



Pooled Monitoring Initiative's Restoration Research Award Program



Project Title

Using eDNA methods to extend biological sampling and identify candidate restorations for species reintroductions

Lead Entity

Robert Hilderbrand & Rodney Richardson, Appalachian Laboratory, University of Maryland Center for Environmental Science

Partners

Anne Arundel, Baltimore, Howard, Harford, & Montgomery Counties. MD DOT State Highway Administration

Research question(s)

Can eDNA provide additional insights into measuring restoration effectiveness?

Issue addressed

Restorations may be considered ecologically ineffective despite proper execution because the desired biota have small populations and are difficult to detect. eDNA can supplement and improve biodiversity surveys through improved detection abilities

Project findings

Restored sections had significantly higher overall biodiversity, sensitive taxa, and other attributes compared to upstream unrestored control sections when incorporating eDNA into benthic macroinvertebrate sampling, whereas no differences were found when using only traditional monitoring methods. In contrast, restoration outcomes when using fish were similar between eDNA and traditional methods. eDNA detected significantly more fish and benthic macroinvertebrate taxa than the traditional monitoring methods.

The Pooled Monitoring Initiative pools resources to support scientists who answer key restoration questions posed by the regulatory and practitioner communities. The research teams then provide the answers back to those who asked the questions for direct application. The goal of the program is to answer these key restoration questions that serve as a barrier to watershed restoration project implementation.

Questions? See cbtrust.org/grants/restoration-research/



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Recommendations

Including eDNA with traditional monitoring results in a better description of the aquatic communities and more sensitivity for assessing restoration success.

Why does this study matter?

Many entities are exploring eDNA for monitoring and assessment, and interest will increase given the study findings. The study provides realistic guidance on the methods, strengths, and limitations of using eDNA in restoration monitoring.

What should we do with this information?

Adding eDNA to aquatic monitoring and assessment should be encouraged because it substantively adds to the biodiversity sampled and can uncover patterns not detectable with traditional monitoring. But it must be used with some cautions as eDNA does not completely replace traditional monitoring.

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What will the end-user (regulator/manager and practitioner) do with this information?

Measureable biological recovery can occur in stream restorations, but the degree of improvement is modest. Entities now have additional guidance to better evaluate, design, and implement aquatic biodiversity surveys for monitoring and assessment. The study also identifies the limits and biases of eDNA.

For more information:

<https://cbtrust.org/grants/restoration-research/>

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