



Return To Oz – A deeper critique of the SAB Connectivity Report

Western Coalitions of Arid States – 2015 Annual Meeting

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Catamaran Resort & Spa, San Diego, California

Dr. Mark Murphy,

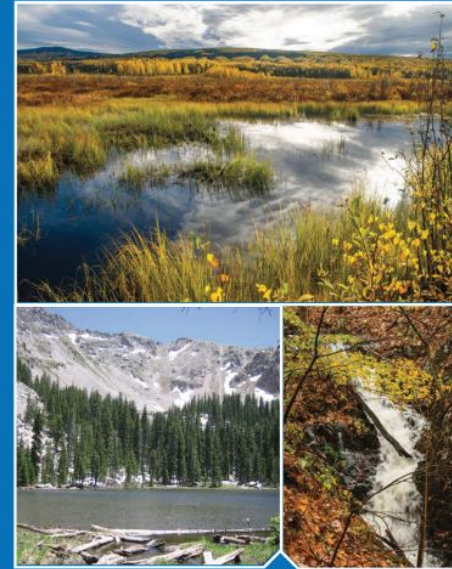
Principal Water Resources Scientist

Allwyn Environmental

When last we talked . . .

- The Connectivity Report, aka, *Connectivity of Streams and Wetlands to Downstream Waters: A Review and Synthesis of the Scientific Evidence*, had gone to draft and EPA had been given the review of the Science Advisory Board.

Connectivity of Streams & Wetlands to Downstream Waters: A Review & Synthesis of the Scientific Evidence



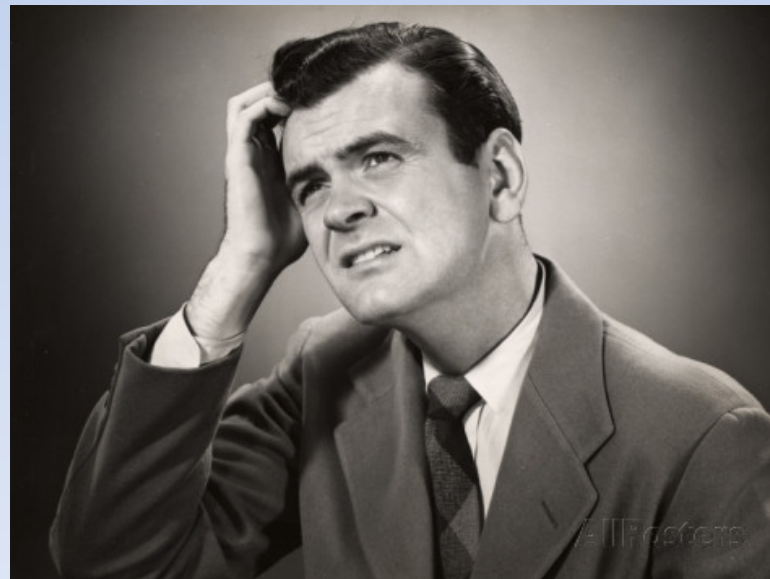
Office of Research and Development
NCEA (Washington DC, Cincinnati OH), NERL (Cincinnati OH, Las Vegas NV) and NHEERL (Corvallis OR)

First the good news . . .

- EPA agreed with the ecological literature that connectivity exists on a gradient.
- EPA admitted that disturbance ecology had important insight into the frequency, duration, magnitude, timing, and rate of change downstream waters.
- EPA concurred that streams are frequently interrupted in space and that high transmission loss (evapotranspiration + seepage) can cause streams to go dry in the arid West.

... And then the bad news!

Despite all this, they did not change any of the conclusions or findings of the report!



The consensus of the panel

Dispute about the meaning of significance in the report.

- Claims it is not statistical significance
- Ignores causal significance - “Correlation is not causation.”
- No cause and effect = No conceptual model

“From our viewpoint, ‘purpose’ is the conception of an **effect which becomes a cause of an action**. Since we take into account every cause which produces or can produce a significant effect, we also consider this one. Its specific **significance consists only in the fact that we not only observe human conduct but can and desire to understand it.**”

- Max Weber, *Sociological Writings*

The consensus of the panel

Lack of a clear conceptual model.

- Functions are processes
- Source, sink, lag . . . these are descriptors
- Without a model, no functions can be evaluated.
Everything is qualitative.

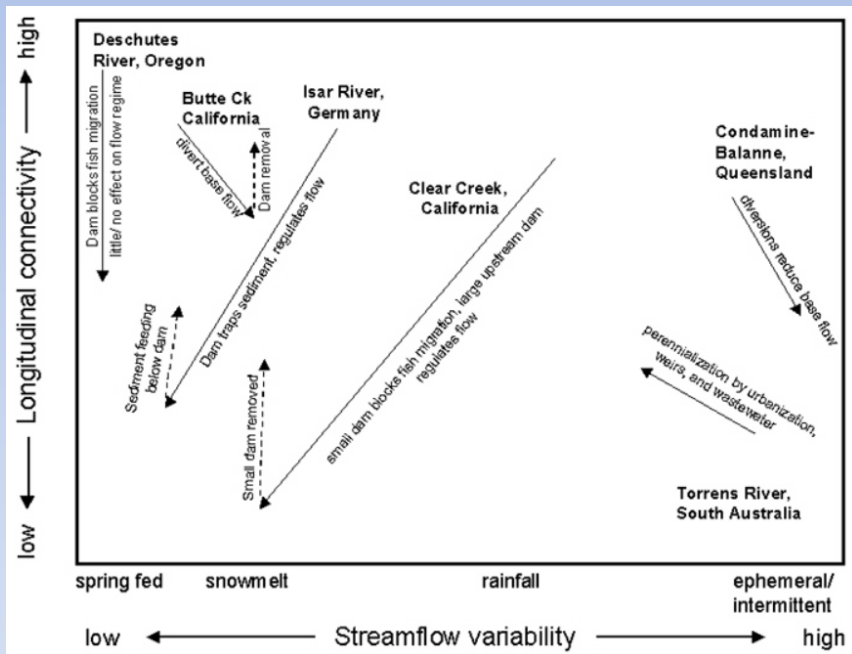
"Function refers, in a descriptive sense, to processes and the causal relations that give rise to them, to the role of organisms within an ecological system, to the overall processes that sustain an ecological system (which together determine its "functioning") and finally to the services a system provides for humans or other organisms."

Jax, Kurt. "Function and "functioning" in ecology: what does it mean?." *Oikos* 111.3 (2005): 641-648.

The consensus of the panel

Lack of a clear conceptual model.

- Connections are made when causes in the watershed produce measurable (significant?) effects to the physical, chemical, and biological integrity of navigable waters.



from: Kondolf, G. M., Boulton, A. J., O'Daniel, S., Poole, G. C., Rahel, F. J., Stanley, E. H., ... & Nakamura, K. (2006). Process-Based Ecological River Restoration: Visualizing Three-Dimensional Connectivity and Dynamic Vectors to Recover Lost Linkages. *Ecology and Society*, 11(2), 5.

The consensus of the panel

Serious reservations about assuming a dichotomous, or digital, definition of connection (i.e is connected/is not connected)

- Report acknowledges gradational connectivity.
- Some watersheds more connected than others.
- But no use of disturbance ecology to scale.

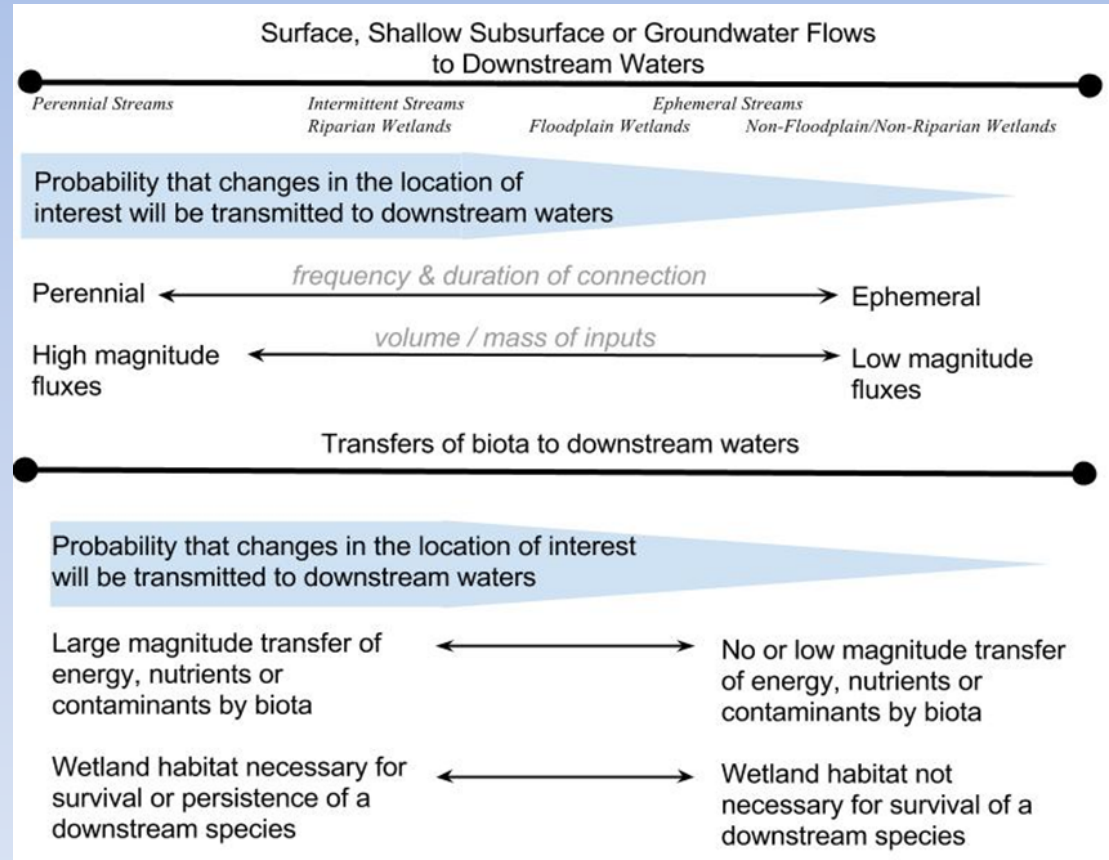
“From headwaters to mouth, the physical variables within a river system present a continuous gradient of physical conditions. This gradient should elicit a series of responses within the constituent populations resulting in a continuum of biotic adjustments and consistent patterns of loading, transport, utilization, and storage of organic matter along the length of a river. ”

- Vannote, et al. The River Continuum Concept, 1980

The consensus of the panel

Serious reservations about assuming a dichotomous, or digital, definition of connection (i.e. is connected/is not connected)

- Mentions, but never uses frequency, duration, magnitude, timing, and rate of change
- The way ecology assess the significance of connections.

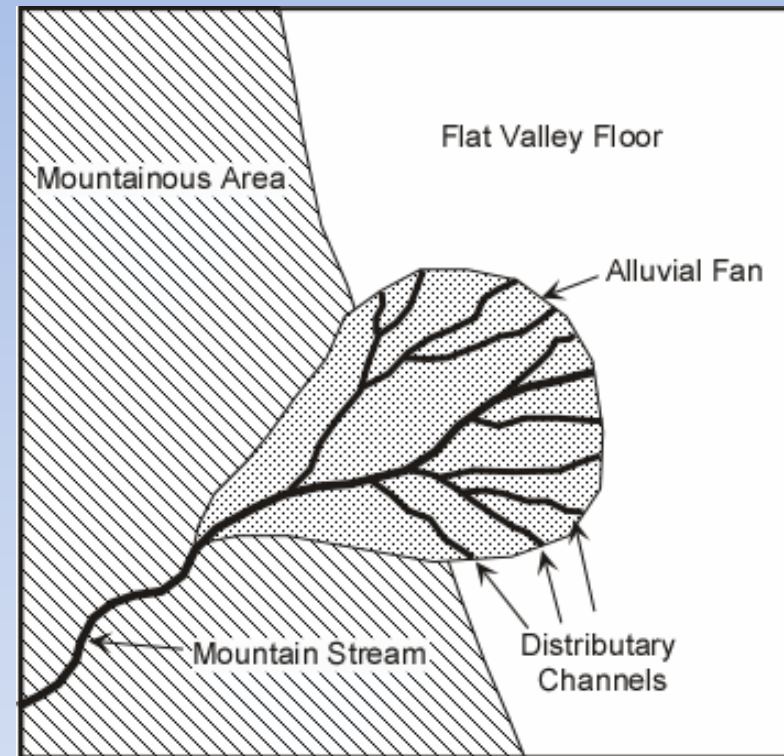


from the SAB Report to EPA

The consensus of the panel

Repeated errors and misconceptions about Arid SW streams and wetlands.

- No arid wetlands/stream consideration.
- No understanding of opportunistic use of ephemeral streams.
- No discussion of downstream salinity



“The strength of connectivity is likely to vary across spatial scales with the magnitude, duration, and rate of rise and fall of floods.”

K. M. Jenkins and A. J. Boulton 2003. Connectivity in a Dryland River: Short-term Aquatic Microinvertebrate Recruitment Following Floodplain Inundation. Ecology 84:2708–2723

The consensus of the panel

Other problems

- Confusion about unidirectional vs. 'other-dimensional' flow.
- Cumulative effects are not discussed in relationship to a downstream observation point.
- No fundamental limits to bed/bank definitions

The consensus of me.

- Despite the decades of usefulness of the CWA, the new definition does not provide any new protective power to the Act.
- By claiming scientific resolution but offering only stronger confusion, the EPA has opened themselves up to extended future litigation from all sides, activists and the regulated community.
- Not much point to further science until the matter is adjudicated, most certainly by SCOTUS. Then we start all over again!

Questions?

