Female scientists to sample plastics in all five Great Lakes

August 16 2016, by Jim Erickson

Female scientists from the U.S. and Canada will set sail Aug. 20 on all five Great Lakes and connecting waterways to sample plastic debris pollution and to raise public awareness about the issue.

Event organizers say eXXpedition Great Lakes 2016 will include the largest number of simultaneous samplings for aquatic plastic debris in history. The all-female crew members on the seven lead research vessels also aim to inspire young women to pursue careers in science and engineering.

Teams of researchers will collect plastic debris on the five Great Lakes, as well Lake St. Clair-Detroit River and the Saint Lawrence River. Data collected will contribute to growing open-source databases documenting plastic and toxic pollution and their impacts on biodiversity and waterway health, according to event organizers.

Two University of Michigan faculty members, biologist Melissa Duhaime and Laura Alford of the Department of Naval Architecture and Marine Engineering, will lead the Lake St. Clair-Detroit River team, aboard a 30-foot sailboat.

The crew of up to eight people will include an Ann Arbor middle school teacher, an artist and student at the Great Lakes Boat Building School, and girls from Detroit-area schools. Onboard activities will include water sampling and trawling for plastic debris using protocols developed by the 5 Gyres Institute.

"There is a place for scientists in this type of public outreach, and it is a complement to the research that we do," said Duhaime, an assistant research scientist in the U-M Department of Ecology and Evolutionary Biology.

"In a single day through an event like this, we can potentially reach orders of magnitude more people than we do when we publish our scientific papers, which are read mainly by other scientists. And greater public awareness about this topic, rooted in rigorously collected and interpreted data, can certainly lead to changed behavior in our relationships with plastics."

Duhaime's lab studies the sources of Great Lakes plastics, as well as how they are transported within the lakes and where they end up. The work has involved a summer on three of the Great Lakes, trips to Detroit-area wastewater treatment plants, and the sampling of fish and mussels.

The group's first Great Lakes project included multiple U-M labs, one of which analyzed the stomach contents of fish and mussels, looking for tiny plastic beads, fibers and fragments. They found no plastic "microbeads"—spheres typically less than 1 millimeter in diameter—but plastic fibers were present in a third of the zebra and quagga mussels and at various levels in all the fish species they checked: 15 percent of emerald shiners and bloaters, 20 percent of round gobies, and 26 percent of rainbow smelt, according to Duhaime.

The stomach-content study, which will be submitted for publication in a peer-reviewed scientific journal, was based on work done in lakes Erie and Huron and was led by Larissa Sano, who is now at U-M's Sweetland Center for Writing.

For years, plastic microbeads were added as abrasives to beauty and health products like exfoliating facial scrubs and toothpaste. But the

federal Microbead-Free Waters Act of 2015, signed into law by President Obama on Dec. 28, bans the manufacture of microbeads beginning next year.

Sources of tiny plastic fibers that make it into the Great Lakes include fleece jackets and other types of synthetic clothing. These microfibers are released during laundering, then slip through wastewater treatment plants and into waterways. Fibers found in common household textiles such as carpets, upholstered furniture and curtains also make their way into the environment and can end up in the lakes.

"Microbeads were just the tip of the iceberg," Duhaime said. "I think fibers are the future of this research and a much more important issue than microbeads, because of the prevalence and the pervasiveness of these plastic textiles in our lives."

Researchers like Duhaime are also investigating the possibility that tiny bits of Great Lakes plastics can transfer toxic pollutants from the water into fish and other aquatic organisms. It is unclear what level of human health risk, if any, these microplastics pose to people who eat Great Lakes fish; it is a topic of active research.

On Aug. 20, the team led by Duhaime and Alford will sail up the Detroit River to Lake St. Clair, sampling water and trawling for plastics along the way. Throughout the day at Detroit's Belle Isle, members of their team will host a beach cleanup and data collection. In addition, a free public-awareness event will be held throughout the day outside Belle Isle Aquarium, followed by a plastic-free community picnic with live music.

Members of the general public are also encouraged to collect Great Lakes water samples and to participate in shoreline cleanup events on the 20th.

The mission leaders for eXXpedition Great Lakes 2016 event are two women who met during an all-female voyage across the Atlantic Ocean in 2014. Jennifer Pate is a filmmaker, and Elaine McKinnon is a clinical neuropsychologist. Pate plans to use video footage and photographs gathered during the Aug. 20 event to create a film called "Love Your Greats."

"In parts of the Great Lakes, we have a higher density of microplastics than in any of the ocean gyres," Pate said. "So the problem isn't just out there in the oceans. It's right here in our backyard, in our lakes and on our dinner plates.

"We are all a part of the problem, but that means we are also all part of the solution. That's why we are holding this event, to give people an opportunity to change the story and create a healthier future."

Provided by University of Michigan