

Macro invertebrate survey and biological assessment of water quality of the Schoharie Creek from Blenheim to Burtonsville N.Y., Summer 2012.

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INTRODUCTION

In August of 2011, the Schoharie Creek was devastated by Hurricane Irene and Tropical Storm Lee. The storms brought a discharge flow level of 128,000 cubic feet per second of water as measured by the USGS flood gage at Burtonsville between August 28, 2011 and September 1, 2011. With the sudden increase of water, the Schoharie Creek overflowed its banks and caused damage to farms, and houses in Schoharie, Schenectady, and Montgomery counties. Along with the damage to property, the rushing waters also took its toll on the ecological state of the Creek. The damage affected the macro-invertebrates, fish, and other wildlife that reside in the Creek. With the flooding the water also brought chemicals and flood debris which ruined habitats along the creek. The TSM (total suspended matter) of the Schoharie Creek was also raised for several months following the flood; it peaked at 48 mg/L. (Gillikin et.al. 2012)

Utilizing the Wadeable Assessments by Volunteer Evaluators (WAVE) methodology for macro-invertebrate sampling, the Environmental Study Team at the Schoharie River Center has been monitoring the effects of Hurricane Irene and Tropical Storm Lee on the water quality of the Schoharie Creek from Blenheim to Burtonsville. During the summer of 2012, EST youth tested The Schoharie Creek, The Manorkill - a tributary of the Gilboa Reservoir, The Schoharie Creek at Blenheim, The Schoharie Creek at Burtonsville, and the Wilsey Creek - a tributary of the Schoharie Creek. The assessments were completed by Schenectady High School Students working with the Schoharie River Center and the Schenectady Job Training Agency (SJTA) as part of the SRC's Summer Youth Environment and Community Documentation Program.

Materials and Methods

At each site, benthic macro-invertebrates were collected utilizing WAVE, a DEC promoted program, which allows volunteer stream monitoring groups to submit usable surface water quality information to the New York State Department of Environmental Conservation Stream Bio-monitoring Unit. To collect the data, we used kick nets, datasheets, stop watches, ice cube trays, tweezers, and isopropyl alcohol. Using the WAVE process we first located a riffle of the stream (WAVE, 6). Then, we collected the sample using kick nets that were size .8mm X .9mm (WAVE, 7). Next, we Identified and grouped the samples (WAVE, 8-9). Finally, we recorded our sample numbers filing out a data sheet and put the bugs in sample containers with isopropyl alcohol (WAVE 10).

Our goal was to discover how clean the water was by collecting and analyzing macro- invertebrate samples. The macro-invertebrates living in the water indicate water quality because some species are more of less tolerant of polluted water. If our sample contain a majority of that were more tolerant to polluted water, it would indicate that the water was more polluted. If we found our sample contained a majority if insects that were less tolerant of polluted waters it would indicate the water in that area was clean. As part of the WAVE methodology, sites which have four or more most sensitive types of macro invertebrates are considered unimpaired. Sites with four or more least sensitive types of macro invertebrates are subject to further testing. There is a third classification of macro invertebrates, others, which aren't shown to definitively indicate water quality. Even though this last group does not have a direct impact on classifying the water body as unimpaired, it is still important to note their existence in that location.

Another tool we used to determine the waters cleanliness was water chemistry tests. Using test kits we determined the waters, temperature, pH, alkalinity, dissolved oxygen, nitrate levels, orthophosphate, conductivity, and turbidity. We tested dissolved oxygen utilizing the LaMotte kit number 5860. We tested for alkalinity using the LaMotte alkalinity test kit 4491. The pH was measured using the LaMotte test kit 5858. The nitrate levels, orthophosphate, and turbidity were tested with a Hach DR890 colorimeter. Conductivity was tested with a Corning conductivity and pH multi meter. All of these tests help to determine what wildlife are able to survive in those conditions. The greater biodiversity of species living in a habitat, the more stable the community. We had sample sites at the Schoharie Creek, Wilsey Creek, and Manorkill.

Site	Most Wanted	Least Wanted	Other
Schoharie Creek at Burtonsville	Isonychiidae (s) Perlidae (s) Rhyacophilidae (f)		Hydropsychidae (m) Chimarra (f) Crane Fly Larvae (f) Riffle Beetle (s)
Manorkill	Heptageniidae (f) Perlidae (s)	Red Midges (f)	Hydropsychidae (f) Baetidae (s) Dragonfly & Damselfly (f) Hellgrammite (f) Crane Fly Larvae (m) Riffle Beetle (f)
Wilsey Creek	Ephemereillidae (f) Heptageniidae(m) Perlidae(s) Rhyacophilidae(f)	Red Midges(m)	Dragonfly & Damselfly (f) Fishfly(f) Crane Fly Larvae (s)
Blenheim	Isonychiidae (s) Heptageniidae (m) Leptophlebiidae (m) Perlidae (m)		Hellgrammite (m) Riffle Beetle (s) Crayfish (m)

(f) few (s) some (m) many

At the Manorkill, the riffles were not as wide as the stream and were less than two times its width, the substrate size contained cobble, boulders, and gravel, and the riparian zone was 12-35 yards wide. There is a lack of some of the water chemistry data for the Manorkill site because we could not find the data.

At Blenheim, the riffle was also as wide as the stream length but less than two times its width, the substrate size was gravel, boulders, and bedrock, and the riparian zone was heavily damaged by the flooding and subsequent clean-up efforts from Hurricane Irene. The riparian shore 6-12 yards wide and devoid of vegetation.

The testing site at The Schoharie Creek at Burtonsville has a riffle size that was not as wide as the stream and had a length of less than two times the streams width, the substrate size was cobble, boulders, and gravel, and the riparian zone was 12-35 yards wide.

CONCLUSION

The Wilsey and Blenheim sites both appear to be unimpaired according to our macro invertebrate data. Due to the lack of family variety of healthy indicators at the Schoharie and Manorkill sites, it cannot be classified as unimpaired using the WAVE methodology. According to our macro invertebrate data, The Manorkill site appears to be the site most in need of further study. Our lack of full water chemistry data for the Manorkill site resulted in an inability to fully analyze the site, which is another reason why further testing should be done at this site. Testing should be continued at all of the sites in order to continue monitoring the effects of humans and natural disasters.



Hydropsychidae (Caddisfly larvae)



Rhyacophilidae (Caddisfly Larvae)

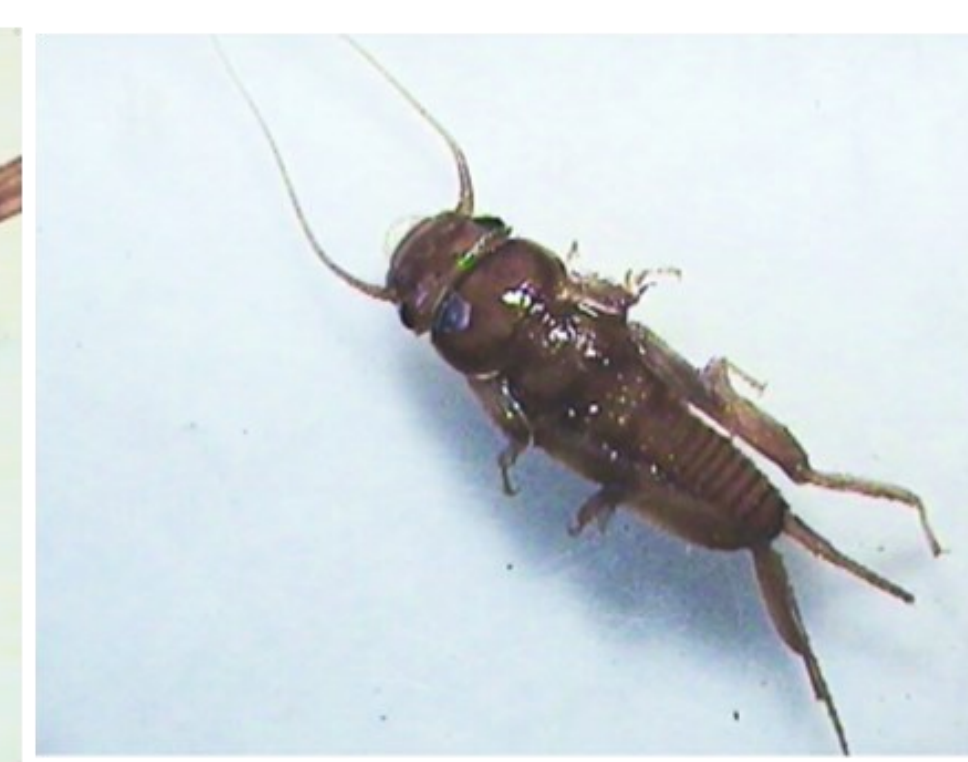
Tests	Manorkill	Wilsey Creek	Schoharie Creek at Burtonsville	Blenheim
Temperature (C)	n/a	16.1 degrees Celsius	26.7 degrees Celsius	21.3 degrees Celsius
pH	7.7	9.4	8.6	8.0
Alkalinity	n/a	141 mg/L	123 mg/L	n/a
Dissolved Oxygen	7.4 mg/L	9.2 mg/L	7.5 mg/L	9.2 mg/L
Nitrate	0.3 mg/L	0.8 mg/L	0.3 mg/L	0.3 mg/L
Orthophosphate	0.0 mg/L	0.05 mg/L	0.02 mg/L	0.0 mg/L
Conductivity	n/a	260 uS/cm	310.3 uS/cm	n/a
Turbidity	n/a	0.0 FAU	7.0 FAU	2.0 FAU



Tipulidae (Crane fly larvae)



Isonychiinae (Mayfly larvae)



Perlidae (Stonefly larvae)

