Tiz Mogollón October 1, 2012

**SPUNKIAD for**

Fausch, K. D., C. E. Torgersen, C. V. Baxter, and H. W. Li. 2002. Landscapes to riverscapes: bridging the gap between research and conservation of stream fishes. BioScience 52:483-498.

**Surprising?**

I found surprising that the status quo fish stream research (at least up to 2002 when this study was published) studied stream fish at small temporal (2-3 years) and spatial (100 meter reach) scales and extrapolated those findings to the entire watershed.

**Puzzling?**

I found puzzling the way intermediate scale was defined because it almost seemed subjective. I would be interested in seeing an updated study of this review today – 10 years later.

**Useful?**

I found useful the three key concepts that apply to both terrestrial and aquatic ecosystems: that understanding processes depends on the scale of study, species will have different responses to landscape scales, and that bigger processes (dispersal of organisms, connectivity or barriers) function at landscape scales.

**New?**

I found new the overarching topic of the paper – the need for answers at intermediate scale for management purposes, and the definition of what intermediate temporal and spatial scale means for stream management – 5-50 years and 1-100km.

**Knew it already?**

I already was familiar with the river continuum concept which allowed me to better understand the other concepts mentioned in the paper (e.g. serial discontinuity concept, hyporheic concept and patch dynamics concept).

**Interesting?**

I found interesting the hyporheic concept in there is both unidirectional (flow) process that affect stream fish, as well as groundwater-surface water interactions, as if it were a certain type of depth metric.

**Do you agree or disagree with the findings?**

In theory, I agree with the study's findings. However, I would be interested to know what stream fish management examples have failed or have been less successful at creating the required habitat for fish species because it was based on a small scale study that had been escalated to a watershed-level. In addition, it seems that the amount of work required to provide a study at an appropriate spatial scale to accurately inform management processes might not be practical given the anthropogenic and natural stressors that occur at a faster rate.

**Reflection**

Fausch et al. 2002 got me thinking about several unrelated issues on stream habitat conservation and management: 1) the links between the Theory of Island Biogeography and stream habitat, 2) relating the Theory of Island Biogeography to Fausch et al.'s (2002) temporal and spatial scale, 3) temporal change in geomorphology and fish movement and 5) the *sensu stricto* meaning of stream functioning and our inherent biases in conservation.

When Dr. Orth mentioned in class the Theory of Island Biogeography applied to stream management, I was able to apply a concept that has long been ingrained in all conservation biology and ecology courses, to the riverscape. Connectivity is what characterizes stream ecosystems, and breaking this connectivity literally (i.e. dam) or figuratively (i.e. impervious cover, sewer drainage), will affect the size of the islands that remain for that stream. Breaking this connectivity impacts the geomorphological balance between sediment and discharge, which has direct effects on aquatic organisms.

We can use the Theory of Island Biogeography to drive home Fausch et al.'s (2002) calling to conserve and research the riverscape at all temporal and spatial scales to correctly inform management. For example, if working at a reach or segment scale we erroneously interpret one "small island" as the entire ecosystem. This view blinds us from seeing the big picture, and the interactions on a greater scale that impacts source-sinks and emigration-immigration of organisms.

In particular, for managing streams, having a good grasp on the dynamics of temporal changes will make us have perspective over stream processes. For example, if we sample a pool-riffle habitat in May, taking the GPS point and the stream habitat metrics needed to characterize that stream, and then we return in September to take the measurements again, the location of the pool-riffle will have changed. In other words, there will be an interaction between hydrology and geomorphology that can give us a different picture of the stream. In addition to the "migration" of pool-riffle habitat, we will also have long-distance movement of fish up and down a river segment at different life-history stages. When these streams are intervened, then this affects the movement of fish, even if the impact is seen upstream – very far – from the disturbance epicenter.

Finally, is it or is it not only about fish? Although this might be contradictory to everything I've wrote so far, it is important to question our motives as stream habitat managers to what we want to see. What is our guiding image? Fausch et al.'s (2002) paper is centered on stream fish. However, what happens if we manage for stability in channels and water quality – without minding about stream fish or aquatic organisms in general? Taking away the intrinsic value of stream fish (for recreational purposes, existence, etc.), we are left with a stream that continues to function (stable channel) while providing the services we ultimately life-death depend on (e.g. drinking water). Fausch et al. (2002) paper focuses directly on stream fish conservation, but fails to acknowledge why other decisions of stream management are taken (e.g. dams for drinking water or flood control).