

# The Dragonfly Project:

## A collaborative approach to mercury detection and education

Dartmouth Toxic Metals Superfund Research Program

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### Background

Every year high school students from Vermont and New Hampshire work with Dartmouth Toxic Metals Superfund Research Program mercury experts and Community Engagement Core staff to explore spatial and temporal variation of mercury in dragonfly larvae. Atmospheric deposition of mercury is an issue of concern in northern New England, and mercury bioaccumulation research allows students to engage with data and increase scientific literacy through a locally relevant topic. This project was developed in partnership with Schoodic Education Research Center Institute and the University of Maine and linked to the National Parks Dragonfly Mercury Project.

### Phase 1: Education and Sample Collection

Project 2 experts educate students about mercury in the environment, dragonfly nymphs, and proper sample collection techniques. Once trained, students and teachers collect larvae from local water bodies. They also collect site descriptions and ancillary data including types of vegetation, sediment descriptions, and water quality metrics. Samples are analyzed for total mercury concentration by Dartmouth's Trace Elements Analysis Laboratory and results are shared with the schools.



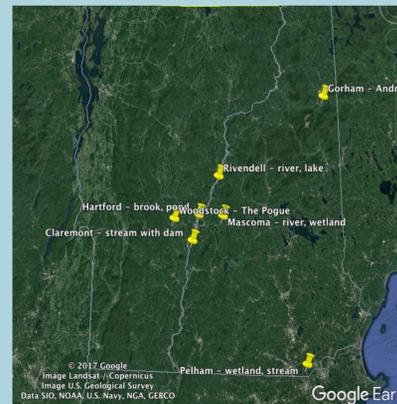
### Phase 3: Public Poster Session

Students from participating schools attend a keynote presentation by a local environmental researcher, present their findings to the public via scientific posters, and engage with each other. Between 200 and 400 people attend the event each year.



### Participating Schools

- Gorham High School, Gorham, NH
- Hartford High School, Hartford, VT
- Mascoma Valley Regional High School, Enfield, NH
- Pelham High School, Pelham, NH
- Rivendell Academy, Orford, NH
- Stevens High School, Claremont, NH
- Woodstock Union High School, Woodstock, VT



### Phase 2: Understanding and Using Data

Students use a variety of STEM education principles to better understand and utilize their data. Students work in teams to create a research question and utilize the data to explore this topic in the form of a scientific poster.

family	length (cm)	sample location	collection date	Hg (ppb)
Macromiidae	1.5	Sawmill Dam	27-Sep-17	284.7
Gomphidae	2.6	Sawmill Dam	27-Sep-17	194.5
crayfish	5.5	Sawmill Dam	27-Sep-17	205.7
Macromiidae	2.7	Sawmill Dam	27-Sep-17	290.8
Macromiidae	2	Sawmill Dam	27-Sep-17	309.9
Gomphidae	2.7	Sawmill Dam	27-Sep-17	228.3
Corduligastridae	1.7	Sawmill Dam	27-Sep-17	396.0
Aeshnidae	2	Sawmill Dam	27-Sep-17	342.7
Aeshnidae	3	Sawmill Dam	27-Sep-17	264.2
Corduligastridae	1.6	Sawmill Dam	27-Sep-17	363.5
Gomphidae	3.8	Shelburne Dam	27-Sep-17	444.9
Gomphidae	3.7	Shelburne Dam	27-Sep-17	556.4
crayfish	2.5	Shelburne Dam	27-Sep-17	280.6
Gomphidae	3	Shelburne Dam	27-Sep-17	590.4
Gomphidae	3	Shelburne Dam	27-Sep-17	580.9
Gomphidae	2.5	Shelburne Dam	27-Sep-17	446.8
Gomphidae	1.4	Shelburne Dam	27-Sep-17	444.1

Water Site General Assessment Data 2015-2016 Name: GPHS

- Name of body of water: Androscogin River
- Classification (circle): Pond Man-made Pond Lake Stream Brook other (clarify) River
- Town: Shelburne
- State: NH
- Latitude: \_\_\_\_\_
- Longitude: \_\_\_\_\_
- Date of collection: 9/27/17
- Time of day: 1:08
- Weather currently (circle): Heavy Rain Sprinkling Rain Cloudy Partial Clouds Sunny
- Has there been heavy rain in the last 7 days? Yes No
- Air temperature (°C): 8.5
- Water temperature (°C): \_\_\_\_\_
- Water pH (with pH strips): \_\_\_\_\_
- Predominant Surrounding Landscape (circle one): Forest Field/Pasture Agricultural Commercial Residential Industrial
- Other (if other, please specify): \_\_\_\_\_

### Accomplishments

- 7 schools participating across two states
- Over 800 student researchers trained
- Over 31 different classes received instruction
- Over 130 posters presented
- 7 poster sessions held
- Over 1,500 poster session attendees
- Local and bi-state press coverage (Print and TV)
- Data shared with the National Parks Dragonfly Project

### Next Steps :

- Addition of new schools
- Creation of a dragonfly data database
- Creation of interactive web portal to improve data sharing and school interaction