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# A citizen engagement approach to water advocacy: experiences from "eXXpedition Great Lakes"

J.A. Pate and E.E McKinnon

**ABSTRACT**

The Great Lakes are a group of interconnected lakes located on the Canada–United States border. Lake Superior, Michigan, Huron, Erie and Ontario form the largest group of freshwater lakes on Earth, and contain around 21% of the world's surface fresh water by volume. These lakes suffer from considerable microplastic contamination. Despite this awareness, citizens around the lakes struggle to take action. With over 80% of plastic debris in the world's water bodies being contributed from land, the solutions for eliminating microplastics have to come from changes in consumer behaviour and by stopping contamination at the source. "eXXpedition Great Lakes 2016" was designed as a one-day mass engagement event to bring the science of microplastics to citizens across the region, allowing them to experience first hand the presence and impact of this pollution. Volunteers collected water samples and conducted shoreline clean-ups on the Great Lakes and connecting waterways. Sailing vessels led by female scientists specialising in plastic pollution, human and environmental health were also launched from key cities in both Canada and the United States. The approach was to utilise the power of citizen engagement to promote clean-water advocacy and action in North America. By experiencing the issue of microplastics pollution first hand, it was hoped that participants would feel an increased sense of responsibility and consider protection of the environment as their duty, which would hopefully lead to changes in consumer behaviour. This paper shares the experiences during the event.

## Introduction

It is well recognised that seeing something first hand can have an incredible impact on our perception. This premise was the underpinning of "eXXpedition Great Lakes 2016".[1] As crewmembers on the first eXXpedition Atlantic 2014[2] crossing, the problems with microplastics in the environment were well known to us. And yet we were awestruck, seeing it for the first time when pulling up the first trawl, hundreds of miles away from land. Over 50 pieces of microplastic were seen, nestled all too comfortably among the life forms that inhabit this layer of surface ocean water. We knew that there were also many more pieces that could not be seen, particles that would only be visible under a microscope. This was confirmed in the sampling with 506 microscopic pieces of plastic detected in one sample taken from the mid-Atlantic in 2014.

**CONTACT** J.A. Pate pate.jennifer@gmail.com

Microplastics are an insidious threat, pervasively found in every ocean in the world, and increasingly they are being identified in bodies of fresh water. It is estimated that 5 to 12 million metric tons of plastic waste ends up in rivers, lakes and oceans every year.[3] Microplastics have found their way to nearly every corner of the globe, and the true nature of the impact of this pollutant is only now being investigated and understood. It is, however, clear that something needs to be done urgently to stem this flow, and a big part of this solution will have to come from changes in citizen, or consumer, behaviour.

What does the average citizen know about microplastics? This is certainly difficult to gauge, as there has been very little investigation in this area. Some research has suggested that there is a level of public concern about marine litter, and that many individuals would endorse that the marine environment is highly valuable to society as a whole.[4] With respect to microplastics, specifically, a recent study of over 26,000 European citizens completed in 2014 by the European Commission reported that 78% agreed with the statement that the use of microplastic particles in consumer products should be forbidden. In recent years, the increase in media attention on the threat of marine debris and microplastics has certainly helped to bring this issue to the forefront, with citizens making further demands on their governments to ban products such as single-use plastic grocery bags, styrofoam, single-use plastic cutlery, etc.

It is, however, also evident that an increase in public awareness is not always followed by changes in individual consumer behaviour. Humans do not always use knowledge to change behaviour, even when it is in their best interests over the long term. For example, people know about climate change, and yet they struggle to adopt behavioural changes for making the necessary choices to secure the future of the planet. In many ways, this is because humans are not wired to respond to such a slow-moving, complex, elusive threat. A threat that develops over decades does not grab sufficient attention as it circumvents the brain's alarm system.[5] Among many other human traits that limit the response to global environmental threats, there is also a tendency to resist making changes.

Research has shown that cognitive dissonance, or that "pesky internal conflict generated by self-hypocrisy",[6] is created when people do not act in keeping with their knowledge and concerns. By participating in this event, it was hoped that people develop increased concern and a sense of duty to care for the water bodies. Based on this new knowledge and experience, people could be called upon to make greener, more environmentally sustainable choices. As highlighted by Burn (2013), "the more knowledgeable we are about what actions we can take to reduce our carbon footprint, the more dissonance we should feel if we carry on in our consumptive habits".[7] Harnessing this cognitive dissonance is certainly one way to get people thinking twice about their choices.

To go beyond just *knowing* a thing, eXXpedition Great Lakes was organised to give citizens a first-hand experience of *seeing* microplastics in their own backyard. This would give individuals the opportunity to see tangible evidence of microplastics, making it more concrete and real in their everyday lives. As highlighted by Morrow (2013) in a literature review concerning the impact of citizen science on changing attitudes and behaviours, "the experiential learning afforded to participants in citizen science and public monitoring activities provides more than simply knowledge and can have a prominent effect upon the subsequent behaviours and attitudes of participants".[8] Consistent with this, the belief was that participating in and investing time and energy into this one-day event would go a long

way toward creating a mindset in people which would prompt them to exhibit environmentally conscious behaviour.

We recognised that not everyone would be affected in the same way by participating in this event. Each person would take from the experience something that is their own, something that is personal. On the other hand there was also a possibility that this experience might result in nothing more than increased awareness of the issue. It might stop there … for now. But the majority of people want to do what is right, to do what is needed to make their neighbourhoods clean, safe and secure for now and in the future. The experience which this facilitated may serve to increase the motivation to do more, equipped both with knowledge of the issue and the tools and strategies to change behaviour. Thus, participation in this citizen science initiative is likely to be an important route for motivating change.

## The event

"eXXpedition Great Lakes 2016" was conducted on August 20, 2016. Over 1000 people from across the Great Lakes region took part in the world's largest simultaneous sampling for microplastics in history. This event involved water sampling and shoreline clean-ups throughout the Great Lakes and St. Lawrence basins, and shifted the focus from studying microplastics in the marine environment to those in fresh water. The first open-water study of plastic pollution within the Great Lakes region was reported in Eriksen et al. (2013), and highlighted the importance of focusing on this fresh water system:

> Given that the watersheds surrounding the Great Lakes are heavily urbanized (including the cities of Chicago, Milwaukee, Detroit, Cleveland and Buffalo in the United States, and Toronto in Canada), flow into the St. Lawrence River and ultimately to the North Atlantic Ocean, the lakes represent an important, potential upstream source of plastic pollution.[9]

This sampling substantiated this theory, highlighting that in fact there is a higher density of microplastics in these lakes than in any of the ocean gyres.

In keeping with the vision and mission of the original eXXpedition Atlantic 2014, 10 all-women crews who were leaders in their respective fields of research from around the Great Lakes region were recruited. These science leads headed up a short one-day expedition on a sailing or motorised vessel, with crew who had signed up through the website. Vessels went out in each of the Great Lakes, the St. Lawrence River and Lake St. Clair. Partnering with Adventurers and Scientists for Conservation (ASC), the Great Lakes event was designed so that scientists with their crews, and citizens who live around these waterbodies, could contribute to the much-needed scientific study of microplastics in their own backyard.

Science vessels conducted water sampling for further analysis through the microplastics initiative set up by ASC, with some samples also being forwarded to the University of Georgia. Scientists also conducted trawling of surface water for microplastics in water bodies, following the protocols set out by the 5 Gyres Institute.[10] Analysis of the trawl findings took place on site for some of these researchers, with crewmembers and others from the public available to examine the results first hand, making the unseen seen to those who had never examined microplastics in person. Figures 1–3 show some of the pictures from the event.

In addition to the 70 crew and leading scientists on board the vessels, the event also had an overwhelming sign-up of citizens from all around the region. In May 2016, an online registration form was made available on the eXXpedition website.[11] The registration process included a small questionnaire that gathered key information about where and how people were planning to take part, if they were taking part alone or as part of a group, how they heard about the event and their reasons for signing up.

By the start of the event, there were a total of 270 registrations. Some of these registrations represented an individual, but the majority represented families or community groups with multiple members taking part. In one case, a single registration represented a community gathering of 300 people to conduct a shoreline clean-up. In terms of the specific activities that registrants endorsed, 142 of 270 registrants intended to conduct shoreline clean-ups, while 127 intended to conduct water sampling. In terms of their mode of getting out on the lakes and rivers, 68 registrants were sailing, 75 were wading, 57 were paddling (canoe, kayak and stand-up paddleboard) and the remaining 70 were using multiple platforms. Figure 4 offers a view of the geographical distribution of registrants, across all of the Great Lakes region and St. Lawrence River.

On August 20, 2016, the eXXpedition Great Lakes event was underway, with clear weather. Participants took water samples across the lakes and forwarded these samples for analysis to ASC (results still pending). The increase in sampling is readily apparent in the comparison of the two maps shown in Figures 5 and 6. Figure 5 shows the

**Fig. 1.** Lead Boat *Manta* Trawling on Lake Huron. Photo credit: Kate Lloyd-Rees. ©Adventure Scientists.

**Fig. 2.** Examining Trawl Results from Lake Ontario. Photo credit: Rowshyra Castaneda.

number of samples taken from the region for ASC by volunteer adventurers prior to August 20, 2016, and Figure 6 shows the same after the event. As is quite evident, sign-ups for the eXXpedition Great Lakes event resulted in a marked increase in critical scientific sampling of this region, the results of which will continue to build on the understanding of the quality of the water bodies. This data will further form a part of the global database.

This day was not only about the science, but also about community involvement. This event would fortify and empower people to become more aware of the damage caused by the use of microplastics, and specifically more committed to the changes that are needed in consumer behaviour and in management of household waste. While the participants eagerly await the results of the sampling, the full impact of the day of engagement is yet to be fully realised.

**Fig. 3.** Trawl Finds from the Lake Ontario Lead Boat. Photo credit: Malin Jacob.

Partnering with the Great Shoreline Cleanup (World Wildlife Fund, Canada)[12] and the Alliance for the Great Lakes Adopt-a-Beach Program,[13] many of the participants signed up to conduct beach and shoreline clean-ups in their local area. Documenting the amount and types of garbage found, both plastic and other, was key to further examining the source of microplastic contamination for stemming the flow of this pollution into the waterways. The participants did not need to wait for the results of the scientific analysis as the evidence of plastic pollution was seen everywhere. Participants were also encouraged to log the garbage they found in the National Oceanic Atmospheric Association (NOAA) Marine Debris Tracker,[14] which adds the findings to a global database. There was incredible enthusiasm for participating in the events, as is shown in the picture of participants from Lake Huron, including crew from the lead boat, and citizens from the community (Figure 7).

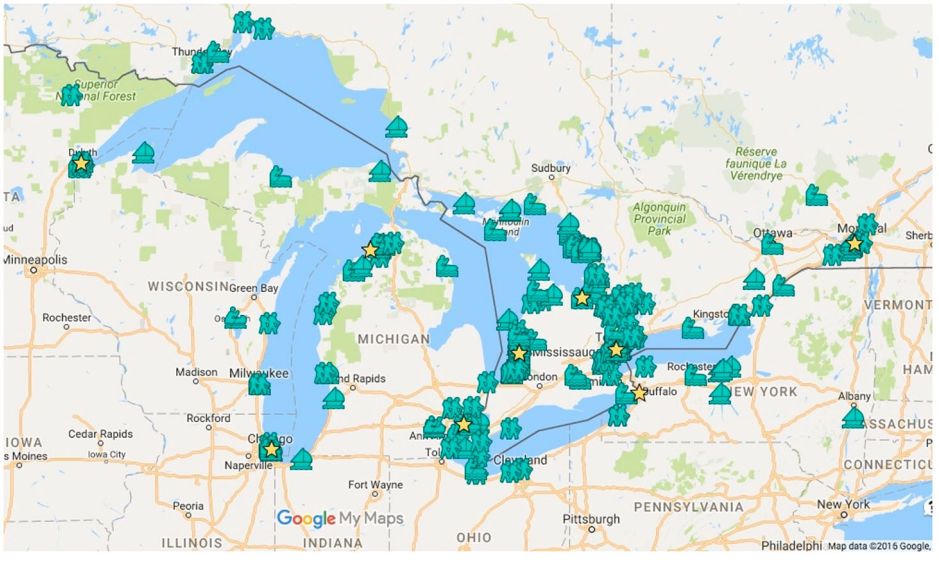


**Fig. 4.** Registered Participants for eXXpedition Great Lakes 2016.

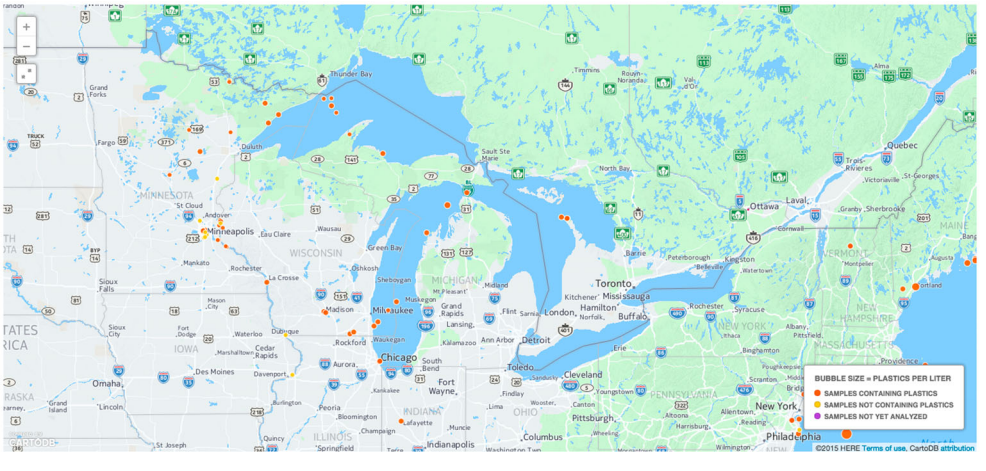


**Fig. 5.** Location of Samples Before the August 20, 2016 Event. ©Adventure Scientists.

## The impact

In an effort to examine the responses of the participants to the event, an opinion survey was to be completed online. This pilot study was undertaken with the aim of understanding how people experienced the event, and how the event could be improved in the future. It was encouraging to see the positive responses to questions about whether participants learned something new about microplastics from their involvement (100% responded yes), and the level of positive endorsement that participants would do more to reduce their use of plastics, with nearly all respondents indicating that they would stop buying products with microbeads (90%) and would refuse plastic water bottles (95%).

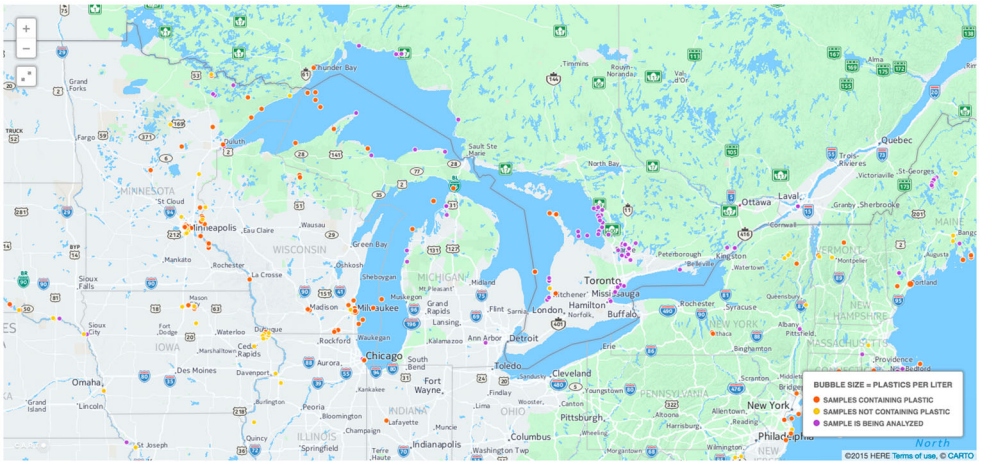


**Fig. 6.** Location of Samples After August 20, 2016 Event.

However, the impact of this experience is yet to be fully realised for many. The participants will no doubt be motivated by seeing the evidence from the results of the water analysis, which will only be further impactful and motivating. For many, the experience will be one that is shared with others, as they discuss what they did and why they did it. Word will spread and others will perhaps become more knowledgeable and aware of the issues, and may be more mindful of the choices they make. Some individuals may become so emboldened by this experience that they will begin to speak out more openly and publicly, putting pressure on local governments, and exploring ways to


**Fig. 7.** Lake Huron Shoreline Clean-up. Photo credit: Frank Beattie.

improve the management of plastics or eliminate unnecessary single-use plastics where possible. The youngest participant, a student 8 years of age, reported that she is going to set up an eco-club at her school in the coming year, and will try to get administrators to ban plastic bottles in her school. And so the journey begins.

It is difficult to establish at this point whether the goals for this initiative have been met. The large number of individuals participating in this first-ever, historical event was certainly indicative of a keen interest and passion that people have towards the environment. The event was successful in spreading awarenesss amongst the general public and facilitated citizens to engage in a meaningful way. As is obvious from the review of what motivated people to attend the event, a love of these waters and a desire to protect them was a central theme. This connection to water and enjoyment is only further strengthened, and the benefits increased, when one connects with water in more responsible and meaningful ways.[15]

## The future

Going forward, we intend to capitalise on the momentum created by the event, although how this will take shape has yet to be determined. The focus for future events will certainly continue to emphasise the involvement of the citizen scientist. This will remain an effective way to increase knowledge and create a sense of duty to care for the lakes and rivers. Being a participant in citizen science gives as much as it receives; citizens can contribute to science in important ways, and they benefit immensely in feeling empowered to protect and connect with the waters they love.

Feedback from the event further highlighted that people want to know what to do differently, so that they can start to become part of the solution, instead of blindly contributing to problems such as microplastics. A further emphasis of the ongoing efforts will thus likely turn to promoting lifestyle changes and strategies that reduce or eliminate unnecessary plastic in our everyday lives.

It is also important to emphasise that more research needs to be completed that further examines the impact of similar approaches, in contributing to both short-term and long-term behaviour change for individuals and communities.

It is well documented that an overemphasis on communicating knowledge alone as a stimulus to behaviour change is bound to fail in conservation and environmental efforts. While knowledge is a critical piece, it must be accompanied by first-hand experience. Once seen, microplastics cannot be unseen. It is on this basis that the new initiative, Love Your Greats,[16] will bring people to see the problem, and empower them to contribute to the solutions that will protect water bodies such as lakes and rivers.

## Notes on contributors

*Ms Jennifer A Pate* is a geographer and filmmaker. More details about her interests and work can be found at http://www.jenniferpate.com/

*Elaine McKinnon* is a registered Clinical Neuropsychologist. More details about her work can be found at www.eXXpedition.com/greatlakes2016

## Notes

1. eXXpedition. "eXXpedition Great Lakes." http://exxpedition.com/greatlakes2016/ (Accessed September 1, 2016).
2. eXXpedition. http://exxpedition.com (Accessed September 1, 2016).
3. Jenna R. Jambeck et al., "Plastic Waste Inputs from Land into the Ocean", *Science*, 347 (February 13, 2015): 768–771.
4. P.J. Kershaw, ed., *Sources, Fate and Effects of Microplastics in the Marine Environment: A Global Assessment*, IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (Rep. Stud. GESAMP No. 90, 2015), 96 pp.
5. Greg Harmon, "Your Brain on Climate Change: Why the Threat Produces Apathy, not Action", *The Guardian*, November 10, 2014, https://www.theguardian.com/sustainable-business/2014/nov/10/brain-climate-change-science-psychology-environment-elections (Accessed September 2, 2016).
6. Shawn M. Burn, "Are You a Sustainability Hypocrite? Harnessing Your Cognitive Dissonance for Sustainability", *Psychology Today*, May 9, 2013, http://www.psychologytoday.com/blog/presence-mind/201305/are-you-sustainability-hypocrite (Accessed September 2, 2016)
7. Ibid.
8. Anthony Morrow, "The Impact of Citizen Science Activities on Participant Behaviour and Attitude: Review of Existing Studies", 2013, http://www.environment.scotland.gov.uk/media/80417/phase-1-report-the-impact-of-citizen-science-on-participant-behaviour-and-attitude-literature-review.pdf (Accessed September 2, 2016).
9. M. Eriksen et al., "Microplastic Pollution in the Surface Waters of the Laurentian Great Lakes", *Marine Pollution Bulletin,* 77, no. 1–2 (2013): 177–182.
10. 5 Gyres Institute. http://www.5gyres.org/ (Accessed September 3, 2016).
11. eXXpedition. "eXXpedition Great Lakes." http://exxpedition.com/greatlakes2016/ (Accessed September 1, 2016).
12. Great Canadian Shoreline Cleanup. http://www.wwf.ca/events/shoreline_cleanup/ (Accessed September 3, 2016).
13. Alliance for the Great Lakes. "Adopt-a-Beach Program." Accessed September 3, 2016. https://greatlakes.org/get-involved/adopt-a-beach/
14. National Oceanic and Atmospheric Association, "Marine Debris Tracker", 2012, https://marinedebris.noaa.gov/partnerships/marine-debris-tracker (Accessed September 3, 2016).
15. Wallace Nichols, *Blue Mind* (New York: Back Bay Books, 2014).
16. Love Your Greats. http://www.loveyourgreats.com/ (Accessed September 3, 2016).