

## Aquatic Macroinvertebrates

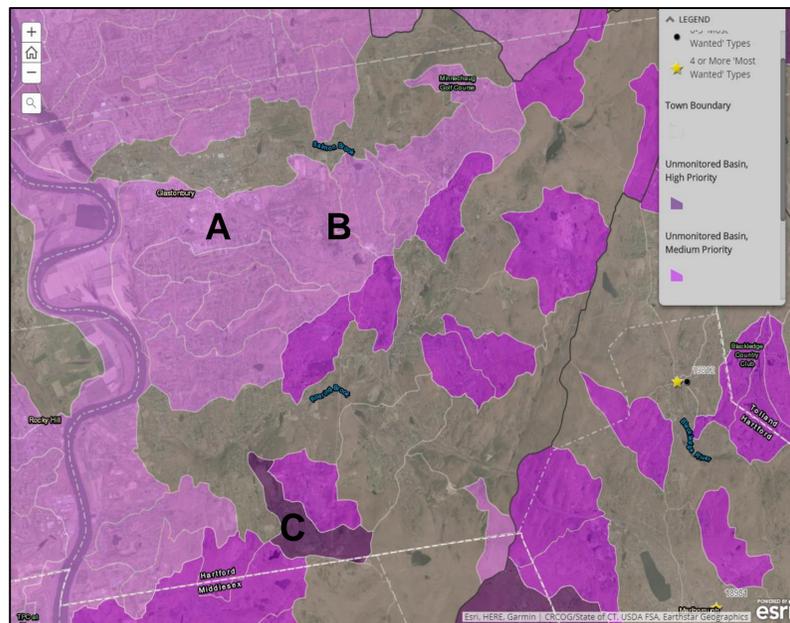
“Benthic macroinvertebrates are macroscopic invertebrate animals inhabiting aquatic habitats” (*Quality*, 2018, p. 11). They have limited mobility, preventing them from readily avoiding exposure to pollution. Thus, they are an excellent indicator of the wider stream’s health (*Program*, 2019).

## Rifle Bioassessment by Volunteers (RBV)

Rifle Bioassessment by Volunteers is a statewide program in Connecticut, used to monitor the water quality of Connecticut’s brooks, streams and tributaries (*Program*, 2019). RBV aims to identify the healthiest streams by collecting, identifying, and logging the number of pollution-sensitive macroinvertebrate taxa. If more than four of these most-wanted taxa are found, it is a strong indicator that the stream supports aquatic life. This data helps CT DEEP formulate their yearly report on the water quality of Connecticut’s waterways (*Program*, 2019).

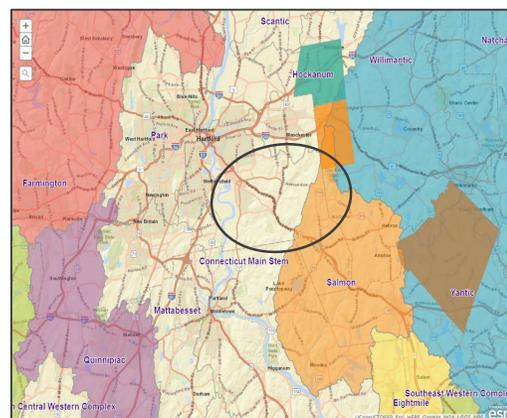
## Study Objectives

RBV studies are largely conducted by regional groups. Glastonbury however, isn’t within any of these regions, leaving it lacking in RBV data. The goal of my project was to help fill in this gap by collecting RBV data from three unmonitored streams in Glastonbury (see below).



**Figure 1. Sampling Sites**  
 A - Hubbard Brook  
 B - Wildcat Brook  
 C - Slab Gut Brook

**Figure 2.** A map of the different sampling organizations with Glastonbury circled for reference



## Materials

- 3 rectangular bins
- 3 ice cube trays
- Net
- Tweezers
- Macroinvertebrate identification binder
- Storage cylinders



**Figure 3.**

## Macroinvertebrate Sampling

### Capturing Macroinvertebrates

- Rifle (rocky area with water exposed to air) identified at site
- Rocks scrubbed with boots and hands with net downstream
- Insects captured in net scrubbed off into bin full of water
- Process repeated twice more at each site farther upstream each time, using a new bin each time

### Identifying and Storing Macroinvertebrates

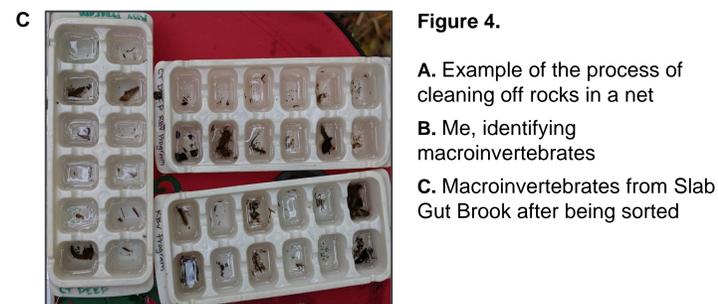
- Leaves and silt removed from bins
- Macroinvertebrates removed from bins with tweezers and sorted into ice cube tray by taxa (with help from identification binder)
- Binder used to identify macroinvertebrates and sort by taxa
- Taxa checked off on field data sheet
- 2-3 of each taxa placed in storage cylinder
- Remaining macroinvertebrates returned to stream

### Dates and Locations for each Sample

- Hubbard Brook
  - Sample taken just downstream of New London Turnpike with help from Jake Schwartz on October 19th
- Slab Gut Brook
  - Sample taken just upstream of crossing with Matson Hill Road with help from my brother and mother on October 20th
- Wildcat Brook
  - Sample taken by the campgrounds of JB Williams Park on October 26th



**Figure 4.**



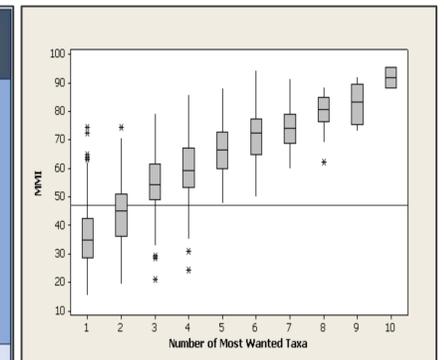
- A.** Example of the process of cleaning off rocks in a net
- B.** Me, identifying macroinvertebrates
- C.** Macroinvertebrates from Slab Gut Brook after being sorted

## RESULTS / DISCUSSION

### Number of Most Wanted Types by Site

Hubbard Brook: 0      Slab Gut Brook: 4      Wildcat Brook: 1

# 'Most Wanted' Taxa	What Does it Tell Us?
4+	<p><b>Excellent!! Lots of very sensitive macroinvertebrate types were present – you found a healthy stream segment!</b></p> <p>This is a very clear signal of excellent water quality as the "Most Wanted" types cannot survive in degraded streams or otherwise low water quality conditions.</p> <p><b>DEEP Assessment Decision:</b> The stream containing the monitoring location will be considered for "Fully Supporting" State aquatic life use standards. Fully supporting streams or stream segments will be listed in the next Integrated Water Quality Report (IWQR) and added to the DEEP's running list of miles of Healthy Waters assessed. (The IWQR is prepared by DEEP and submitted to the U.S. Environmental Protection Agency every two years.)</p> <p><b>Recommended Volunteer Follow-Up Action:</b> Revisit every 2 to 5 years to continue documenting the excellent health of this stream.</p>
3	<p><b>A Very Good Sign – Keep this Site on Your Radar!</b></p> <p>Three Most Wanted or very sensitive macroinvertebrate types in a sample is a strong signal of good to excellent water quality. Although three most wanted is not statistically enough data for DEEP to list the site as a healthy stream segment this time, this is a great find!</p> <p><b>DEEP Assessment Decision:</b> No Assessment Made... but consider trying again!</p> <p><b>Recommended Volunteer Follow-Up Action:</b> If this was the first time the site was monitored with RBV, this site should be a high priority candidate for monitoring next season.</p>
0-2	<p><b>Double check whether this is a good spot to be using the RBV method...</b></p> <p>More information is needed to determine the water quality at this site. Reasons for few most wanted may include poor water quality; however, few most wanted types should not be interpreted as a proof of degraded conditions. Other factors such as unusual flow conditions (i.e. very high or very low), lack of adequate riffle habitat, etc. could result in few most wanted types despite overall good water quality.</p> <p><b>DEEP Assessment Decision:</b> No Assessment Made</p> <p><b>Recommended Volunteer Follow-Up Action:</b> If this is a first-time monitoring location, and the site otherwise is suitable for RBV monitoring (e.g. small watershed with year-round flow and riffle habitat), assign the site a low to medium priority for follow-up monitoring.</p>



**Figure 5.**

**A.** CT DEEP interpretation of the water quality data

**B.** Box plot of MMI (water quality score) and the number of most wanted taxa, with the line representing the point at which a stream meets water quality requirements

## CONCLUSION

Since RBV is only useful as a screening tool, the only strong conclusion that can be made is that Slab Gut Brook, with four most wanted taxa, is fully supporting of aquatic life. This is not certain however, as CT DEEP still needs to verify the data. As for Hubbard Brook and Wildcat Brook, their low most wanted taxa count indicates that RBV may not be the best method for measuring their water quality.

This data seems to confirm that watersheds drawing from open space tend to support aquatic life, especially when similarly high most wanted taxa counts have been seen in previous RBV studies in the less developed land around South Glastonbury.

## REFERENCES

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