Using Macroinvertebrates to Determine Water Quality

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INTRODUCTION

Benthic macroinvertebrates are organisms without a backbone, that can be seen without using a microscope and live on the bottom of streams, lakes, and rivers. The presence or lack of these organisms can give an indicator of the health of a waterway. They are a reliable indicator of water quality because they spend most of their lives in the water and respond to human disturbance in fairly predictable ways.

Certain macroinvertebrates are more sensitive to pollutants in the water than others. This means that they can only survive in the healthiest waterways. A healthy waterbody will contain a wide variety and high number of macroinvertebrates. Many of those will be intolerant of pollution.

The body of water tested was assessed as in good condition by the Environmental Protection Agency in 2018. This gives an idea of what is to be expected in the results based on macroinvertebrate presence.
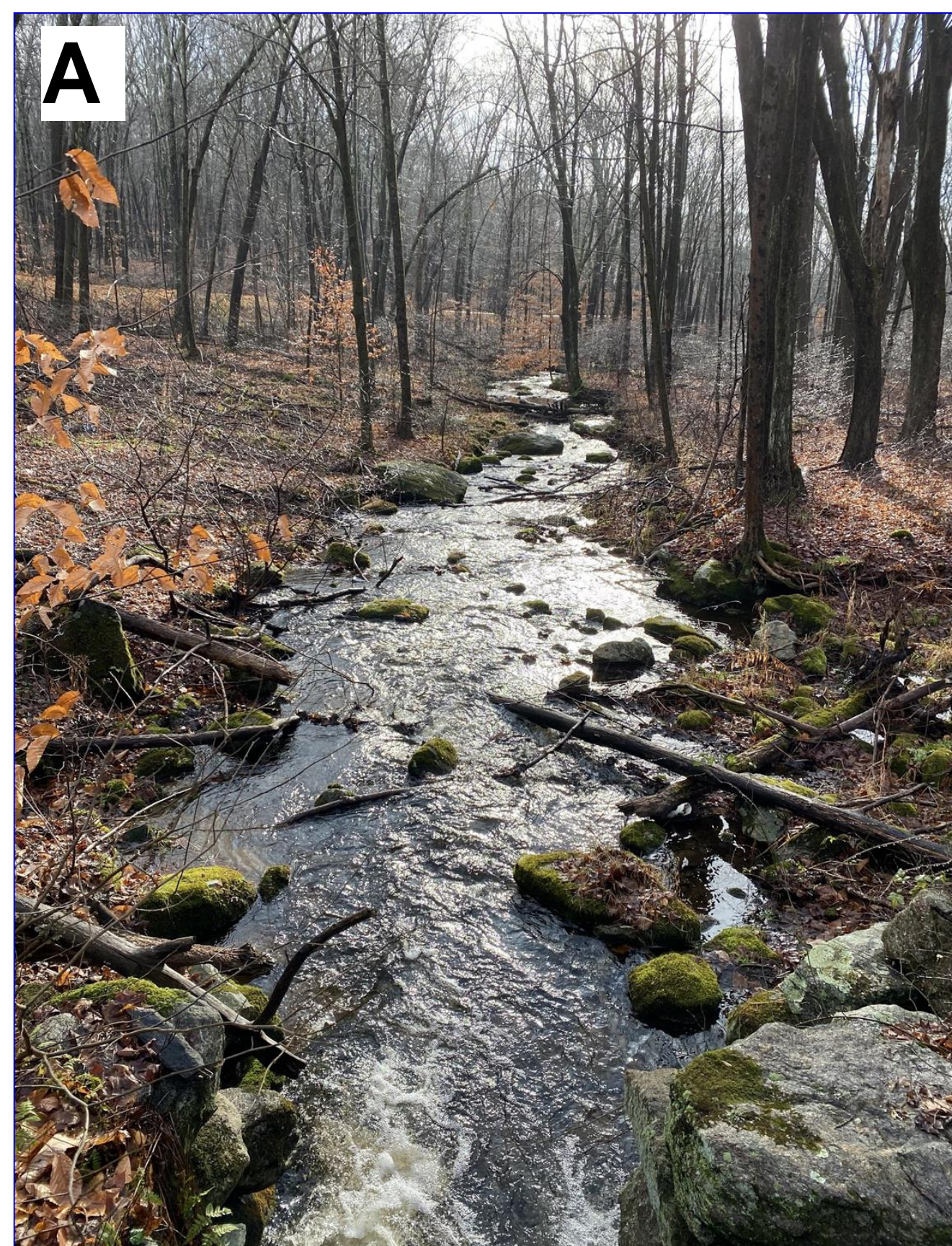
Fig A. Downstream view of Fourmile Brook
Fig B. Searching for Macroinvertebrates

MATERIALS AND METHODS

Test Site

➢ Samples were observed and collected from fourmile brook, which lies on the Seymour/Oxford town line. The brook runs alongside Holbrook Road and numerous mountain bike trails.
➢ The samples were taken at the end of November after a heavy rainfall.
➢ This riffle is fast moving and shallow, having a depth of approximately 1 foot at its deepest point.

Materials

➢ Kicknet, strainer, trays, tweezers, vials filled with alcohol

Methods

➢ After selecting an area, sweep your foot in a kicking motion through the bottom of the waterway, allowing debris to move into the kicknet
➢ Using the strainer, separate any findings out onto tray.
➢ Using tweezers, place any organisms in vial filled with alcohol to preserve as a sample

Fig C. The yellow star marks the test site. Fig D. The red star marks the test site
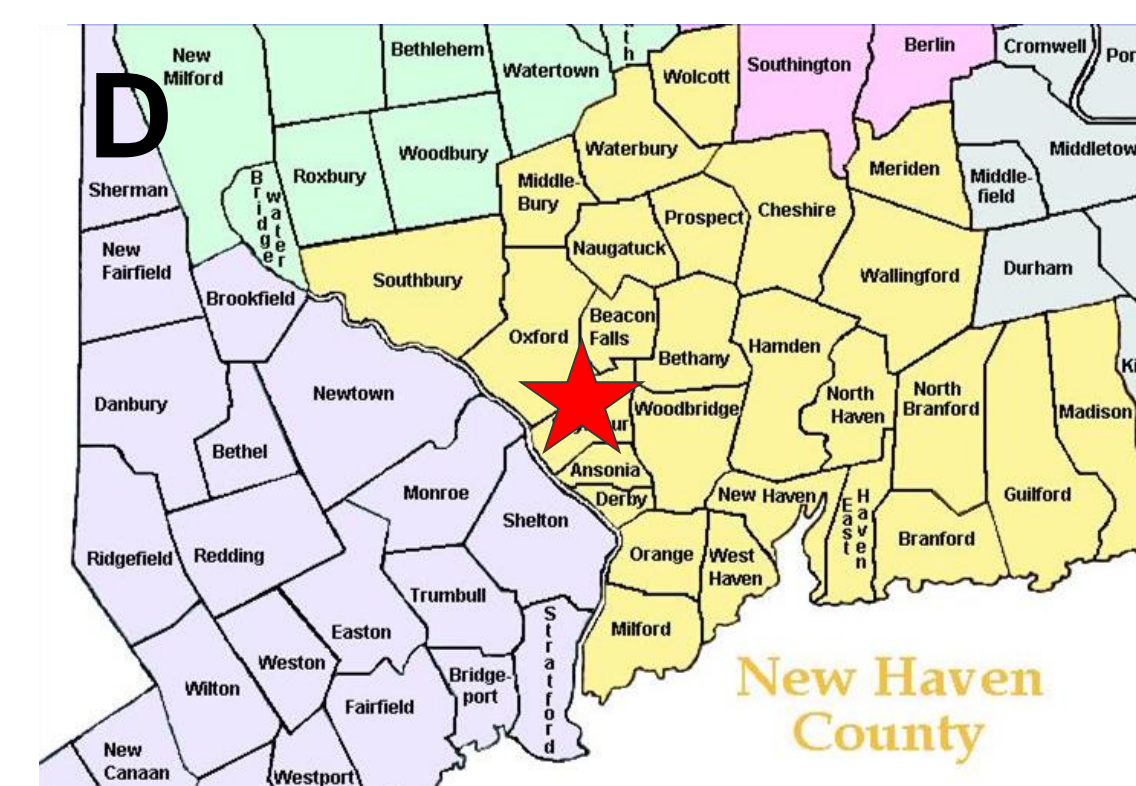
Invasive Species

While invasive species were not the intended focus of the project, they were observed. Rusty Crayfish, while common in western Connecticut, are invasive. These crayfish tend to be more resilient than native species. This can be troublesome as the invasive specie is more likely to push out native species.

RESULTS / DISCUSSION

Organisms observed include:
- **Aquatic Worm**
  - ↳ Least Sensitive to pollutants
  - ↳ Tolerance Value = 8
- **Non-Biting Midge (Red)**
  - ↳ Least Sensitive to pollutants
  - ↳ Tolerance Value = 8
- **Rusty Crayfish(orconectes rusticus)**
  - ↳ Moderately intolerant to pollutants
  - ↳ Tolerance Value = 6
- **Biddie Dragonfly larvae (cordulegastridae)**
  - ↳ Moderately sensitive
  - ↳ Tolerance Value = 3

The findings suggest that the Fourmile Brook is in good condition. However, it is possible that there are still more sensitive macroinvertebrates that were not observed during testing. This means that it is possible that the waterway is even healthier.

Fig E. Biddie Dragonfly larvae.   Fig F. Rusty Crayfish

CONCLUSION

Macroinvertebrates are essential to the health of many ecosystems. These reliable indicators are easy to collect and study. It is important that we use them to learn about the health of our water.

The Fourmile brook continues on to the Great Hill Reservoir Dam. The outflow of the dam is released in the Housatonic River, an impaired waterway. By studying the macroinvertebrates of the brook, its potential effects on other waterways can be determined.

REFERENCES

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ACKNOWLEDGEMENTS