Students study Microplastics

SMALL DEBRIS, BIG ISSUE

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Have you ever wondered about what else, besides fish, resides in our Great Lakes? You may be surprised to learn that plastic is floating throughout the Great Lakes. This plastic pollution can weather and break down into smaller and smaller plastic fragments, also known as microplastics. These small pieces of plastic absorb pollutants, and confused as food, they can also be consumed by fish and birds resulting in harm. In general, marine debris is a growing issue and concern in our world's oceans but also here at home in our freshwater seas – the Great Lakes.

To better understand this issue, Alpena High School ninth grade chemistry students, in cooperation with Great Lakes scientists, are researching plastic pollution in Thunder Bay and Lake Huron. Using a surface trawl, a research net designed to sample plastic pollution, students have collected water samples onboard the glass bottom boat, Lady Michigan, over the past two school years. Collecting data specific to local waters, these samples were taken back to the school chemistry lab, where they were analyzed. While on the water, students conducted some field-based water chemistry analysis and learned about biological pollution – aquatic invasive species – also affecting the health of Lake Huron ecosystems.

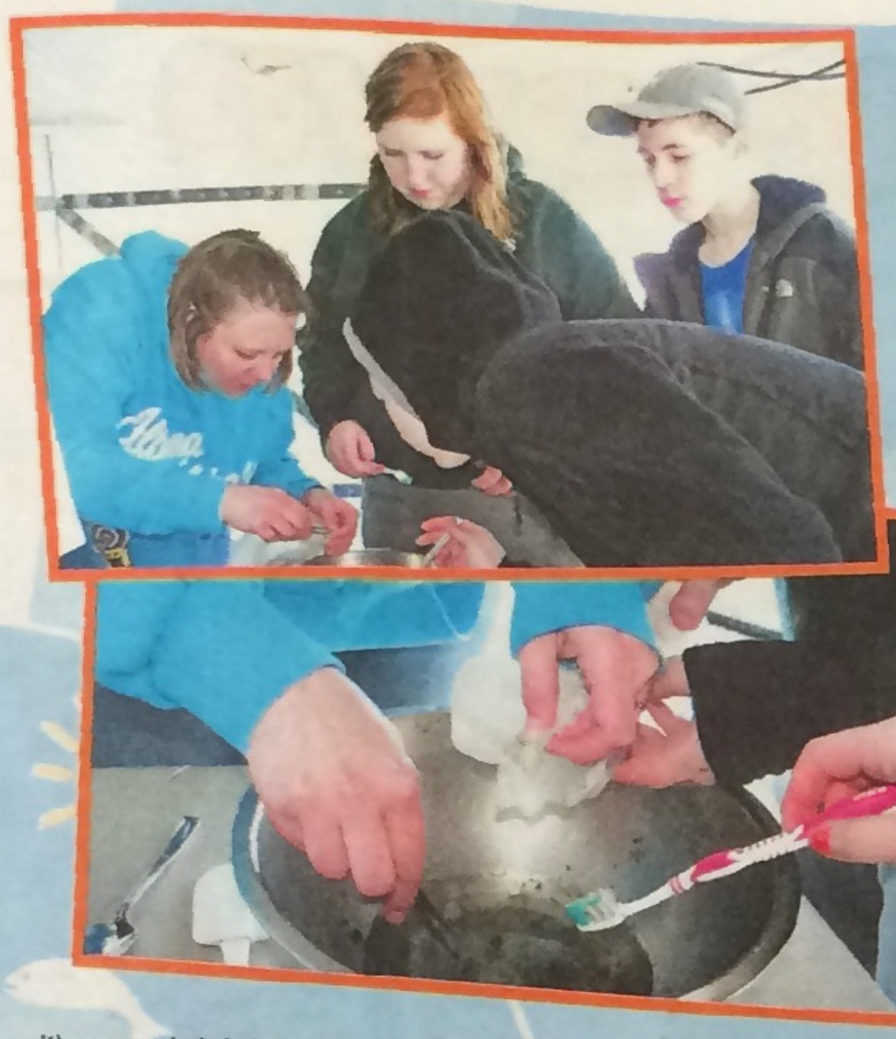
Expanding their research in 2015, these students have newly partnered with David Brooks, owner and captain of the Nancy K, a retired commercial fishing vessel retrofitted to assist university and citizen scientists in researching microplastics in the Great Lakes. While onboard, a select group of Alpena High School students collected surface water samples and charted sample locations. The collected water samples were analyzed in the classroom as part of the students' chemistry class.

Alpena High School teacher, Melissa Smith, first developed the idea and opportunity for this student-led plastic pollution research opportunity during the 2013 Lake Huron Summer Place-Based Education Institute, a professional development opportunity facilitated by partners of the Northeast Michigan Great Lakes Stewardship Initiative. Sponsored by the Sea Grant Center for Great Lakes Literacy (CGLL) and the Great Lakes Fishery Trust, this workshop connected educators with Great Lakes scientists with the goal of helping teachers to engage students in locally relevant Great Lakes stewardship projects. It was here that Melissa first connected with Dr. Mason's microplastic research. Gaining added experience and training, Melissa later participated in microplastic research first-hand while working alongside Dr. Mason for a week on Lake Erie aboard the EPA research vessel – the R/V Lake Guardian - as part the Great Lakes Shipboard Science Program, another CGLL-sponsored learning opportunity for teachers.

Putting this project into action locally, Smith's students have made community connections through their research supported by the NOAA B-WET water education initiative and the NE MI GLSI network. Today, Smith's class is conducting their studies in partnership with Michigan Sea Grant, Michigan State University Extension, NOAA Thunder Bay National Marine Sanctuary, David Brooks and his team of citizen scientist volunteers aboard the Nancy K, and others.

Prior to trawling for plastics in Thunder Bay and Lake Huron, students researched marine debris and the widely publicized Pacific Ocean 'garbage patches'. Next, the class localized the issue by exploring current research about plastic pollution in the Great Lakes, including studies about microplastic beads that end up in the environment as a by-product of some personal care products. They also studied the chemistry of plastics and other polymers and conducted an in-class scientific investigation where students discovered that plastic debris does not degrade like other marine debris but rather erodes into small particles. Engaging her class in this issue reflects a place-based education opportunity where students, through their learning, are connecting with community partners and exploring the growing issue of marine debris and its impacts on Great Lakes ecosystems locally.

Through their study, students gain opportunities to explore careers while connecting with Great Lakes science professionals. For instance, students coordinate and share their data with Dr. Sherri Mason, a chemistry professor at Fredonia State University in New York, who is a leading researcher of plastic pollution in the Great Lakes. At school, students conduct assessments of their own local Lake Huron samples, which are shared and verified with Dr. Mason's research team. Sorting samples under microscopes, students have discovered relatively low amounts yet a wide variety of plastic pollution. They found blue plastic fibers they believed to be from nylon roping or blue plastic tarps,



along with some brightly colored red, green, and blue particles possibly from shopping bags and plastic wrapping. The class even found a few perfectly round green and blue plastic particles thought to be microplastic beads from personal care products.

By working with Great Lakes scientists and connecting communities these students are contributing scientific information about plastic pollution in Lake Huron while raising awareness about marine debris in their local watershed. As the class continues its studies, they hope to be more involved in addressing the issue of plastics entering the Great Lakes by promoting marine debris prevention opportunities locally. They hope to educate and involve their community as partners in exploring ways to reduce and prevent plastic debris from entering the waterways.

Call to Action

Join the team of citizen scientists on Nancy K investigating and trawling for microplastics in Thunder Bay and Lake Huron. To join the team, contact David Brooks at dhbrooks@umich.edu or (734) 476-2144.

WANT TO HELP KEEP MICROPLASTICS OUT OF YOUR PERSONAL PRODUCTS AND AREA WATERSHEDS?? AVOID USE OF PRODUCTS CONTAINING:

Polyethylene (PE)
Polypropylene (PP)
Polyethylene terephthalate (PET)
Polymethyl Methacrylate (PMMA)