

Extended Abstract for

Moerke, A. H. and G. A. Lamberti. 2004. Restoring stream ecosystems: lessons from a midwestern state. *Restoration Ecology* 12:327-334.

What was the scientific question addressed?

Moerke and Lamberti (2004) asked what the strengths and weaknesses were of reach-scale stream restoration, particularly for streams in the Midwest.

What was their conclusion(s)?

They found that people's perception of the restoration effort was different than what the data showed. Restorers perceived their projects as successful and highly successful, whereas the chemical and physical assessments conducted by the authors of the paper showed some improvement regarding depth-width ratios, but little change in comparison to the unrestored reach.

How was their conclusion developed?

They included in their study restoration (rehabilitation) projects that involved at least 300m of stream work, and that included multiple approaches to stream rehabilitation (both in-stream habitat improvement as well as riparian and floodplain restoration). Of the 10 projects that met their criteria, they were asked to fill out questionnaires and surveys. The authors then visited 8 of the 10 sites and conducted chemical and physical measurements of these areas.

What assumptions did they make?

That they would be able to identify the strengths and weaknesses of stream restoration projects by looking at just 10 studies, and that these projects were comparable (location, reason for restoration).

What are your concerns about study designs?

My main concern about their study design is that their sample size is too small to be able to say something conclusively about reach-scale stream restoration projects in the Midwest.

Why is this conclusion happening today?

Reviews like this one, on the effectiveness of reach-scale stream restoration, are happening then (2004) and today (2012) because the money continues to be available for these types of projects. However, the theory of what actually works is lagging behind. While scientists measure the effectiveness of these projects from a functionality perspective, non-scientists (stakeholders, developers) measure the effectiveness based on aesthetics and geomorphic/hydrologic changes.

Is there a counter argument mentioned (or not mentioned) in the article?

While the authors recognize that depending on whom the restorer is, the project may be considered a success or not, they argue that larger scale projects have a greater likelihood of being successful. However, the authors fail to give concrete examples of successful large scale restoration projects.

What is the MOST important information in this article?

The authors put in perspective the reality of why reach-scale restoration project is the norm (cheaper, less logistics, easier to cooperate with landowners, short-time frame, rapid results), acknowledging that it is not an effective approach from an ecosystem functionality perspective.

What are the implications and consequences of the conclusions developed?

While not effective through time, reach-scale stream restoration projects will continue into the future regardless of the evidence. The findings of this study imply that bigger restoration projects are carried out by private companies usually for developers that have as an end goal to restore the aesthetics of an area. If that is the final goal, then re-establishing riparian areas and in-stream habitat will accomplish this goal.

What is the best way to move forward from this state of affairs?

From the scientific perspective of needing a way to restore the functionality of aquatic ecosystems, documenting the effectiveness of large-scale restoration/rehabilitation efforts seems logical since these are painted as the utopic project.

Where would you choose to invest your stream restoration funds?

I would invest my stream restoration funds in reach-scale stream restoration if I am a developer because it effectively and locally accomplishes my objectives. However, if I a State Agency interested in improving water quality to reduce the costs of water treatment, then I would invest my funds in a watershed scale restoration project.

Which of the priority strategies of Roni et al. 2008 were addressed by this study?

The bottom two portions of Roni et al.'s (2008) diagram: restore watershed processes (mainly through riparian areas) and improve in-stream habitat (mainly through in-stream structures).

Reflection

Reflecting on Moerke and Lamberti's (2004) review, I point out the flaw in their analysis, acknowledge the value of the issues they raised, and the implications of these issues within the general context of stream restoration.

Moerke and Lamberti's (2004) objective was vague. They were looking at the strength and weaknesses of current reach-scale stream restoration practices; however their criteria limited the number of projects they were assessing. Drawing conclusions of reach-scale stream restoration practices from 10 projects to the entire Midwest is unscientific and defeats the purpose of conducting a review. In not assessing all the reach-scale projects, but limiting projects to greater than 300m of stream work, seemed they wanted to cherry pick their study sites for posterior assessment.

Putting aside their small sample size, an interesting issue raised by Moerke and Lamberti (2004) is that they introduced reach-scale restoration for aesthetic purposes. From a developer perspective, if a lot or house can be sold for twice as much because there is a nice looking stream in front, there is no questioning this is going to happen. The property owner probably does not even ask if the stream is fishable, but instead is enthralled by the idea of having a vegetated, trash-free stream running beside their home. If this is the purpose for restoration, then local-work (in-stream habitat, riparian area creation) is going to accomplish the goals.

Moerke and Lamberti (2004) also acknowledged that failed restoration projects are rarely documented. This is a sad fact not only for funders but for people that engage in stream restoration. While people are going to have different perspectives on what "effective restoration strategies" means, failed projects can admit failure only if they lay out clearly what their project goal was. Clearly identifying the goal of the project allows developers to learn from other people's mistakes if their end goal is aesthetics, the same way that scientist can learn under what circumstances putting in-stream structures increased macroinvertebrate diversity and when did it not work.

Stepping away from Moerke and Lamberti's (2004) study, their results are interesting within the general context of stream restoration because they acknowledge that end-goals will be different in every project, and with this the meaning of "effective restoration strategies". For Palmer et al. (2010), their review was solely to understand if in-stream habitat heterogeneity increases macroinvertebrate richness. This is a scientific perspective looking at aquatic ecosystem functioning and resilience. However, many of those projects might have had another end goal in mind.