

Falls River Water Quality Sampling

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Introduction

Testing water quality is extremely important to provide people with an idea of what they are consuming and how it might affect the surrounding ecosystem. "Water-quality monitoring is used to alert us to current, ongoing, and emerging problems; to determine compliance with drinking water standards, and to protect other beneficial uses of water." (Myers 2016)

One such problem that is being monitored are impervious surfaces. These surfaces do not absorb water, yet are usually found near it which can contribute to higher conductivity levels and possible pollutants due to runoff.

The primary objective of this project was to determine the water quality of the streams in the Ivoryton, CT portion of the Falls River, and to determine if necessary to improve the quality of life for those who rely on that water.

Materials and Methods

Site Selection

- From 12 Sept- 3 Oct, four sites along the Falls River were monitored (Fig. 2A)
 - Two sites were monitored per week, and each site was monitored twice
 - Weather and environmental characteristics were recorded for initial monitoring (Fig.1A)

Water testing

- Initial measurements of width, average depth, and water velocity was obtained at each site
- At each location, Temperature (°C), Conductivity (µS/cm), and total dissolved solids (TDS;ppm) were obtained with a TDS Ubante meter, and collected from one spot.
- A water sample was collected in a jar from upstream and tested using test strips for pH, Ammonia, and Nitrate

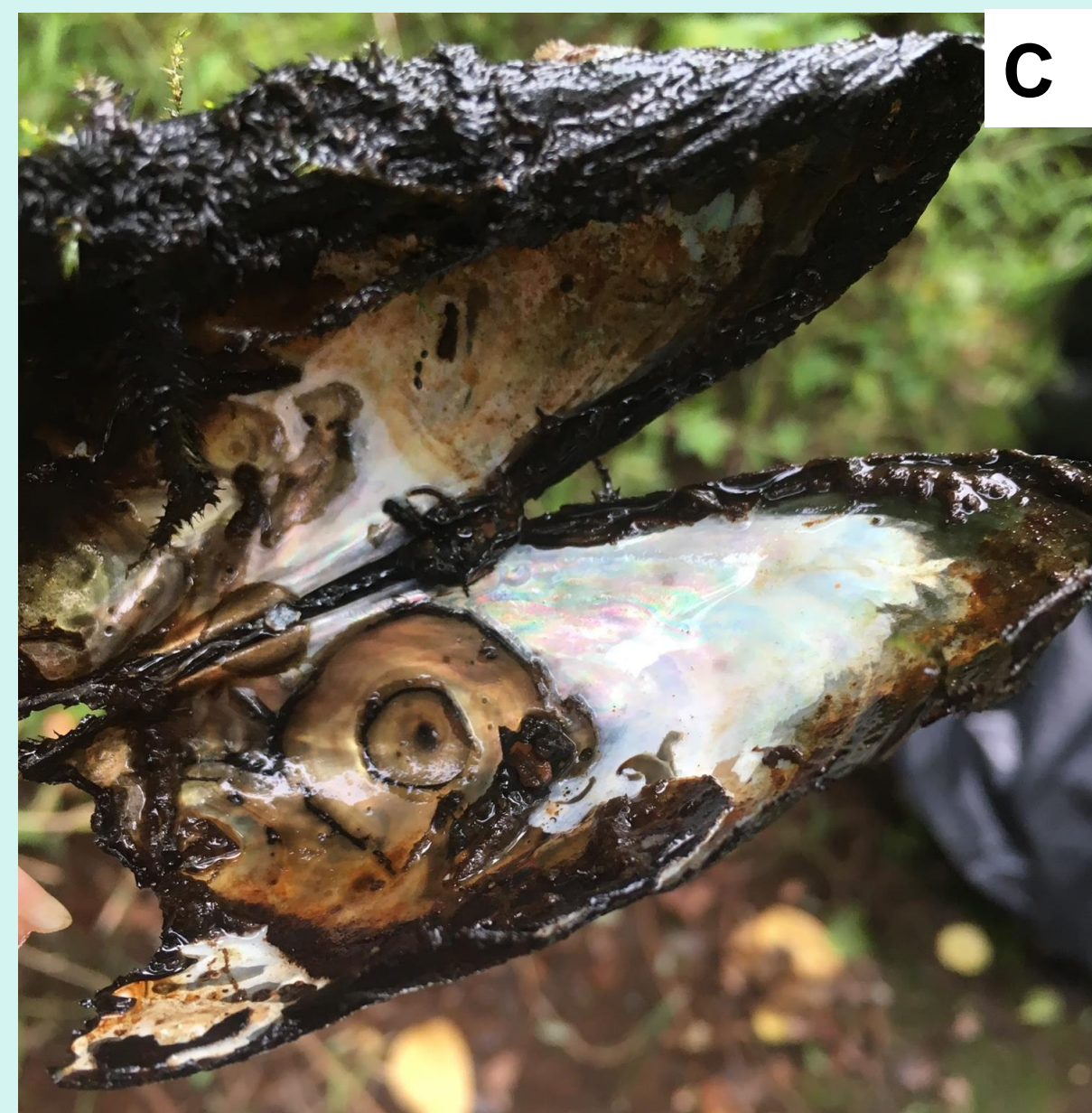


Fig 1. A - Tabby, Chet, and Bob taking general observations at the Messerschmidt location. B - An aquatic beetle found in the Falls River with a car key for scale. C - A mussel shell found at the Dennison Road site. D - Bluegill sunfish that was captured in the seine.

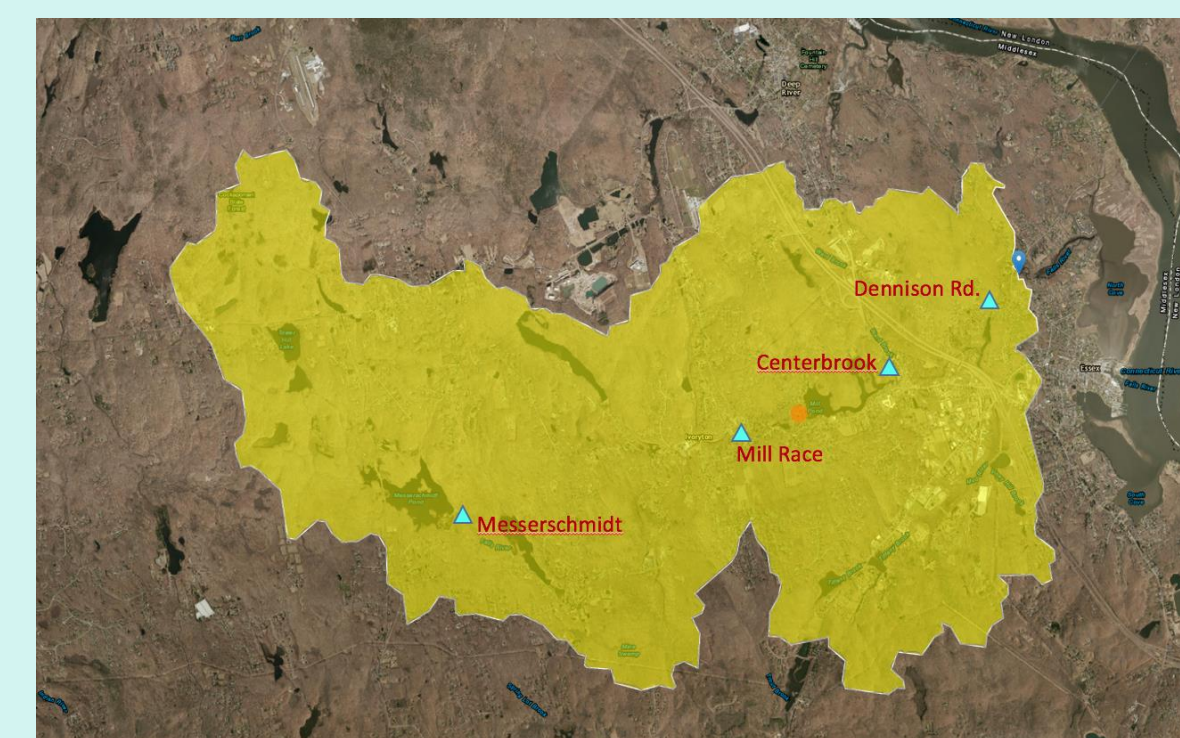


Fig 2A. The Falls River watershed with the four testing sites labeled.



Fig 2B. Over three hundred cattfish captured in the seine at Denison Road.

Wildlife survey

- At each location, a macroinvertebrate survey was taken every time the location was visited
 - A spot with rocks was selected
 - A D net was placed downstream and the rocks were moved and scrubbed for at least 30 seconds
 - Macroinvertebrates caught in the net were transferred to a bucket and analyzed using DEEP's Field ID Cards (CT DEEP 2016)
- At 3 of 4 sites, a fish survey was taken using a seine, operated by two people
- The net was examined on shore and its contents were emptied into a bucket
- The fish were analyzed, counted, and released

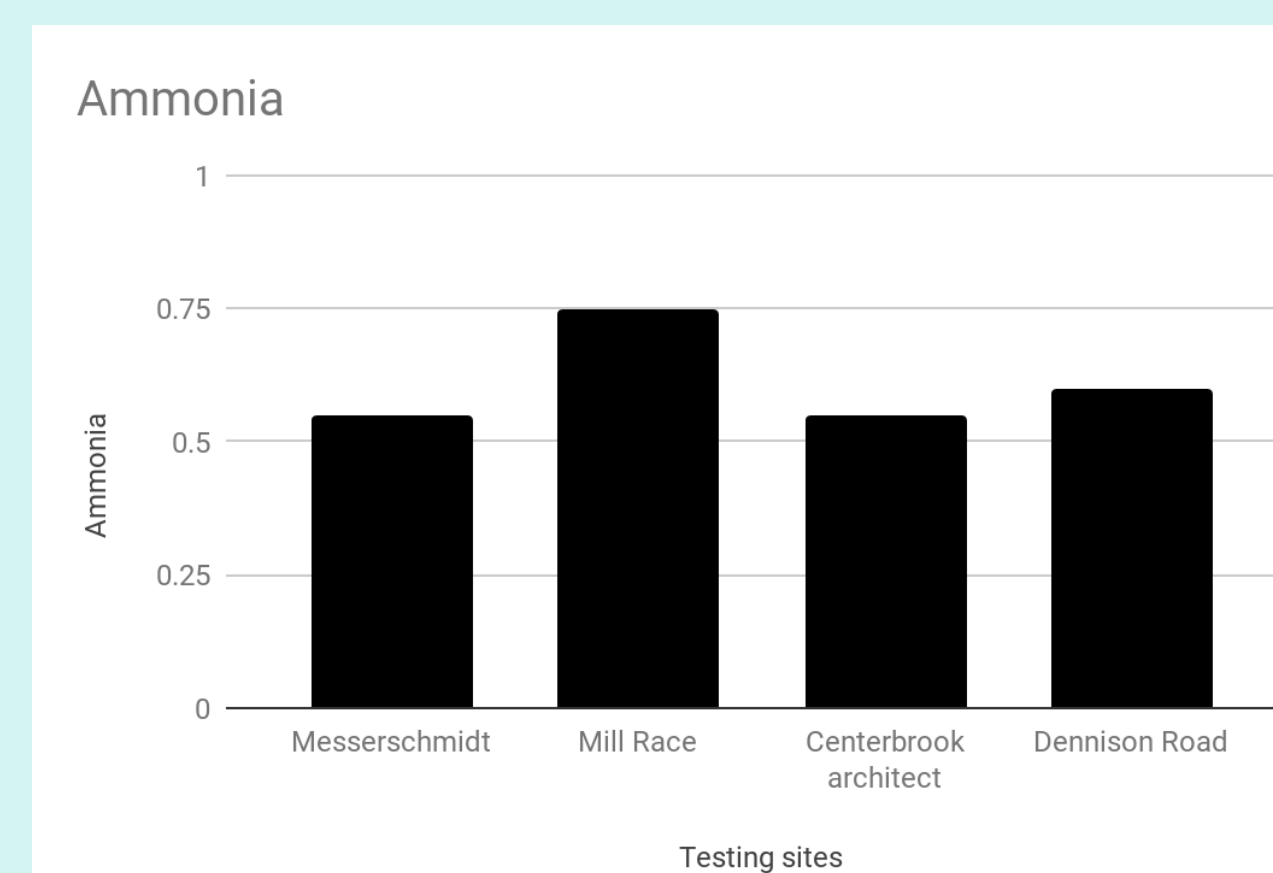


Fig 3A. The average ammonia levels at each site.

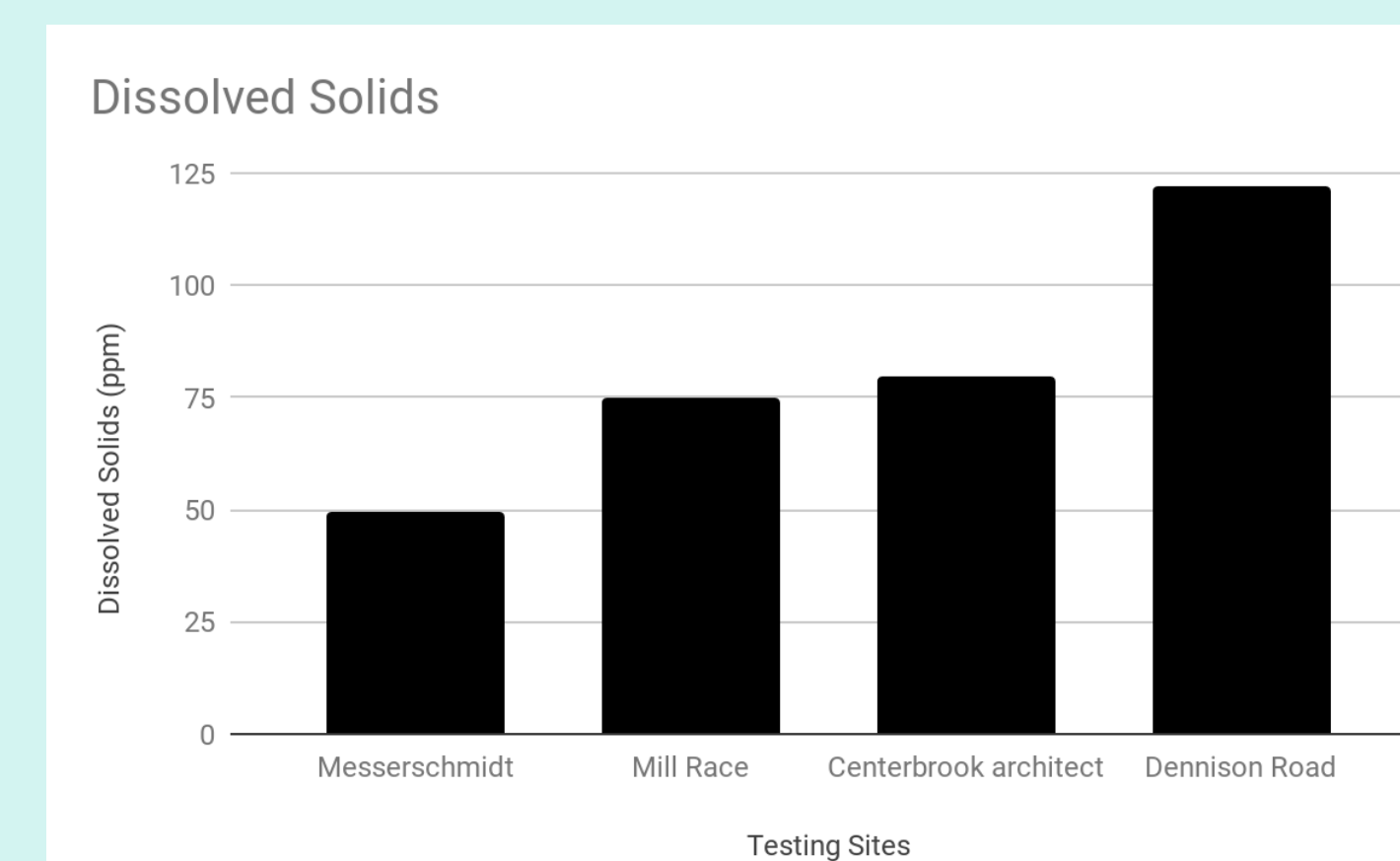


Fig 3B. The average total dissolved solids levels at each site.

Results

Water Testing

- Conductivity and TDS measured at Dennison Road was highest among the sites (Fig. 3B and Fig. 4B)
- No nitrate was detected at any site
- All of the values for ammonia were above 0.53 (Fig. 3A)
- Conductivity ranges were from 100 - 261(µS/cm) (Fig.4B)

Wildlife Survey Findings

- Dennison Road yielded the highest number of fish ~303 catfish (Fig. 2B)
- Mayfly and Scud were the only two macroinvertebrate species found consistently in all locations

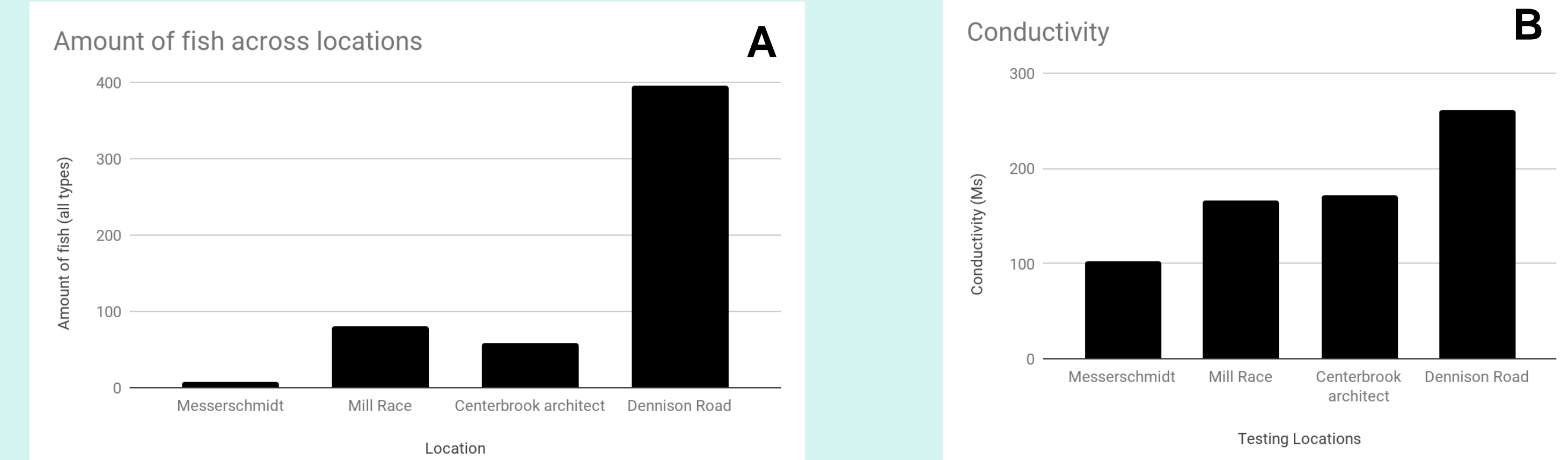


Fig 4. A - The amount of fish found across the four locations. All captured types included in these numbers. B - The conductivity measurements in µS/cm across all four locations.

Conclusions

- TDS at all sites are between ideal drinking water and hard water (Fondriest Environmental, Inc. 2014.)
- Ammonia levels above 0.53 are toxic for select wildlife depending on temperature (Kentucky DEP 1996)
 - This may be why there was such a limited amount of fish found in the locations.
- Most healthy streams are from 150 - 500 (µS/cm) (Behar 1997)
 - This means that the Falls River has an acceptable amount of conductivity for wildlife to survive.
- Conductivity and TDS increased downstream
- The water quality of the Falls River is acceptable for a variety of wildlife, including humans. The only concern is potentially high ammonia levels which can be detrimental to fish populations.

References

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