

SPUNKIAD for

Wenger, S. J. W. S. J., J. T. P. J. T. Peterson, M. C. F. M. C. Freeman, B. J. F. B. J. Freeman, and D. D. H. D. D. Homans. 2008. Stream fish occurrence in response to impervious cover, historic land use, and hydrogeomorphic factors. *Canadian Journal of Fisheries and Aquatic Sciences* 65:1250-1264.

Surprising?

I found surprising that the authors when looking at the historic land use through aerial imagery, did not look at species records from back then as well. In other words, to what degree can species occurrence from 1998 to 2003 going to be explicative of the land cover found in 1938?

Puzzling?

I found puzzling that the authors considered reservoirs as a historical impact. While many of these reservoirs were created from the 40s to the 60s, they haven't been taken out and thus their impact might still be pressuring populations.

Useful?

I found useful that the authors separated between total impervious area (the impervious area from the watershed) and effective impervious area (impervious are adjacent to streams) in quantifying the effect these have on stream fishes.

New?

I found the 2% threshold for determining the amount of impervious area and their impact on stream fishes shockingly low, although I also recognize these are some of the most sensitive species.

Knew it already?

I already knew that the response of species to disturbance will vary – thus the response of a group (fish assemblage) cannot be used as the response of an individual species.

Interesting?

I found interesting the mechanisms of how the fish are actually affected by impervious areas – for example: modification of hydrologic regimes, introduction of toxins, physical habitat change and food web dynamics.

Do you agree or disagree with the findings?

In general, I agree with the results and think this study is important to understand how our built environment interacts with aquatic ecosystems and organisms; however, I do not agree with way they tabulated the impact impervious surfaces have on streams. For example, why did they use a radius to determine the area of influence on a species? Why would they include the

areas downstream of where they found the sample? Seems more logical to just quantify the impacts upstream of where the fish was sampled.

Reflection

My reflection below is critiques and applauds parts of Wenger et al.'s (2008) paper, and then puts in perspective the results from this paper on restoration strategies and goals at large.

While I agree that increasing impervious surface is going to negatively affect sensitive aquatic organisms, Wenger et al.'s (2008) article bothered me because they did not include a thorough reasoning for selecting the five stream fish species. If the paper's intention was to look at the response of sensitive stream fish species to an increase in impervious areas, then it would have been acceptable to select those five species. However, the paper should not generalize the response of all stream fish to impervious cover. It would have almost been more interesting to see the continuum of responses of stream fish species of differing sensitivities to impervious surface. I am imagining a figure similar to Figure 11 in Cormier et al. (2008).

Apart from the issue above, I found the methodology and results interesting and relevant. Being familiar with GIS and Remote Sensing, I can imagine how hard it must have been to have digitized and interpreted land cover from 1938 through aerial imagery. They show compelling evidence of the impact impervious areas have on stream fish, and the low thresholds these fish can withstand before declining.

On restoration in general, I find that disturbed streams are not going to be, nor does it makes sense to make them be, 'natural' again. It does not make sense to make them natural again because the land use surrounding those streams is probably what disturbed the stream ecosystem in the first place, and there is slim to no chance of the land use surrounding these streams will change dramatically to reverse the damage that has already been caused. Land use change from forest to agriculture, and from agriculture to suburban and urban areas has been increasing, and with population growth and greater population affluence, this increase is not going to taper any time soon.

That said, restoring a disturbed channel to work with a more reasonable hydrology than what would have been the natural hydrology makes sense; although this decision trickles down to the aquatic stream organismal composition. Such that in these types of streams the composition of aquatic organisms in aquatic environments might well be the more resilience and generalist species that can withstand drastic changes in flow and habitat configuration. In this case, what does our end goal become of managing a stream? Do we manage to improve water quality? Or do we manage to restore fish habitat? If the second, then what fish species are we going to introduce?