



Ten Mile River Biomonitoring

A healthy stream and the “bugs” that live in it

Introduction

The National Park Service (NPS) partners with many organizations and landowners to steward the natural and cultural resources of the Upper Delaware Scenic and Recreational River. Protecting and improving the condition of these resources is important so that they continue to provide countless ecological and recreational benefits for many generations to come.

The biological “health” of Ten Mile River, which is included in the 2014 Upper Delaware BioBlitz, has been assessed several times since 2008 by the Eastern Rivers and Mountains Network (ERMN). The ERMN, along with 31 other “networks” are responsible for long-term monitoring of ecological condition of National Parks.

Ecological Monitoring in the Eastern Rivers and Mountains Network

The NPS is mandated to maintain or improve the condition of its natural resources for future generations. Stewarding natural resources requires knowing the condition that they are in through time. To track the ecological “health” of wadeable streams, the ERMN monitors benthic macroinvertebrates such as aquatic insects. Different kinds (species) of benthic macroinvertebrates can tolerate different amounts of human pollution; therefore, monitoring which species (and how many of each) live in a stream allows the ERMN to assess how healthy streams are, now and into the future.

In addition to wadeable stream monitoring, the ERMN monitors other characteristics of park ecosystems throughout nine parks in four states. These ecosystem characteristics include air quality, invasive species (i.e., early detection), riparian plant communities, river water quality, streamside birds, vegetation and soils, and weather and climate.

Ten Mile River Macroinvertebrates

The ERMN collected and identified benthic macroinvertebrates from Ten Mile River in three different years since 2008. In spring, 2014, 37 types of macroinvertebrates were found in riffle-cobble habitats in Ten Mile River. Because most macroinvertebrates are very small and difficult to identify to the species level, the ERMN usually identifies them to genus, which is a higher taxonomic level. There are undoubtedly many more than 37 macroinvertebrate species that live in Ten Mile River – a variety of other habitats (e.g., sandy-bottomed pools) that different macroinvertebrate species prefer were not studied by the ERMN.



Figure 1. Caddisflies in the genus *Brachycentrus* are found in Ten Mile River and in other streams throughout North America – they are commonly referred to as Grannom Caddis. These insects build tapered, four-sided cases from pieces of plant material that they cut and “glue” together with silken secretions. Cases protect many caddis species when they are larvae and pupae. As larvae, these caddisflies attach their cases (and themselves) to stones and other underwater structures where they forage for algae, plants, and very small animals. Adults emerge and live for several days to weeks before females swim underwater to attach their eggs to the stream bottom where the life cycle begins again.

An indicator that Ten Mile River is a relatively healthy stream was that many (73%) of the macroinvertebrate taxa identified were mayflies, stoneflies, or caddisflies. Compared to most other benthic macroinvertebrates, these insects are considered to be very intolerant of pollution.

Scientists have been studying benthic macroinvertebrates for many years and have a thorough understanding of which (and how many) species are expected to live in unpolluted streams. Policymakers in many states use mathematical formulas and statistics that describe the condition of benthic macroinvertebrate communities. Using these tools, lawmakers can conserve and protect streams by passing regulations regarding water quality and the activities that affect it.

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More Information

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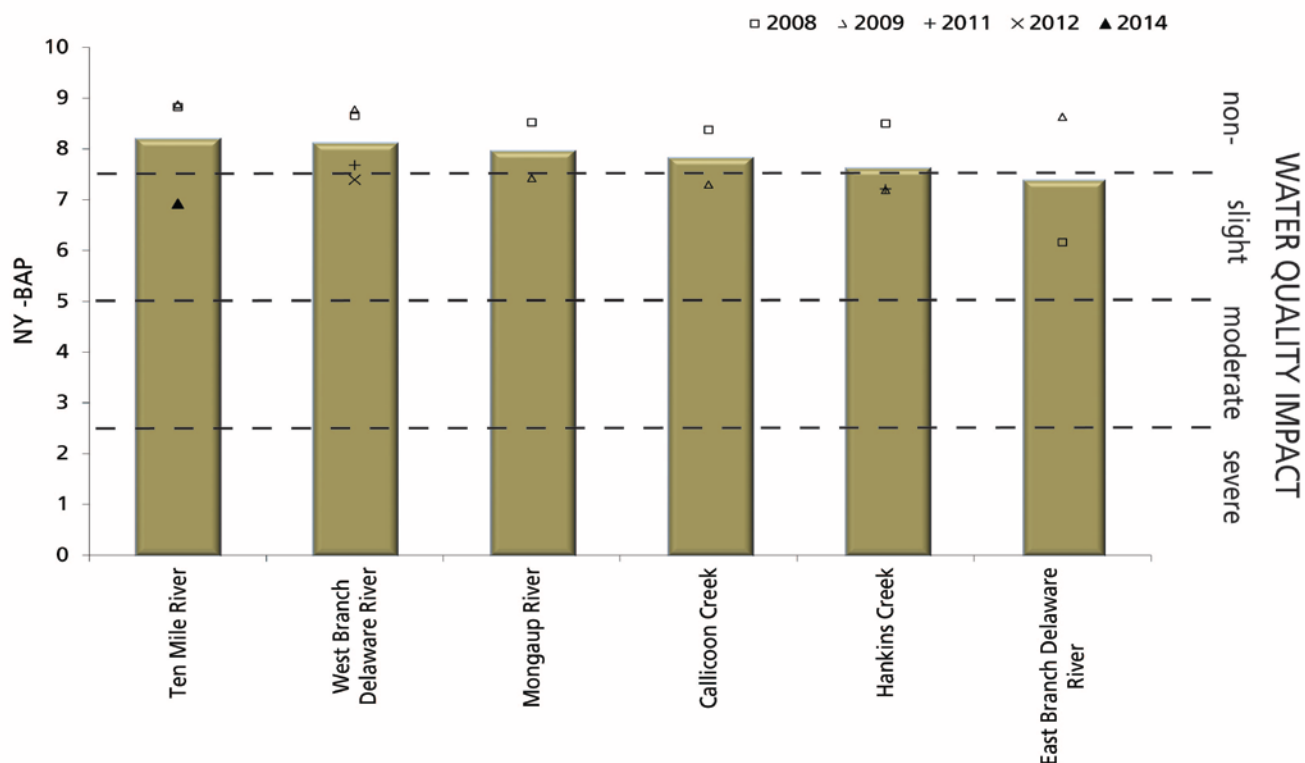


Figure 2 (above). Water quality of Ten Mile River and several other tributaries to the Upper Delaware Scenic and Recreational River, 2008 to 2014. The Eastern Rivers and Mountains Network (ERMN) uses several measures of benthic macroinvertebrate community condition to monitor Wadeable Streams – one measure is an index called the “New York Biological Assessment Profile” (NY-BAP). The NY-BAP is used by the New York State Department of Environmental Conservation (NYSDEC) for water quality regulations – it should be noted that these results have not been reviewed by NYSDEC and are for illustrative purposes only.

Based on ERMN benthic macroinvertebrate data and calculations, Ten Mile River water quality was typically in the best water quality impact category (i.e., non-impact). As illustrated by the figure, there can be year-to-year differences but Ten Mile River was often one of the “best” streams sampled by the ERMN. In 2014, a relatively high number of black flies (Simuliidae) were collected, and because black flies are considered pollution-tolerant, the NY-BAP was slightly lower than in previous years.

Conclusions

Ten Mile River and many other streams near the Upper Delaware Scenic and Recreational River are biologically “healthy” based upon benthic macroinvertebrate monitoring. Although monitoring by the ERMN and others will help maintain the good condition of streams, their conservation and protection as a common resource are ultimately up to concerned citizens. Thank you for your interest and for attending the 2014 Upper Delaware BioBlitz.



**Eastern Rivers and
Mountains Network**

NPS INVENTORY & MONITORING PROGRAM

Table 1. Benthic macroinvertebrates collected from Ten Mile River downstream of New York State Route 97 on April 12, 2014. Scientific names listed in the “Taxa” column are usually genus but some organisms were identified at higher taxonomic levels.

Common	Family	Taxa
Blackfly	Simuliidae	Prosimulium
Caddisflies	Brachycentridae	Brachycentrus
	Hydropsychidae	Cheumatopsyche
	Hydropsychidae	Diplectrona
	Hydropsychidae	Hydropsyche
	Limnephilidae	Hydatophylax
	Philopotamidae	Chimarra
	Philopotamidae	Dolophilodes
	Polycentropodidae	Polycentropus
	Rhyacophilidae	Rhyacophila
	Uenoidae	Neophylax
Clubtail dragonfly	Gomphidae	Gomphidae
Crane Flies	Tipulidae	Antocha
	Tipulidae	Tipula
Dagger Fly	Empididae	Trichoclinocera
Dobsonflies	Corydalidae	Corydalus
Fishflies	Corydalidae	Nigronia
Freshwater limpet	Ancylidae	Ferrissia
Mayflies	Baetidae	Baetis
	Ephemerellidae	Ephemerella
	Heptageniidae	Epeorus
	Heptageniidae	Leucrocota
	Heptageniidae	Maccaffertium
	Isonychiidae	Isonychia
Midge	Chironomidae	Chironomidae
Riffle Beetles	Elmidae	Oulimnius
Stoneflies	Chloroperlidae	Sweltsa
	Nemouridae	Amphinemura
	Nemouridae	Ostrocerca
	Perlidae	Acronuria
	Perlidae	Isoperla
	Pteronarcyidae	Pteronarcys
	Taeniopterygidae	Oemopteryx
	Taeniopterygidae	Taenionema
Water Penny	Psephenidae	Psephenus
Water Snipe Fly	Athericidae	Atherix