

SPUNKIAD for

Cormier, S. M., J. F. Paul, R. L. Spehar, P. Shaw-Allen, W. J. Berry, and G. W. Suter. 2009. Using field data and weight of evidence to develop water quality criteria. *Integrated Environmental Assessment and Management* 4:490-504.

Surprising?

I found surprising that until now had the *modus operandi* of water quality testing was based on toxicity alone, without acknowledging that non-toxic exposure – such as erosion – could cause a great deal of impairment.

Puzzling?

I found puzzling that the discussion emphasized the framework being a risk-based approach to developing water quality criteria, although being unfamiliar with these types of assessments, I don't know what other type of approach exists, and the pros and cons between other approaches and a risk-based approach.

Useful?

I found useful Figure 11 (pg. 500) that showed the thresholds of the different taxa affected when exposed to fine sediments in substrate because it shows the sensitivity of each species. One can imagine that ecosystem integrity is lost to some degree with each subsequent species loss as a response of increased fine sediment in the substrate.

New?

I found new the three modes of action that are taken into account with this framework – biological, physical and chemical – instead of just doing a toxicity test.

Knew it already?

I already knew that water quality is assessed and reported based on what it can be used for: drinking water, swimming, and near the bottom of its uses – whether it supports aquatic life.

Interesting?

I found the proposed approach to assessing water quality interesting because it uses today's technological capacity to assess exposure paths or impacts of chemical, biological or physical stressors even if it is through modeling exercises based on field data and evidence.

Do you agree or disagree with the findings?

In general, I agree with the proposed framework, although I find it hard to be fully on-board with this approach without seeing other possible approaches, and the cost-effectiveness of the approach.

Reflection

Water quality assessment and standards are important. Cormier et al. (2009) proposes a way to accomplish this task based on field data, modeling and evidence. My reflection is on the barriers to adapting this proposal, and some evidence from North Carolina and Virginia on the feasibility of adopting a framework like the one proposed by Cormier et al. (2009).

I had a hard time incorporating Cormier et al.'s (2008) article into my knowledge base because it is not a subject I can relate to. While the first part of the article sounded logical and reasonable, I had a hard time being critical about it because I did not have a base to compare it to. Furthermore, reflecting on the training I've had in science, these types of papers rarely come up in classes. This is not surprising though because unless you specialize in water quality assessment, deeply understanding the paper and its implications to improve current methods needs training on this subject.

However, it is important to read these types of papers – that may seem ivory towerish – because they set regulation and standards for water quality. The framework is risk-based so it uses as a foundation the precautionary principle which holds that it is better to prevent than to cure. Thus in Cormier et al.'s (2008) framework, they stress the need to use field base and the evidence found to assess the modes of action – be that biological, chemical or physical.

The framework – in theory – sounds reasonable. However, is it realistic? According to section 303d of the Clean Water Act, States must provide a yearly report to the Federal government on the water quality and rank each waterbody they assess according to its level of use. However, assessing water quality of waterbodies requires a high level of investment, personnel and expertise.

Regardless of being a national mandate, undertaking the task of assessing waterbodies for the entire state is challenging and this challenge is shown in the assessment numbers. For example, in 2010 Virginia had assessed 34% of its streams and most of these are higher order streams. North Carolina had assessed 32% of its streams, and most of these streams are also high order streams. Both Virginia and North Carolina have assessed nearly all of its reservoirs and lakes, 97% and 94% respectively. This should not be surprising – lakes and reservoirs are big and important for people, and thus will be sampled with more frequency and extent than streams. However, the low number of streams that have been sampled for both NC and VA show the difficulty and expense of sampling water.

Returning to Cormier et al.'s (2009) framework to develop water quality criteria, I still believe that it is unrealistic given the 2010 data on assessed waterbodies for Virginia and North Carolina. However, it does not do harm to think beyond the plausible as one day this will become the norm.