A Comparison of Two Rapid Biological Assessment Sampling Methods for Macroinvertebrates

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Background

Two methods for rapid biological assessment of invertebrates in streams have been published by EPA. One method focuses sampling in a single fast-water habitat (riffles) and the other samples multiple habitats within a stream. The single habitat method has been widely used in the U.S. for biological assessment of streams for over a decade. However, Region 3 biologists recognized that in the Piedmont and Northern Piedmont regions of the U.S., riffle habitat is less abundant in streams. However, no study has directly compared these two methods in these streams to determine the relative usefulness of the multiple habitat method.

Objective

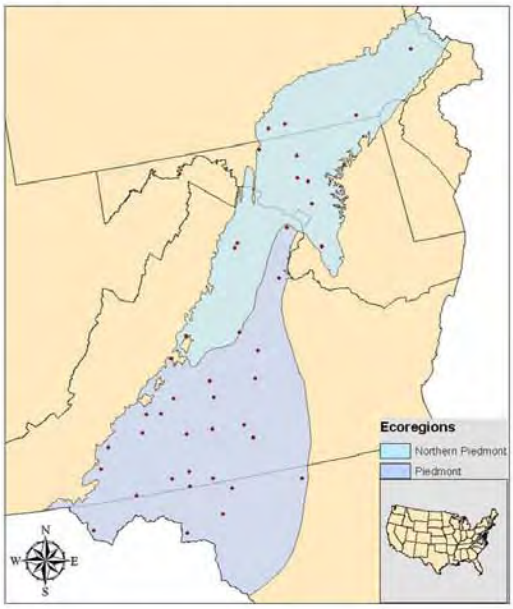
Compare single and multiple habitat sampling methods for invertebrates side-by-side in the field

Funding

Provided by Region 3 through a Regionally Applied Research Effort (RARE) Grant.

Study Area

41 Sites selected to represent a range of conditions in the Piedmont and Northern Piedmont Regions of the U.S.



Methods

- For single habitat method 4 kick net samples were collected from riffles.
- For multiple habitat method, 20 jabs or kick net samples were collected in habitats in proportion to their relative abundance.
- Water chemistry and habitat data were collected.

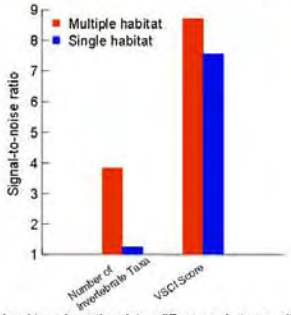
Collaboration

- Data were jointly collected by personnel from EPA NERL-Cincinnati and Region 3
- Data were processed and analyzed by EPA NERL-Cincinnati
- Interpretation of the data was aided by the EPA Region 3's contact with States

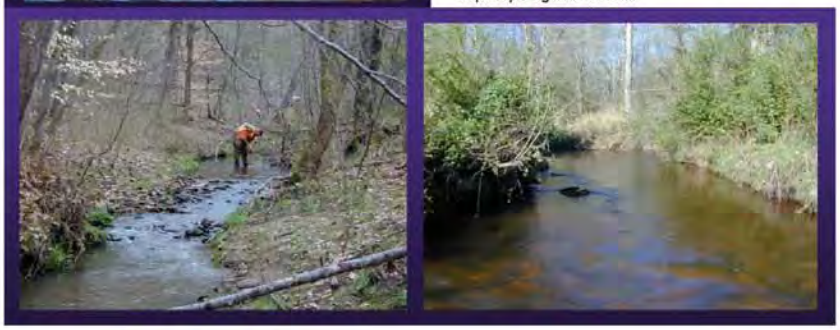
Results

The Virginia Stream Condition Index (VSCI) is a tool used by Virginia to measure the health of its streams based on several individual measures of invertebrate community.

This graph illustrates that while there is little difference between the abilities of the two methods to pick up a signal in the VSCI scores, there is a bigger difference in those abilities for Number of Taxa. This is important because Number of Taxa is one of the measures that makes up the VSCI.



The signal-to-noise ratio relates differences between sites to differences between samples collected at the same site. Larger values are more desirable, indicating a better ability to pick up a signal in the data.



Conclusions (based on results not presented here)

- For programs that have a history of collecting samples using the single habitat method, there is little evidence to compel a change to the multiple habitat method.
- However, resource availability may be a factor in choosing a method. Collecting samples using the multiple habitat method can take as much as 70% longer to collect than using the single habitat method.
- If the streams being assessed lack significant riffle habitats, the multiple habitat method may be the most logical choice.
- Because the multiple habitat method tends to collect a greater number of taxa, it may be more suitable for programs interested in developing an inventory of taxa.

Although this work was reviewed by EPA and approved for publication, it may not necessarily reflect official Agency policy.

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