Tiz Mogollón September 10, 2012

SPUNKIAD for

McManamay, R. A., D. J. Orth, and C. A. Dolloff. 2012. Revisiting the homogenization of dammed rivers in the southeastern US. Journal of Hydrology.

Surprising?

I found surprising that dams are managed in the same way without taking into account the flood and low-flows regime of the stream where the dam was constructed in.

Puzzling?

What is puzzling is that the purpose of the study was to determine the effects on dams by flow classes; yet dams generally occur in streams with a specific hydrology. In other words, dams do not occur everywhere (e.g. they do not occur in intermittent or flashy streams).

Dividing between flow classes seems equivalent to dividing stream gauges geographically (slope, topography, land cover, climate), so maybe what could have been done would have been to analyze the variation in hydrology of similar streams with and without dams.

Useful?

I found the listing the hydrologic indices (including the Indicators of Hydrologic Alternation and Environmental Flow Component indices) very useful for my own work.

New?

I found new the Geospatial Attributes of Gages for Evaluating Streamflow (GAGES) dataset, and Hydrologic Index Tool software.

Knew it already?

The general impact that dams have on streams – of lowering high flows and increasing low flows; and the impact of urbanization on streams that has the opposite effects (increasing high flows and decreasing low flows).

Interesting?

I found interesting the results that magnitude and direction were the two metrics that showed a strong influence of dams on stream flow by flow class membership.

Do you agree or disagree with the findings?

I agree with the finding that the framework of using flow classes or membership as a unit of analysis that can be used to understand the impact, not only of dam regulation, but of any disturbance is more appropriate than using stream order or not using any classification at all.

Reflection

Having never before been exposed to a flow classification paper, there were a lot of new concepts and methodologies. However, I incorporated into my knowledge the idea that flow classification can yield important information on the ecology of a stream, the dynamic nature of streams, and a way of addressing a similar question to McNanamay et al. (2012). Below I will touch on these three reflections.

Ordering streams by classes presents a more appropriate framework for managing disturbances, and to understand pre-disturbance conditions. This can be used for restoration purposes, or to understand the eco-hydrology of a highly altered area. Besides from the flow classification describing the flow, it can also describe the ecology. So in other words, the topography, soil and geology of an area can be used to determine what type of fish, macroinvertebrate and aquatic vegetation occur in that stream.

Streams are inherently variable and dynamic. If humans alter the stream in any way, then managing that dynamic variability becomes even harder. I realized that representing or showing that variable nature through a time series analysis is really important for management. GIS tools have become very popular and common for hydrologic analysis – although they still fall short to showcase the dynamic nature of streams. Furthermore, McNanamay et al. (2012) results on how dammed streams did not homogenize the flow, but instead the spread of regulated streams was more variable than that of regulated flows.

When McNanamay et al. (2012) compared regulated and unregulated streams to determine flow classification based on hydrologic statistics, but it made me think that dams are not going to occur equally throughout the landscape. There is probably land cover changes (increase in impervious surfaces) patterns, specific precipitation regimes and energy demands that can determine where dams are located. Dams need to be located in streams that have enough water for hydropower, retain high flows to mitigate floods or for recreation. Thus maybe a different analysis that would have been interesting to do is to have created a dam suitability model, and from there divide streams into flow classes. For example, I would assume that dams are less likely to occur in headwater or low order streams, than in alluvial rivers.