



Mercury Study

CU Maurice River has been contributing to this project by sampling dragonfly nymphs since 2015.

Since 2011 the University of Maine, in partnership with the United States Geological Survey (USGS), the Schoodic Institute, and the National Park Service, has been conducting a nationwide study on mercury contamination in America's natural resources. This project involves collecting dragonfly nymphs and analyzing them for mercury in order to better understand mercury distribution in the United States.

The issue at hand...

Mercury is a naturally-occurring element which is emitted into the air through environmental processes like volcanic eruptions and wildfires. That said, much of the mercury found in the atmosphere is a result of human activities, including gold mining and coal burning. According to the Environmental Protection Agency, coal burning to generate electricity is the largest source of these emissions in the United States (Basic Information about Mercury, EPA.gov).

Elemental mercury is present in coal. Once the coal is burned, the mercury is released into the atmosphere. Wind currents can carry it long distances crossing city, county, state, and even national borders. Air deposition through precipitation or gravity causes this element to fall to the ground, covering communities as well as natural habitats. There it works its way into the soil and water. According to the National Park Service and EPA, elemental mercury is converted into a toxic form called methylmercury by microscopic organisms in aquatic habitats like rivers, lakes, and wetlands. There it

will persist unchanged as a toxin, working its way into the food web.

Bioaccumulation occurs when an organism ingests a contaminant faster than it can eliminate the substance from its body, which leads to build-up over time. When a species higher on the food chain consumes that organism, the contaminant is biomagnified, meaning it becomes more concentrated each time the next species up ingests it. When a fish gobbles a tadpole and a heron gobbles the fish, the shorebird receives a much higher dose of a toxin than present in the aquatic environment. In this fashion, mercury continues moving its way up through the food web, growing in concentration and, consequently, becoming more detrimental to larger predators. Because people consume top level predators we too are exposed. For the purpose of this study, dragonfly nymphs are collected because they are predators that consume a wide variety of aquatic lifeforms, making them an ideal indicator species in understanding mercury contamination trends and the health of aquatic ecosystems in the watershed.

This biomagnification of methylmercury can have devastating effects on wildlife as well as human health.

Methylmercury is a neurotoxin. This means that when it is ingested in large amounts it can affect the nervous system. The National Parks Service lists reduced reproductive success, impaired growth and development, behavioral abnormalities, impaired immune response, disease, and decreased survival as the potential effects of methylmercury on fish, fish-eating birds, and other wildlife. Humans as an apex predator consume many aquatic species that have experienced biomagnification of methylmercury. Not being immune to this neurotoxin, USGS lists the milder effects this contaminant can have on the human body as reduced motor skill function and dulled senses of sight, touch, and taste. But as the concentration increases in a person his brain, heart, kidney, lungs, and immune system functions can become compromised, which could even lead to death.

The task at hand...

Originally, the Dragonfly Mercury Project began as a high school science project led by one student curious to know more about mercury deposition, contamination, and biomagnification. Today it has grown into a nationwide study led by some of the country's most influential leaders in conservation and resource management.

So far, over 4,000 citizen scientists have volunteered to collect nymphs at more than 100 National Park Units, including Wild and Scenic Rivers. This goes to show the power of ordinary citizens, volunteers, in making a difference for a greener, healthier tomorrow. As a local project partner and National Park Service Partnership Organization, CU Maurice River has been contributing to this project by sampling for dragonfly nymphs on the Wild and Scenic Maurice River and its tributaries since 2015. We hope that you can join us in helping grow the scope and reach of the project this year. **See box below for sign up details.**

CU Maurice River's team of citizen scientists will sample at three different sites: one on the Muskee,

one on the Menantico, and another on the Manumuskin River. The team will be divided into three groups: The *Draggers*, the *Baggers*, and the *Flaggers*, each with differing tasks. The *Draggers* will be the water group, which entails slogging through the river while utilizing a dip net in search of dragonfly nymphs. The *Draggers* will hand their net contents over to the *Baggers* on the riverbank, who will then pick out the dragonfly larvae from other river creatures and carefully place the specimens into specimen bags. Finally, there are the *Flaggers* who will be in charge of identifying the dragonfly species and taking measurements. No worries, *Flaggers!* We will have cheat sheets on hand. No prior experience is necessary. At the beginning of each day there will be an introductory and training meeting.

You can be part of 2019's sampling team! You are invited to be a volunteer citizen scientist and help with this study on August 27th, 29th, and 30th. All are welcome. And again, no prior experience required! To get involved contact the office at (856) 305-3238, email CitizensUnited@CUMauriceRiver.org,

or visit the Citizens United to Protect the Maurice River's Facebook page. There you will find posts on the Dragonfly Mercury Project with more details and a link to sign up.