Tiz Mogollón September 17, 2012

SPUNKIAD for

Trush, W. J., S. M. McBain, and L. B. Leopold. 2000. Attributes of an alluvial river and their relation to water policy and management. Proceedings of the National Academy of Sciences **97**:11858.

Surprising?

I found surprising the date of when this article was written because it proposes that the ecosystem services (without using those words, but it is the concept) - those created by dams (recreation, hydropower, drinking water retention, etc.) and maintaining the functioning of the alluvial river ecosystem – can co-occur.

Puzzling?

Seems very puzzling that the dynamic nature of the alluvial river ecosystem (high/low flows sort of predictable but not really) and managing a dam to fulfill the needs that it was created for (hydropower, etc.) can be done in synchrony. It would have been interesting to see a time line of a dry and wet year to maintain the ecological functioning and the dam's purposes.

Useful?

I found figure 3 (pg. 11861) to be useful because it shows the conceptual model of bed mobility thresholds along the bankfull discharge event. This drives home the idea of balancing the fine and coarse sediment.

New?

Maintaining the balance of fine and coarse sediment to provide habitat and maintain bar sequence movement. I always thought that if dams were good for something is that they retained the "erosion" coming from upstream, but the sediment balance is part of the alluvial river's ecology.

Knew it already?

Alluvial channels migrate from side to side and we can see remnants of the migration by looking at the ecotones from the short-lived vegetation along the riparian flooded areas, and more established trees further inland from the stream.

Interesting?

That the recovery of the ecological functioning of the Trinity River at Lewiston is now a reality and that it will be interesting to read about the success of this approach.

Do you agree or disagree with the findings?

I agree that this is a great experiment more so than something that should be followed word for word in a dam's management plan. However, I am more skeptic as to whether this is actually feasible, and whether comprises will be greater from the ecological functioning side than from the dam management side. The attributes that they listed are based – seems at least – only on their experience in restoring the ecological functioning of the Trinity River. Are there attributes equally applicable to other latitudes?

Reflection

The following discussions points are integrating reflections on Trush et al. (2000) and Rosgen (2011). I reflect on the interrelation between Trush et al.'s (2000) attributes, the different approaches to stream restoration by comparing Trush et al. (2000) and Rosgen (2011) work, and assimilating the new knowledge learned at the different levels – scientific and political.

Trush et al.'s (2000) attributes of an alluvial river with the particular case of the Trinity River at Lewiston, came through as a strategy that can restore ecological integrity without removing the dam. However, they did not discuss the degree of dependence or independence between the attributes. Are there a couple of attributes that come before others? If 3 of the 10 attributes are implemented, what is the rate of success of restoration? And are there monetary trade-offs between attributes? It seems that the most important driver to restoring the geomorphology and biology of an impacted alluvial river, is first to restore the hydrologic regime.

The focus of Trush et al.'s (2000) paper is on recuperating the ecological integrity of alluvial rivers from dam impacts. The attributes, however, hold for other types of disturbance. They are not the restoration guidelines, but the blue print characteristics of alluvial rivers. This is an important distinction because it is a completely different approach to Rosgen's Natural Channel Design – which is less straight forward and clear.

While Trush et al. (2000) acknowledges that the intervention at the Trinity River is an experiment and that the attributes listed were used as guidelines to know what – at least – should be maintained; Rosgen's (2011) National Channel Design (NCD) does not present his ideas as an experiment but as the truth. Not having been exposed to Rosgen before, I read him with just what Dr.Orth had told us ("read it with a skeptical eye"). I found him to be overly dry, repetitive, and mostly (90%) cited his previous work. My first impression was that he did not have an authoritative voice within the stream restoration community since he failed to incorporate work by other people. However, I was surprised to find out in class that his NCD framework might be adopted by the EPA.

Regardless of agreeing with the results, methods or style, incorporating Trush et al. (2000) and Rosgen (2011) to my knowledge base, I now have a more tangible framework on the interrelations between biotic and abiotic components of stream restoration. The strong feedback loops between hydrology and geomorphology, and then how the biotic community success to colonize and reproduce is the result that demonstrates success. I also realized the importance of tone in scientific discourse. We, as scientist, have to be able to prove wrong what we once thought was right if that is what the results say.

Rosgen, D. L. 2011. Natural channel design: Fundamental concepts, assumptions, and methods. Stream Restoration in Dynamic Fluvial Systems: Scientific Approaches, Analyses, and Tools, Simon A, Bennett SJ, Castro JM (eds). American Geophysical Union: Washington, DC.

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