlands; and
- 4) Does the literature cited, findings, and conclusions reflect the best available science with respect to downstream connectivity and effects of “unidirectional” wetlands and open-waters located outside of floodplains?

Overall we found the Report to be well written, factually correct, and very well referenced. We were pleased to see that the emphasis was placed on the most recent literature (excluding 2013). Below we address the individual charges.

**Clarity and technical accuracy of the draft Report overall and its conceptual framework:**

The presentation of the Report is easy to follow and well formatted. The framework is set on well understood ecological principles. The report does a good job of relating the principles to the concept of hydrology and connectivity. We particularly agree with the Reports principle of “aggregation” and cumulative effect.

**Does the literature cited, findings, and conclusions reflect the best available science with respect to stream connectivity?**

We agree with the Report’s conclusions in respect to stream connectivity and feel that it does an excellent job of bringing together the literature. The concept of “storage compartments” (ponds, shallow aquifers, etc.) and their relationship to base flow is extremely helpful. By connecting infrequent flows (e.g. ephemeral, intermittent), an often overlooked but important subsystem, the Report emphasizes the connectivity of these subsystems to streams.

**Does the literature cited, findings, and conclusions reflect the best available science with respect to downstream connectivity and effects of floodplain wetlands?**

Much literature in the past and present has addressed this issue and nearly all have come to the same conclusion of the Report. Therefore, we concur with the Reports conclusion that “Wetlands and open-waters in landscape settings that have a bidirectional hydrologic exchanges with streams or rivers...are physically, chemically, and biologically connected with rivers via the export of channel-forming sediment and woody debris, temporary storage of local groundwater that supports base flow in rivers, and transport of stored organic matter.”. Again, the literature on this connectivity is extensive; overall we feel that the SAB has done an excellent job of synthesizing it.

**Does the literature cited, findings, and conclusions reflect the best available science with respect to downstream connectivity and effects of “unidirectional” wetlands and open-waters located outside of floodplains?**

This one was more difficult. As the SAB found out, there is not much literature available that can be used to make general conclusions on unidirectional wetlands. Therefore, they had to refer to “case-studies”. Needless to say, case-studies differ in scale, geomorphic settings, and time. However, that being said, the Report still confirms the importance of the ecological functions that these wetlands provide to downstream areas.

There is one conclusion that appears to be over-interpretive. The Report states: “The literature we reviewed does not provide sufficient information to evaluate or generalize about the degree of connectivity (absolute or relative) or the downstream effects of wetlands in unidirectional landscape settings.” While we can understand the rationale for the conclusion, it seems to ignore the individual case-studies. We suggest that this conclusion needs to clarify that in cases where unidirectional wetlands have been studied, even according to literature reviewed in the Report, these wetlands have provided important ecological functions to downstream systems.

**Minor Comments:**

- 1) The term “significant” is used to both define the statistical process and as an adjective. This is scientifically inappropriate. We suggest that the term “significant” should be limited to its statistical use only.

- 2) The term “bidirectional” should be defined early on in document (“unidirectional” is defined in Summary).
- 3) There are several typographic errors that should be addressed.

Finally, we would again like to congratulate the SAB for a well done report. They have addressed a very difficult subject and have done an admirable job of synthesizing over 1000 pieces of literature. We thank them for the ability to comment on the draft and hope our comments are helpful.

Sincerely  
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