



Great Lakes Land-based Marine Debris Action Plan

2014-2019 Accomplishments Report

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May 2014-May 2019

Acknowledgement

The Great Lakes Land-based Marine Debris Action Plan is the result of a collaborative effort across the region. Many thanks go to the regional partners who provided the content of this Action Plan and their contributions to completing action strategies; to the planning and support teams for the planning and execution of the workshops during development and review; and to the NOAA Marine Debris Program for supporting and facilitating the creation of the Action Plan, as well as supporting the implementation of numerous actions.

For citation purposes, please use:

National Oceanic and Atmospheric Administration Marine Debris Program (2019). Great Lakes Land-based Marine Debris Action Plan Accomplishments Report. Silver Spring, MD: National Oceanic and Atmospheric Administration Marine Debris Program.

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List of Acronyms

ACC	American Chemistry Council
BMP	Best management practices
ECCC	Environment and Climate Change Canada
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GCSC	Great Canadian Shoreline Cleanup
GLSGN	Great Lakes Sea Grant Network
IAGLR	International Association of Great Lakes Research
ICC	International Coastal Cleanup
IJC	International Joint Commission
IL	Illinois
IN	Indiana
LS NERR	Lake Superior National Estuarine Research Reserve
MI	Michigan
MN	Minnesota
NERR	National Estuarine Research Reserve
NOAA	National Oceanic and Atmospheric Administration
NOAA MDP	National Oceanic and Atmospheric Administration Marine Debris Program
NY	New York
OH	Ohio
OSG	Ohio Sea Grant
OSU	The Ohio State University
OWC NERR	Old Woman Creek National Estuarine Research Reserve
PA	Pennsylvania
PWG	Plastic Working Group
SUNY	The State University of New York
WI	Wisconsin

Introduction

The following document details accomplishments of the Great Lakes Land-based Marine Debris Action Plan. This Action Plan consisted of 53 actions, which were to be completed within five years (May 2014–May 2019). It is through the commitment, efforts, and care of the Action Plan’s partners that there has been great progress made on the issue of marine debris in our community. Of the 53 actions in the Action Plan, contributors to the Great Lakes Land-based Marine Debris Action Plan successfully completed 34 actions, and are currently working on 17 actions. One action has not yet started, and another was removed during review.

The first workshop in the planning and development of the Action Plan brought the Great Lakes marine debris community together for the first time. Participants recognized the need and value of an action plan to promote collaboration, coordination, and raise awareness of each other’s efforts. Through the process, multiple aspects of the marine debris issue were synthesized into shared goals that participants could work on together. Participants established diverse partnerships due to shared interests and networked across sectors. This collaborative approach has served as a model for other regional action plans around the United States.

Collectively, the group has helped to raise awareness of the marine debris issue in the Great Lakes through clear and consistent messaging. These developed partnerships amplified the voice and the role of freshwater in what has been largely considered an ocean problem. As a result, there has been increased attention and interest in research, policy, and management of marine debris within the Great Lakes.

The Great Lakes marine debris community made great strides to address the issue over the past five years. This includes completing research and publishing scientific articles, engaging with the policy and management community, educating the public and students, and removing debris from the environment. In total, 180,062 people were educated on the topic during 711 events and approximately 306,665 pounds of debris was removed by volunteers.

Semi-annual check-ins for the Action Plan were held via webinar in May and November of each year. During the webinars, participants heard and shared summaries of the progress of actions to date. Specifically, summary information was presented for each of the four goals in the Action Plan, completed actions were highlighted in presentations, and other high-level updates were given from action coordinators. The webinars ended with an open discussion of feedback on reporting, communications, and challenges. The majority of these webinars were recorded, and archived on the [Great Lakes Marine Debris Collaborative Portal](#).

Action Plan participants reconvened in August 2019 to review these accomplishments, evaluate the Action Plan, discuss challenges, and plan for the future of marine debris efforts in the Great Lakes. While much progress has been made in addressing the issue, more work remains to see the Great Lakes free from the impacts of marine debris.

Action Plan Purpose

The overall purpose of the Great Lakes Land-based Marine Debris Action Plan is to establish a comprehensive framework for strategic action to ensure that the Great Lakes, its coasts, people, and wildlife are free from the impacts of marine debris.

Action Plan Status

The 2014-2019 Great Lakes Land-based Marine Debris Action Plan was completed in May 2019. Upon its completion, participants provided feedback on improvements to the Action Plan scope, structure, implementation, monitoring, and communication. Participants expressed an interest to build on successes and develop a new five-year Action Plan. The new 2020-2025 Great Lakes Land-based Marine Debris Action Plan will soon be publically available.

Marine Debris Goals, Objectives & Actions

The tables below are the core of the Action Plan. They list goals, objectives, and actions that contribute to achieving the Action Plan's goals.

Goals

Goal 1: Research & Monitoring

Knowledge gaps are identified and filled through research and monitoring of land-based marine debris.

Goal 2: Science-based Approaches & Management

A science-based and strategic approach is used to guide land-based marine debris policy and management decisions in the Great Lakes.

Goal 3: Prevention & Education

Land-based marine debris is prevented and reduced through an educated and involved community.

Goal 4: Removal & Tracking

The impacts of land-based marine debris are reduced through removal and tracking efforts.

Objectives

In the context of this Action Plan, the objectives define how each goal will be achieved. Typically, there are several objectives per goal.

Actions

Actions are projects and activities supporting an objective, undertaken to achieve the associated goal.

In this Action Plan, Coordinators and Partners are entities that have volunteered to carry out a given action, pending the availability of resources (funding, staff, time, materials, etc.). **Coordinators/Co-ordinators** were responsible for undertaking activities that fulfilled the action strategy and reported on the progress, challenges, and completion of the action. **Partners** were responsible for supporting and undertaking activities that fulfilled the action strategy and provided input on progress.

53 Total Actions:

34 Complete
17 In Progress
1 Not Started
1 Removed

30+ Participating
Organizations

Vision

The Great Lakes, its coasts, people, and wildlife are free from the impacts of marine debris.

Mission

The Great Lakes will be free from marine debris through an increased understanding of the problem, preventative actions, reductions in impacts, and collaborative efforts of diverse groups.



Goal 1: Research & Monitoring

Knowledge gaps are identified and filled through research and monitoring of land-based marine debris.

Microbeads sieved from toothpaste during an educator workshop (Photo: Ohio Sea Grant).

Action Status:

7 Complete

6 In Progress

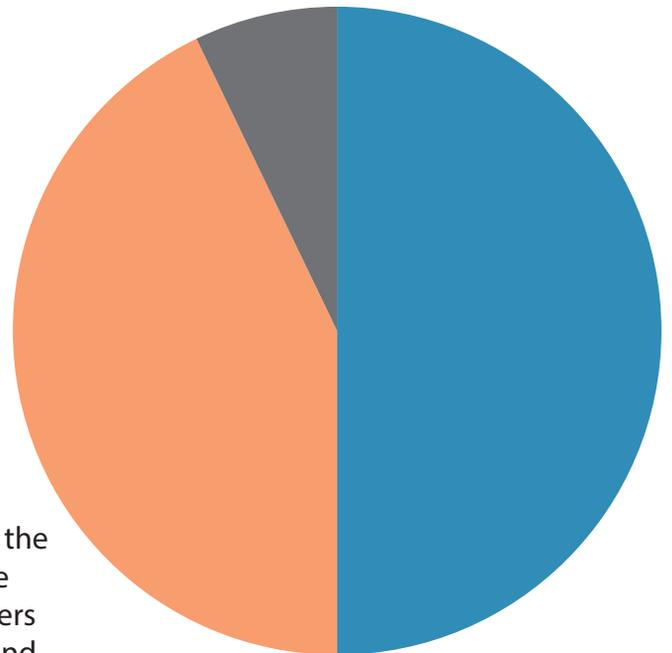
1 Removed

Goal Accomplishments

Great Lakes Marine Debris Collaborative Portal

(Objective 1.1)

The NOAA Marine Debris Program, in cooperation with input from regional partners, developed a regional web-platform, the Great Lakes Marine Debris Collaborative Portal. Broader than a research platform, this tool provides the opportunity for all of those engaged in the regional marine debris community to share resources and ideas. Stakeholders submitted ideas on function and format for the platform, and provided input on the prioritization of features. The Collaborative Portal is also accessible to the public to serve as a tool for regional marine debris information. The site is available at <https://greatlakes-mdc.diver.orr.noaa.gov/>. This tool is currently being replicated in other regions around the country.



Convened Researchers to Foster Collaboration (Objective 1.2)

Marine debris researchers from around the region met at each of the last five annual conferences of the International Association of Great Lakes Research (IAGLR). Marine debris sessions at each of these conferences focused on microplastics in the Great Lakes environments and their sources, fates, and impacts. Each year, approximately 50 people attend the sessions, which generated discussions on the issue, as well as provided an opportunity for researchers to network and forge new collaborative opportunities.

Completed a Research Summary and Gap Analysis (Objective 1.3)

A synthesis paper, entitled “Plastic debris in the Laurentian Great Lakes: A review”, was published in the March 2015 issue of the Journal of Great Lakes Research and authored by the research group at the University of Waterloo (doi:10.1016/j.jglr.2014.12.020). This work provided key information for attendees at an International Joint Commission (IJC) microplastics workshop in April 2016 and informed the identification of research gaps and recommendations to guide future research efforts. The IJC recommendations include:

- Communicate results of research to share information with the public of all ages and decision makers, through the development of Great Lakes focused educational materials.
- Encourage prevention of plastic marine debris through changing behavior by using education, outreach, policy, and market-based instruments.
- Assess the impacts of ecological and potential human health impacts using an ecological risk assessment framework (exposure/hazard).
- Compare and analyze existing programs and policies for the reduction and prevention of plastic marine debris and promote those that are good models for plastics management.
- Invest in solution-based research, including innovative product development and water infrastructure improvements.
- Conduct modelling to determine the sources and fate of microplastics in the Great Lakes.
- Enable the plastic industry, its clients and other Great Lakes stakeholders to enhance effective management and implementation of reduce, reuse, and recycle programs.
- Promote improved waste management and debris removal.
- Develop and strengthen binational Great Lakes linkages to support sharing of research, education and outreach programs, and best management practices.
- Develop and/or adopt standardized sampling and analytical methods for microplastics.

The IJC produced a [final workshop report](#), which provided additional information on these recommendations. An updated research review is now in process from the University of Toronto.

Management Community Connections (Objective 1.4)

Conversations have begun to connect Great Lakes marine debris researchers with management agencies in an effort to foster collaborative research on relevant marine debris topics. This work is being done through the Plastic Working Group (PWG) in Cleveland, Ohio, as well as through science symposiums that were organized by ECCC.

Goal 1: Knowledge gaps are identified and filled through research and monitoring of land-based marine debris.

Objective 1.1: By the end of 2016, develop a platform for long-term collaboration on Great Lakes marine debris research.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
1.1.1. Convene a small working group to discuss research community needs, timeline, scale, and intent for a future platform.	Coordinator: NOAA MDP Partners: University of Waterloo, Clean Water Action Participants: All research organizations	Complete	The NOAA MDP finished the development of a regional web-platform for the Great Lakes marine debris community. Stakeholders submitted ideas/desires for the platform, and provided input on the prioritization of features. The Great Lakes Marine Debris Collaborative Portal site is now available.
1.1.2. Once the needs analysis is complete, examine existing platforms to meet those needs.	Coordinator: NOAA MDP	Complete	The NOAA MDP finished the development of a regional web-platform for the Great Lakes marine debris community. The NOAA MDP met with the developers and manager of NOAA Data Integration Visualization Exploration and Reporting (DIVER) and have concluded that this platform was a good fit based on desires/requirements of regional community that were identified in action 1.1.1. The Great Lakes Marine Debris Collaborative Portal site is now available.

Objective 1.2: By 2016, convene researchers to foster partnerships and collaboration.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
1.2.1. Share current venue opportunities and identify invitees. Invitees should include those researchers who are currently involved in, or have an interest in, land-based marine debris research in the region.	Coordinator: Alliance for the Great Lakes Partners: SUNY Fredonia, NOAA MDP, University of Wisconsin – Superior	Complete	The Alliance for the Great Lakes was one of the partners for the first ever Great Lakes Day on August 20, 2016 coordinated by the eXXpedition. As a partner, they connected the Inland Seas Education Association with participants, and as a result, Inland Seas helped lead the large sampling effort. In addition, the eXXpedition planners connected Inland Seas with an educational program through Toronto Brigantine Inc., which also participated in Great Lakes Day and used Inland Seas’ shipboard curriculum for microbeads.

Objective 1.2: By 2016, convene researchers to foster partnerships and collaboration.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
1.2.2. Host a research panel or session at a regional conference.	<p>Coordinator: University of Michigan</p> <p>Partners: University of Wisconsin – Superior, SUNY Fredonia, Western University, Ontario Ministry of the Environment, IL - IN Sea Grant, NOAA MDP</p>	Complete	The IAGLR 2014 microplastics session was completed. Approximately 40-50 people attended the session and generated discussion around the research and possible ways to prevent microplastics. Researchers also gathered again at IAGLR in 2015, 2016, 2017, and 2018 for a session on marine debris.

Objective 1.3: Over the next five years, create summary documents of existing research on land-based marine debris and identify key data gaps for the research community.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
1.3.1. Publish a synthesis paper on plastic marine debris research in the Great Lakes.	<p>Coordinator: University of Waterloo</p> <p>Partner: ECCC, University of Toronto</p>	Complete	<p>The synthesis paper, entitled “Plastic debris in the Laurentian Great Lakes: A review”, was published in the March 2015 issue of the Journal of Great Lakes Research (doi:10.1016/j.jglr.2014.12.020).</p> <p>ECCC recently hired Dr. Chelsea Rochman at the University of Toronto to synthesize available research in order to provide a better understanding of the contamination, sources, and effects of plastic pollution on our Great Lakes. This will allow for the identification of outstanding science gaps and updated science priorities. In addition, she will explore the policy implications of the findings to inform decision making on actions to reduce plastic pollution in the Great Lakes.</p>
1.3.2. Based on results of the synthesis paper, perform a gap analysis to identify research needs in the region.	<p>Coordinator: NOAA MDP</p> <p>Partners: University of Waterloo, University of Western Ontario, University of Michigan, Loyola University, SUNY Fredonia, University of Wisconsin – Superior, ECCC</p>	Complete	The IJC held a microplastics workshop in April 2016. At this workshop, research gaps were identified for this particular debris type. Additional analysis will be needed to identify research gaps in other types of land-based marine debris. The IJC produced a final workshop report , which includes prioritized research needs.

Objective 1.4: Through 2019, engage Great Lakes management communities to prioritize and foster implementation of relevant research topics.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
1.4.1. Identify relevant management stakeholders and establish communication channels.	<p>Coordinator: Great Lakes Sea Grant Network</p> <p>Partners: NERRs, Alliance for the Great Lakes, Keep America Beautiful</p>	In Progress	<p>Ohio Sea Grant is participating in the PWG in Cleveland. Through the PWG, Ohio Sea Grant has broadened the stakeholders it has worked with on the issue of plastic debris and shared education ideas.</p> <p>Barrier to Completion: Many groups are now working on the topic of marine debris, especially plastic pollution. Unfortunately, this has led to a more competitive and less collaborative atmosphere in certain areas of the region.</p>
1.4.2. Through established communication channels, work with management stakeholders to develop a list of research questions that are of interest to the Great Lakes management community.	<p>Coordinator: Great Lakes Sea Grant Network</p> <p>Partners: NERRs, Alliance for the Great Lakes, Keep America Beautiful</p>	In Progress	<p>There is a need for additional information on the use of plastic bags and the effectiveness of reminder strategies for reusable bags. This was identified as a result from the social marketing campaign conducted in Cleveland, OH (see actions 3.2.2 and 3.3.2). Ohio Sea Grant received funding from the NOAA MDP to complete a study on reminder strategies. Data collection began in May 2019.</p> <p>ECCC hosted a science symposium to identify research gaps related to the development of a Canadian science agenda on plastics. This event engaged domestic stakeholders, particularly intergovernmental departments and academia, to determine domestic research gaps and prioritize those of high importance.</p>

Objective 1.5: Within the next five years, the Great Lakes research community will address knowledge gaps on land-based marine debris by completing and publishing a minimum of two studies.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
1.5.1. Based on the completed synthesis paper and gap analyses (Objective 1.3), develop a list of prioritized questions that need to be addressed and share it with the regional research community.	<p>Coordinator: NOAA MDP</p> <p>Partners: Researchers, Alliance for the Great Lakes, ECCC, Inland Seas Education Association</p>	Complete	<p>The IJC held a microplastics workshop in April 2016 where research gaps were identified for this particular debris type. Additional analysis will be needed to identify gaps in other types of land-based marine debris. IJC produced a final workshop report, which includes prioritized research needs.</p>

Objective 1.5: Within the next five years, the Great Lakes research community will address knowledge gaps on land-based marine debris by completing and publishing a minimum of two studies.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
1.5.2. Identify funding sources for land-based marine debris research, both current and future.	<p>Coordinators: University of Waterloo, University of Michigan</p> <p>Partners: Great Lakes Sea Grant Network, University of Wisconsin – Superior</p>	In Progress	<p>No Report for 2017, 2018, or 2019</p> <p>No new progress. University of Michigan and other colleagues took part in a Sea Grant training workshop on microplastics at the NOAA Great Lakes Environmental Research Lab in April 2016. Sea Grant affiliates will request microplastics be stated as a priority research item in the next Sea Grant request for proposals. Sea Grant is identified as a potential funding source.</p>
1.5.3. Create and send a bi-national letter to inform potential funding officials of regional research needs for land-based marine debris.	<p>Coordinators: University of Waterloo, University of Michigan</p>	In Progress	<p>No Report for 2017, 2018, or 2019</p> <p>No new progress. University of Michigan and University of Waterloo staff, along with other colleagues, took part in an IJC workshop on microplastics. The goal of the workshop was to establish research gaps and priorities, which was accomplished. The IJC will now formalize these statements to present to the United States and Canadian governments to encourage funding basic research. This report could also serve as a template for further dissemination.</p>

Objective 1.6: Through 2019, ensure data collection consistency and quality assurance by multiple users.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
<p>1.6.1. Establish standardized metadata on land-based debris for the following mediums:</p> <ul style="list-style-type: none"> a. Open and nearshore water b. Shoreline c. Deep and nearshore sediments d. Fisheries e. Water infrastructure (wastewater systems, stormwater, etc.) 	<p>Coordinators: SUNY Fredonia, University of Michigan</p> <p>Partners (corresponding to mediums listed):</p> <ul style="list-style-type: none"> a. SUNY Fredonia, NOAA MDP, University of MI, University of Wisconsin – Superior, Inland Seas Education Association b. Loyola University, University of Waterloo, Alliance for the Great Lakes, NOAA MDP, Inland Seas Education Association c. University of Western Ontario, NOAA MDP d. State/Provincial Departments of Natural Resources e. SUNY Fredonia 	<p>In Progress</p>	<p>No Report for 2018 or 2019 No new progress. The first 2 steps in the list have been completed. Significant progress has been made on step 3, while the others have not been started.</p> <ol style="list-style-type: none"> 1. Compile methods (complete) 2. Review methods and identify the steps in the protocols where metadata collection is crucial (complete) 3. Develop optimized/recommended metadata for each sampling media modeled after the Minimum Information about a Genome/ Metagenome Sequence (MIGS/MIMS) specification, especially the metadata requirements for environmental sampling component 4. Share drafts of optimized/recommended metadata collection forms for various media types 5. Request various research personnel use the form to “report” some of their samples to ensure that all crucial metadata is accounted for 6. Revise/amend metadata forms based on feedback from researchers 7. Submit final recommendations for metadata collection to Action Plan
<p>1.6.2. Establish opportunities to share standardized meta-data across the regional organizations. This may be completed in conjunction with Objective 1.2.</p>	<p>Coordinator: None</p> <p>Partners: SUNY Fredonia, NOAA MDP, University of Wisconsin – Superior, NERRs</p>	<p>In Progress</p>	<p>No Report for 2017, 2018, or 2019</p> <p>No progress without a coordinator to lead the action. Dependent on completion of action 1.6.1.</p>



Goal 2: Science-based Approaches & Management

A science-based and strategic approach is used to guide land-based marine debris policy and management decisions in the Great Lakes.

Trash and recycling overflow from bins in a public park (Photo: NOAA).

Action Status:

5 Complete

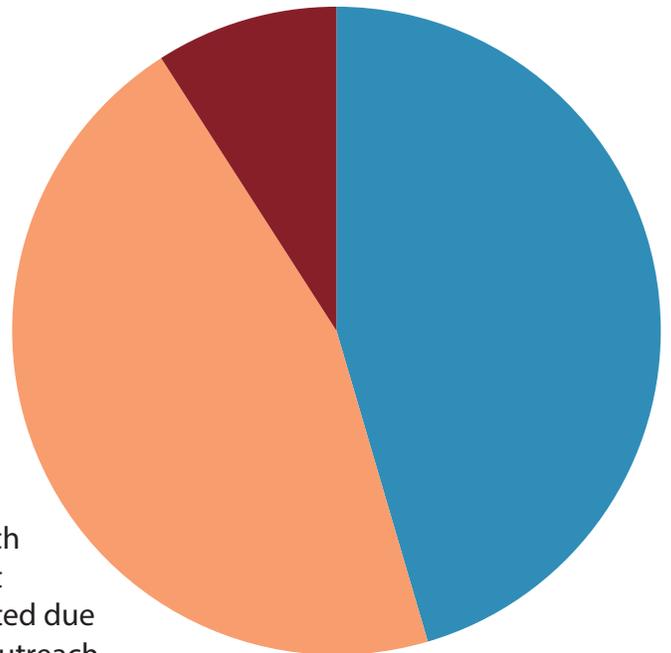
5 In Progress

1 Not Started

Goal Accomplishments

Summary of Existing Marine Debris Policies (Objective 2.1)

After reviewing policies from other regions, the Alliance for the Great Lakes and Keep America Beautiful created a list of categories and model examples of existing policies and best management practices. Based on this list, outreach began in 2017 across the Great Lakes basin to find relevant regional examples. The idea of a broad survey was eliminated due to logistical and practical concerns, and instead targeted outreach through the Great Lakes Land-based Marine Debris Action Plan list serve and other Great Lakes coalitions (such as the Healing Our Waters coalition) led to the creation of a list of communities that have implemented policies. Examples of these policies included bag bans/fees, bans on the use of single-use plastics in government facilities, public outreach campaigns, and social marketing campaigns. To date, few examples of local, county, or state level policies aimed at reducing marine debris appear to exist in the Great Lakes.

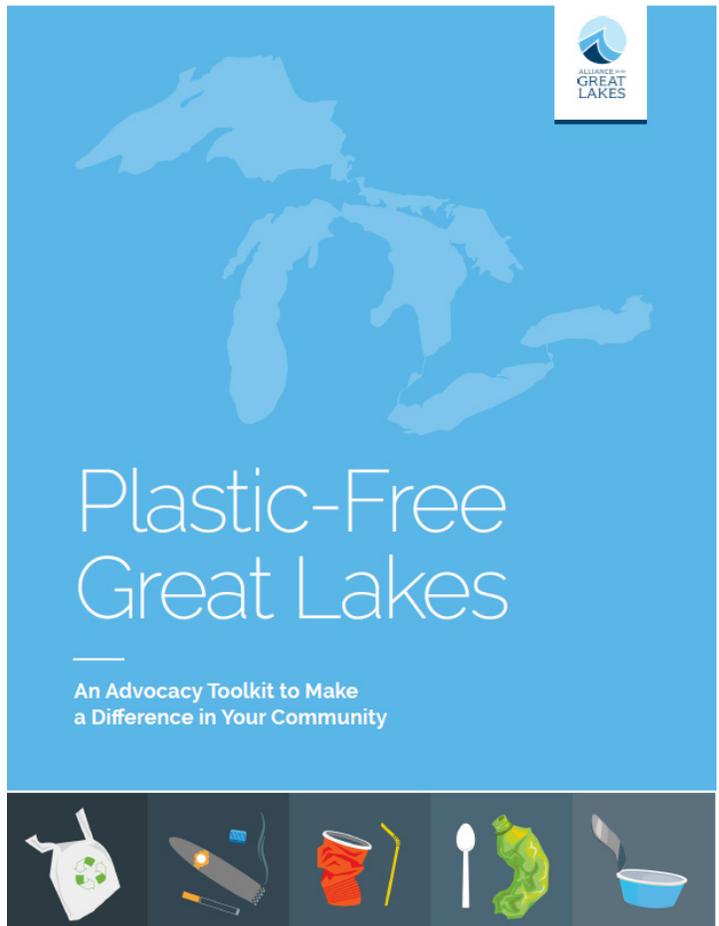


Based on the results of the outreach in 2017, it was determined that a toolkit for volunteer advocates would be the best way to encourage policies and best management practices in more communities. The toolkit, "[Plastic-Free Great Lakes: An Advocacy Toolkit to Make a Difference in Your Community](#)" was released by the Alliance for the Great Lakes on November 8, 2018 in conjunction with a [public webinar](#). The toolkit features

brief examples of plastic pollution reduction policies and programs in the Great Lakes region and tools for volunteers to use in their advocacy to local and state policy makers.

Dissemination of Action Plan to Policy and Management Officials (Objective 2.2, Actions 2.2.1 and 2.2.2)

Throughout the past five years, the Action Plan was presented 39 times, reaching approximately 1,796 policy and management representatives. Additionally, in 2014, the NOAA MDP, in partnership with state management programs (Coastal Zone Management Offices, Departments of Natural Resources or Environmental Quality), the Environmental Protection Agency, the Great Lakes Sea Grant Network, and the National Estuarine Research Reserves developed a contact list of relevant policy and management representatives from around the region. These contacts received the Great Lakes Land-based Marine Debris Action Plan via email on August 5, 2014.



Cover page for the “Plastic-Free Great Lakes: An Advocacy Toolkit to Make a Difference in Your Community,” which was developed by the Alliance for the Great Lakes.

Goal 2: A science-based and strategic approach is used to guide land-based marine debris policy and management decisions in the Great Lakes.

Objective 2.1: By the end of 2017, create a summary document of existing land-based marine debris policies and management systems in the Great Lakes.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
2.1.1. Inventory and create a summary document on existing policies and best management practices related to land-based marine debris in the Great Lakes.	<p>Coordinators: Alliance for the Great Lakes, Keep America Beautiful</p> <p>Partners: ACC, NERRs</p>	Complete	<p>After reviewing policies from other regions, a list of categories and examples of policies was created. Based on this list, outreach began across the Great Lakes basin to find examples. After the idea of a board survey was eliminated due to logistical and practical concerns, targeted outreach through the Action Plan list serve and other Great Lakes coalitions (such as the Healing Our Waters coalition) led to the creation of a list of communities that have implemented policies. Examples of these policies included bag bans/fees, bans on the use of single-use plastics in government facilities, public outreach campaigns, and social marketing campaigns. To date, few examples of local, county, or state level policies aimed at reducing marine debris appear to exist in the Great Lakes. Information gathering from regional policy research was incorporated into "Plastic-Free Great Lakes: An Advocacy Toolkit to Make a Difference in Your Community." This toolkit features several examples of policies and best management practices.</p>
2.1.2. Once the needs analysis is complete, examine existing platforms to meet those needs.	<p>Coordinators: Alliance for the Great Lakes, Keep America Beautiful</p> <p>Partners: ACC, NERRs</p>	Complete	<p>Based on the results of outreach in 2017, it was determined that a toolkit for volunteer advocates would be the best way to encourage policies and best practices in more communities. The toolkit, "Plastic-Free Great Lakes: An Advocacy Toolkit to Make a Difference in Your Community" was released on Thursday, November 8, 2018 in conjunction with a public webinar.</p>
2.1.3. Share the developed summary with policy makers in the Great Lakes region and make recommendations for policy improvements.	<p>Coordinators: Alliance for the Great Lakes, Keep America Beautiful</p> <p>Partners: ACC, NERRs</p>	Complete	<p>The volunteer advocacy toolkit was released on Thursday November 8, 2018. This toolkit features brief examples of plastic pollution reduction policies and programs in the Great Lakes region, and tools for volunteers to use in their advocacy to local and state policy makers.</p>

Objective 2.2: Share the developed land-based marine debris Action Plan with the policy and management communities upon its completion.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
2.2.1. Present the finalized Action Plan at relevant local, regional, and national conferences and/or meetings.	Coordinator: None – captured in annual reporting. Partners: Everyone	Complete	Throughout the last five years, the Action Plan was presented 39 times, reaching approximately 1,796 policy and management representatives.
2.2.2. Develop a contact list of policy and management representatives for distribution of the final Action Plan.	Coordinator: NOAA MDP Partners: State/ Provincial management programs (Coastal Zone Management Offices, Departments of Natural Resources), EPA, Great Lakes Sea Grant Network, NERRs	Complete	The NOAA Marine Debris Program, in partnership with state management programs (Coastal Zone Management Offices, Departments of Natural Resources or Environmental Quality), the EPA, the Great Lakes Sea Grant Network, and the National Estuarine Research Reserves developed a contact list of relevant policy and management representatives from around the region. These contacts received the Great Lakes Land-based Marine Debris Action Plan via email on August 5, 2014. Partners continue to follow-up with these individuals.
2.2.3. Develop a summarized Action Plan with brief talking points.	Coordinator: Great Lakes Sea Grant Network Partners: Michigan Department of Environmental Quality, City of Cleveland Office of Sustainability, Wisconsin Coastal Management, Ohio Coastal Management	In Progress	A fact sheet of a summarized Action Plan was previously drafted by Ohio Coastal Management and sent to partners for feedback. The fact sheet has been forwarded to Sarah Zack at IL-IN Sea Grant, who will now be seeing it through to completion. This project was delayed due to time constraints. Given that the best use of this tool would have been at the beginning of the Action Plan, IL-IN Sea Grant is proposing to instead develop a fact sheet and information on success stories from the Action Plan. This will be discussed at the next Great Lakes Sea Grant Network Meeting in 2019.
2.2.4. Create a general presentation or summary slide on the final Action Plan and share with Great Lakes marine debris community for use in outreach to the policy and management communities.	Coordinator: Great Lakes Sea Grant Network Partners: Michigan Department of Environmental Quality, City of Cleveland Office of Sustainability, Wisconsin Coastal Management, Ohio Coastal Management	In Progress	The presentation that was previously created by Ohio Coastal Management and sent to partners for feedback has been forwarded to Sarah Zack at IL-IN Sea Grant, who will now be seeing it through to completion. This project was delayed due to time constraints until Spring 2018. Given that the best use of this tool would have been at the beginning of the Action Plan, IL-IN Sea Grant is proposing to develop information on success stories from the Action Plan. This will be discussed at the next Great Lakes Sea Grant Network Meeting in 2019.

Objective 2.2: Share the developed land-based marine debris Action Plan with the policy and management communities upon its completion.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
2.2.5. Work with states, municipalities, and other key constituencies throughout the Great Lakes region to fully understand their trash prevention goals, programs, and perceived needs and barriers to success, and develop collaborative regional projects to address those factors.	Coordinator: EPA	Not Started	No progress to report due to a lack of staffing support to implement the EPA Trash Free Waters Program in the Great Lakes.

Objective 2.3: Review and prioritize storm water control practices at five municipal districts in the Great Lakes by 2019.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
2.3.1. Engage storm water professionals and the Great Lakes Storm Water Management Institute on land-based marine debris issues in the region.	Coordinator: NERRs Partners: Great Lakes Sea Grant Network, Erie Soil & Water Conservation District, Cleveland Mayor’s Office of Sustainability, Alliance for the Great Lakes, City of Cleveland Water Pollution Control	In Progress	<p>The LS NERR has recently acquired a new Coastal Training Program Coordinator. OWC NERR is hoping to strengthen ties and marine debris collaboration, and recently met with LS NERR staff at the 2018 NERRS Annual Meeting, which was hosted by the LS NERR. While the staff capacity of the LS NERR has limited their availability to this topic, new research opportunities relating to oil residue attaching itself to microplastics in Lake Superior and educational endeavors, indicate they may be able to coordinate again soon.</p> <p>OWC NERR is continuing to collaborate with the Erie Conservation District on the Clean Water Contractor Program, which targets the construction industry and provides trainings on stormwater best management practices, and the threat of storm water-driven land-based marine debris. The 2019 Clean Water Contractor Sediment & Erosion Control Expo took place on February 28, 2019.</p>

Objective 2.3: Review and prioritize storm water control practices at five municipal districts in the Great Lakes by 2019.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
2.3.2. Identify existing storm water control practices related to land-based marine debris and identify gaps in programs and/or policy.	<p>Coordinator: NERRs</p> <p>Partners: Alliance for the Great Lakes, Keep America Beautiful, ACC</p>	In Progress	<p>LS NERR staff limitations have put on hold a potentially planned call with NERR partners to identify existing marine debris efforts, create a strategy, and allocate assignments to move forward on the progress of this action item.</p> <p>Keep America Beautiful, Alliance for the Great Lakes, and ACC agreed to help contribute to this action item via their assessment of practices that is an outcome of action item 2.1.1.</p>
2.3.3. Implement tools and incentives to leverage action by various groups.	<p>Coordinator: NERRs</p> <p>Partner: Keep America Beautiful</p>	In Progress	<p>OWC NERR is working with local stakeholders (e.g., community representatives) to install and track cigarette butt recycling receptacles and monofilament fishing line recycling receptacles. Technical assistance was provided to the Huron Yacht Club and City of Sandusky. OWC NERR also hosted two workshops focused on plastic reduction strategies in July 2018. The workshops were hosted with support from Talkin' Trash, Ohio Sea Grant College Program, the Ohio Clean Marinas and Clean Boaters Programs, the NOAA Marine Debris Program, Lake Erie Nature & Science Center, Bowling Green State University Firelands, and the Cleveland Office of Sustainability.</p> <p>The workshops involved outlining the issue of marine debris in the Great Lakes, highlighted several regional and local awareness campaigns, directing participants on monofilament fishing line receptacle construction and painting, and sharing the NOAA MDP Monitoring and Assessment Project protocol. OWC NERR continued to circulate designs from Recycled Runway 2018, which involved multiple action groups' representation to confront the issue of land-based marine debris, and raise funds for conservation projects along Ohio's Lake Erie coast. Venues include the Milan Historical Museum, Ohio State Fair, Stone Laboratory on Gibraltar Island, and the Greater Cleveland Aquarium.</p>



Goal 3: Prevention & Education

Land-based marine debris is prevented and reduced through an educated and involved community.

NOAA MDP educating Girl Scouts at The Aquatic Visitors Center on South Bass Island, OH (Photo: Ohio Sea Grant).

Action Status:

15 Complete

0 In Progress

0 Not Started

Goal Accomplishments

All 15 of the actions outlined in Goal 3 were completed. Specific accomplishment highlights are below.

Education Needs Assessment (Objective 3.1)

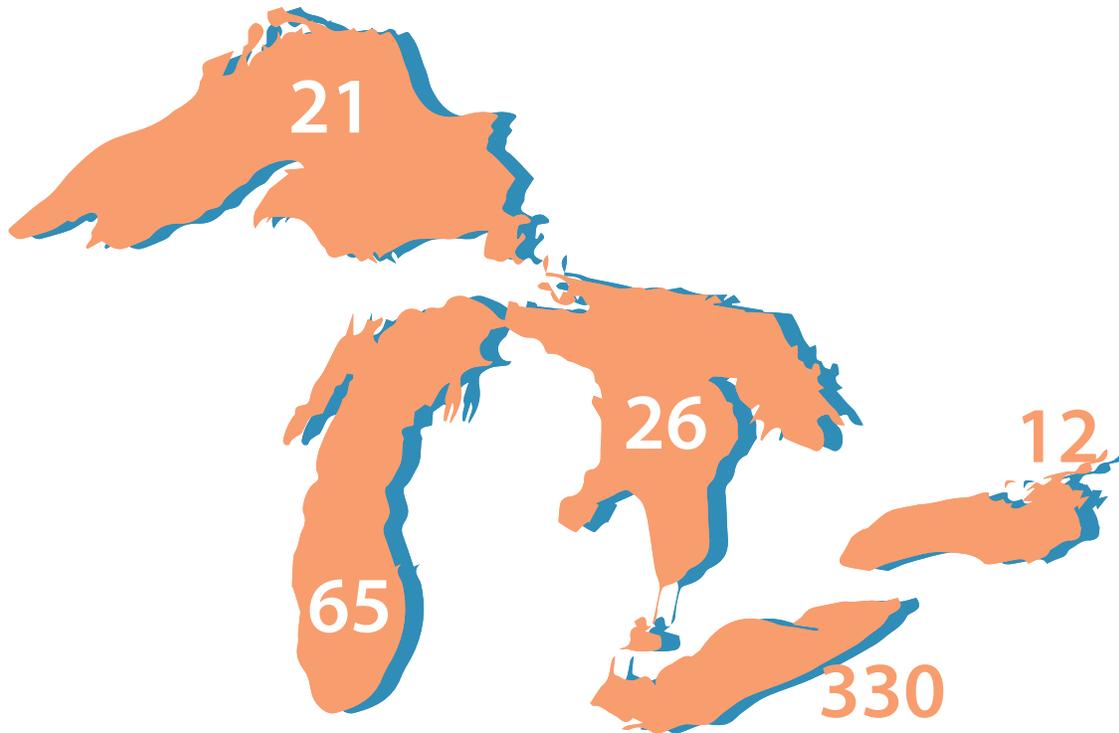
In 2015, the Alliance for the Great Lakes interviewed Action Plan partners to identify a target audience for education efforts in the region. Based on feedback, it was determined that for this particular objective, the focus was on formal education, or education that takes place in a classroom setting. The Alliance for the Great Lakes compiled formal educational materials from partners around the region and attempted to review them for potential education gaps. However, they found it challenging to gather partners to analyze materials. Limited analysis has found many ocean-focused materials can simply be adapted for the Great Lakes region, but partners face time and document accessibility challenges, and difficulties adapting curricula that they do not own. Therefore, it was recommended that the adaptation of materials be the responsibility of owners.

Awareness Campaign in Cleveland, OH (Objective 3.2)

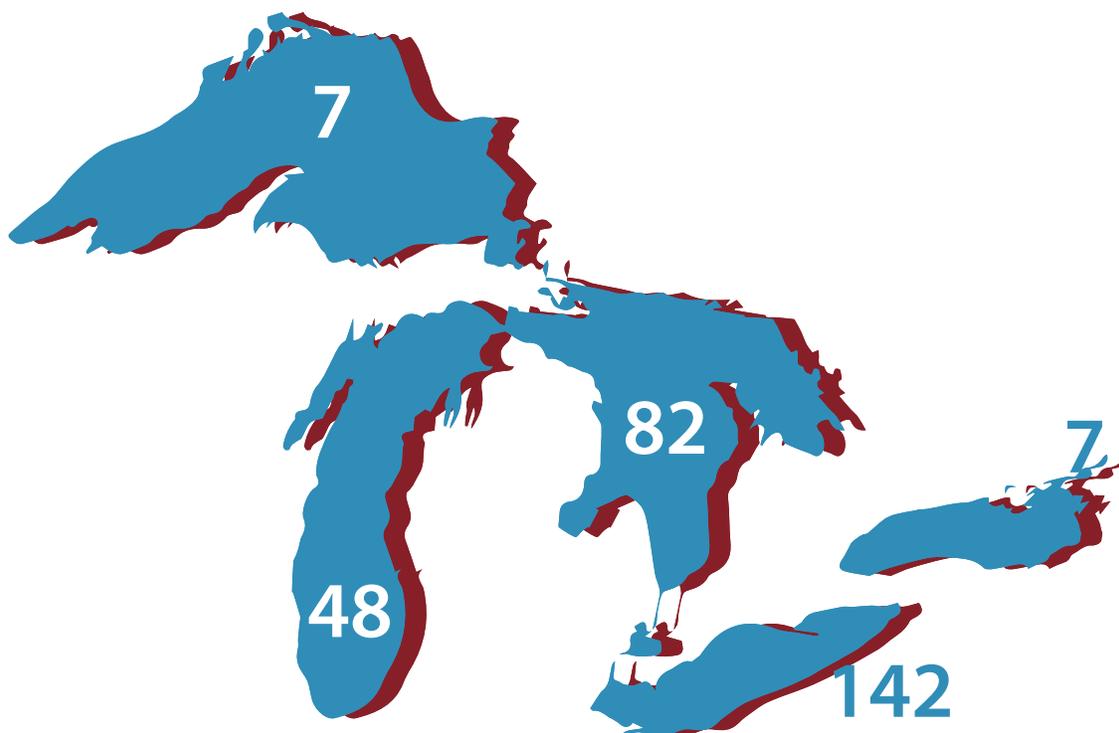
The City of Cleveland Mayor's Office of Sustainability, with the support of a NOAA Marine Debris Program Prevention Grant, identified barriers to the reduction of plastic marine debris and developed a community-based social marketing campaign to overcome these barriers. The goal of this project was to achieve lasting behavior change in Cleveland residents that would result in the reduction of littering, reduce the use of plastics, and increase proper disposal of plastics, which would ultimately reduce marine debris. The pilot social marketing campaign, [Don't Break the Lake](#), utilized various communication tools and

methods, including signage at water refill stations and in grocery stores, an insert in mailed water bills, outreach through social media, and the purchase and giveaways of reusable bags and bottles. Preliminary grocery store results indicate that the number of reusable bags used in the store increased as a result of the campaign.

Number of informal education activities on land-based marine debris per lake, with the public:



Number of informal education activities on land-based marine debris per lake, with targeted audiences.



Outreach Highlights



**Gave 386
Presentations to
149,764 People**



**Participated in
325 Educational
Events with 30,298
Students**



Created 61 Displays

Goal 3: Land-based marine debris is prevented and reduced through an educated and involved community.

Objective 3.1: By the beginning of 2016, conduct a needs assessment for future education efforts on land-based marine debris in the Great Lakes.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
3.1.1. Identify target audiences and potential new partners for future education efforts.	Coordinator: Alliance for the Great Lakes	Complete	In March and April of 2015, the Alliance for the Great Lakes interviewed all partners listed in Goal 3, with the exception of those that did not respond to outreach. Through that initial outreach, the Alliance determined the target audiences that partners want to reach varied between formal classroom education and informal public education. To narrow the focus of this objective it was changed to formal education, while informal public education became the focus of Objective 3.2.
3.1.2. Inventory educational resources that are currently available and identify gaps in content and style/type.	Coordinator: Alliance for the Great Lakes Partners: Great Lakes Sea Grant Network, NOAA MDP, NERRs, Coastal Training Program, City of Cleveland Office of Sustainability, Inland Seas Education Association, Shedd Aquarium	Complete	Educational materials have been compiled and reviewed by partners and the initial steps for identifying gaps have been taken.
3.1.3. Create new or adapt existing educational materials to fill gaps identified in action 3.1.2.	Coordinator: Alliance for the Great Lakes Partners: Great Lakes Sea Grant Network, NOAA MDP, NERRs, Wisconsin Coastal Management Program	Complete	See action 3.1.2. The action team has found many ocean-focused materials that can simply be adapted for the Great Lakes region, but partners face both time and document accessibility challenges, and difficulties adapting curricula that they do not own. Adaptation of materials is now the responsibility of owners. Five organizations, including Ocean Wise, Ocean School, Students on Ice, Sea Smart, and WE Charity, have teamed up with support from ECCC to provide teachers with new educational tools focused on plastic pollution and how it affects our environment. The Ocean Plastic Education kit featured materials and classroom resources to help students learn about how to reduce plastic use and waste. It related the plastic material to current curriculum, so that it can easily be incorporated into teacher's lesson plans. The materials supported this action by providing custom curriculum to fill educational gaps related to marine plastic waste for Ontario, Canada.

Objective 3.2: By the end of 2016, launch at least one awareness campaign for Great Lakes communities regarding land-based marine debris.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
3.2.1. Identify and review existing awareness campaigns that could be leveraged.	<p>Coordinator: Keep America Beautiful</p> <p>Partners: Alliance for the Great Lakes, Inland Seas Education Association, Hubbub (UK-based litter prevention organization)</p>	Complete	Keep America Beautiful completed a local pilot in Erie, PA to test the effectiveness of the Hubbub Ballot Bin for reducing cigarette litter. The Erie affiliate placed two bins in their community, one by a library and the second by a park. Overall results were an 88.5% reduction in cigarette litter over the months of the pilot, which compared preliminary results to final litter scans.
3.2.2. Engage a marketing expert to assist in the development of a campaign.	<p>Coordinator: City of Cleveland</p> <p>Partners: Alliance for the Great Lakes, ACC, Great Lakes Sea Grant Network, Keep America Beautiful, Hi-Cone, Inland Seas Education Association</p>	Complete	The pilot campaign " Don't Break the Lake " is continuing beyond the original project. This includes a reusable bag campaign with Zagara's Marketplace in Cleveland Heights, OH, encouraging reusable water bottle usage through educational signage and social media, and continued research into plastic cigar tip disposal behaviors.

Objective 3.3: By 2019, develop a social marketing plan, including 10 communication products to address land-based marine debris in the Great Lakes.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
3.3.1. Identify and review effectiveness and impact of existing social marketing programs on littering behavior.	<p>Coordinators: Keep America Beautiful, Alliance for the Great Lakes</p> <p>Partners: Great Lakes Sea Grant Network, Clean Water Action, NERRs</p>	Complete	A list of social marketing campaigns was compiled for review. The partners will continue to add to and refine this list, seeking additional input from relevant contacts, affiliates and others, particularly those connected with water.

Objective 3.3: By 2019, develop a social marketing plan, including 10 communication products to address land-based marine debris in the Great Lakes.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
3.3.2. Create a brand with localized and targeted messages based on social science research on barriers and benefits. Social science research may include public-opinion focus groups and value identification.	<p>Coordinators: City of Cleveland, Alliance for the Great Lakes</p> <p>Partners: OSG</p>	Complete	<p>The City of Cleveland contracted with a local marketing firm, thunder::tech, to develop a social marketing campaign for three plastic marine debris items, including plastic grocery bags, plastic disposable water bottles, and plastic cigar tips. Thunder::tech subcontracted with Ohio Sea Grant (OSG) to conduct an online survey focused on identifying the barriers to desired behaviors for these three items. The survey was distributed via multiple channels. Within the five county regions of concern, 982 respondents finished the survey. A focus group was convened to discuss disposal methods of plastic cigar tips. OSG presented the results of their research to thunder::tech in March 2017. In general, the results showed that the greatest barrier was that respondents forget to bring their reusable bags and bottles, while the barriers to the proper disposal of cigar tips are both material and social. The results were shared with the local marketing firm for the development of the campaign and have been published on the Great Lakes Marine Debris Collaborative Portal.</p>

Objective 3.4: Conduct five informal education activities on land-based marine debris per year, per lake, to the public.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
3.4.1. Engage the Beach Ambassador Program as well as museums and/or aquariums on educational activities related to land-based marine debris in the Great Lakes.	<p>Coordinator: Alliance for the Great Lakes</p> <p>Partner: OWC NERR</p>	Complete	<p>The Alliance for the Great Lakes launched a new pilot initiative in Chicago called “My Beach Your Beach,” through which multiple social and cleanup activities were hosted at Oak Street Beach throughout the summer of 2016. These events included placing small flags on the beach during cleanups as items were removed from the beach, a voting box in which individuals could vote with cigarette butts, and various cleanup events. Over the next several months, the Alliance will be assessing the impacts of this work. In addition, the Alliance is working with the State of Michigan on a Clean Beaches Initiative, bringing together agencies at the state level to share information on marine debris in Michigan coastal areas, and looking for opportunities to collaborate to reduce debris.</p>

Objective 3.4: Conduct five informal education activities on land-based marine debris per year, per lake, to the public.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
3.4.2. Organize an annual Boat Float in Lake Erie.	<p>Coordinator: City of Cleveland Office of Sustainability</p> <p>Partners: Cleveland Metroparks, Cleveland Museum of Natural History, Alliance for the Great Lakes, Drink Local Drink Tap, RES Polyflow</p>	Complete	The 10th and final Annual Great Lake Erie Boat Float was held at Edgewater Park Beach on Saturday, September 8, 2018. Eight boats participated in the event, and despite the less than ideal weather conditions, all boats got in the water. Photos from the event may be found at www.ldempsey.com . Dr. Marcus Eriksen from The 5 Gyres Institute was the guest judge for the event and gave an inspirational and positive speech. Four previous boat floats were organized from 2014-2017 as a part of this Action Plan.
3.4.3. Outreach to the general public, including presentations to coastal communities during field research expeditions.	<p>Coordinator: None – captured in annual reporting.</p> <p>Partners: All educators</p>	Complete	Over the past five years, 386 events and presentations were conducted, reaching 149,764 people. Additionally, there was a Canada-wide public consultation on plastic waste and plastic pollution and a #BePlasticWise campaign launched in Canada.
3.4.4. Create land-based marine debris educational displays at public venues (i.e., state parks, museums, marinas, universities, etc.). The displays may be mobile in nature to be easily shared across the region.	<p>Coordinator: None – captured in annual reporting.</p> <p>Partners: Everyone</p>	Complete	Sixty-one displays were developed within the last five years.
3.4.5. Encourage events (e.g., conferences, etc.) to be “zero-waste” or “reduced-waste.”	<p>Coordinators: Keep America Beautiful, City of Cleveland Office of Sustainability</p> <p>Partners: SC2019 ZeroWasteNEO Working Group, Graduates of the Cuyahoga County Solid Waste District’s Master Recyclers class</p>	Complete	Requests for assistance with zero or reduced-waste events have increased over the past few years. The Sustainable Cleveland ZeroWasteNEO (Northeast Ohio) Working Group provides guidance to event planners by offering workshops, an Event Planning Guide, and additional resources. The Cleveland Office of Sustainability also has signs available for loan. With many events planned in June 2019 for the City-wide celebration of the 50th anniversary of the last burning of the Cuyahoga River, the Working Group held several workshops in April and May 2019 and updated the Guide. In addition, for some events, Cathi Lehn serves as the Waste and Recycling Coordinator and attends all planning meetings and was on site for the day of the event. Over the past five years, the City of Cleveland Office of Sustainability has aided 28 events to be zero or reduced waste.

Objective 3.5: Conduct five formal education activities on land-based marine debris per year, per lake, to targeted audiences.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
3.5.1. Host a regional webinar on land-based marine debris for education/outreach professionals.	<p>Coordinators: NOAA MDP, Alliance for the Great Lakes</p> <p>Partner: Great Lakes Sea Grant Network</p>	Complete	<p>The NOAA MDP, in partnership with OSG, hosted a Great Lakes Education Webinar on April 3, 2019. Thirty-one educators learned about marine debris, received a list of resources, and viewed an example lesson. A recording of the webinar is available Great Lakes Marine Debris Collaborative Portal.</p>
3.5.2. Host a teacher workshop or class on land-based marine debris.	<p>Coordinators: Great Lakes Sea Grant Network, NOAA MDP</p> <p>Partners: Alliance for the Great Lakes, OWC NERR, Regional Science Consortium at the Tom Ridge Environmental Center</p>	Complete	<p>In 2015, through a partnership with the OSU Stone Lab on Lake Erie, the NOAA MDP and OSG held a free three-day workshop on marine debris for teachers and informal educators on June 8-10, 2015. Thirteen educators experienced a mix of classroom curriculum and field activities, including instruction on the use of manta net trawls and sample analysis with Dr. Rios Mendoza, as well as a beach cleanup with the Alliance for the Great Lakes. Pennsylvania Sea Grant and the Center for Great Lakes Literacy also held a teacher training for ten teachers at Tom Ridge Environmental Center in Erie, PA.</p> <p>Throughout 2016, an additional 33 teachers participated in workshops in PA and OH.</p> <p>In 2017, 67 teachers were engaged in marine debris workshops in PA and NY.</p> <p>On October 20, 2018, twenty-seven teachers learned about the impacts of plastic pollution on water quality, wildlife, and potentially humans, as part of a Center for Great Lakes Literacy Resources and Curriculum workshop in Erie, PA. New York Sea Grant also held two educator workshops in the summer of 2018, reaching 38 teachers.</p>
3.5.3. Conduct land-based marine debris educational activities with students of all ages in the Great Lakes.	<p>Coordinator: None – captured in annual reporting.</p> <p>Partners: Everyone</p>	Complete	<p>During the past five years, 30,298 students of various ages were engaged through 325 educational events.</p>



Goal 4: Removal & Tracking

The impacts of land-based marine debris are reduced through removal and tracking efforts.

Marine debris removed from South Bass Island State Park, OH (Photo: NOAA).

Action Status:

8 Complete

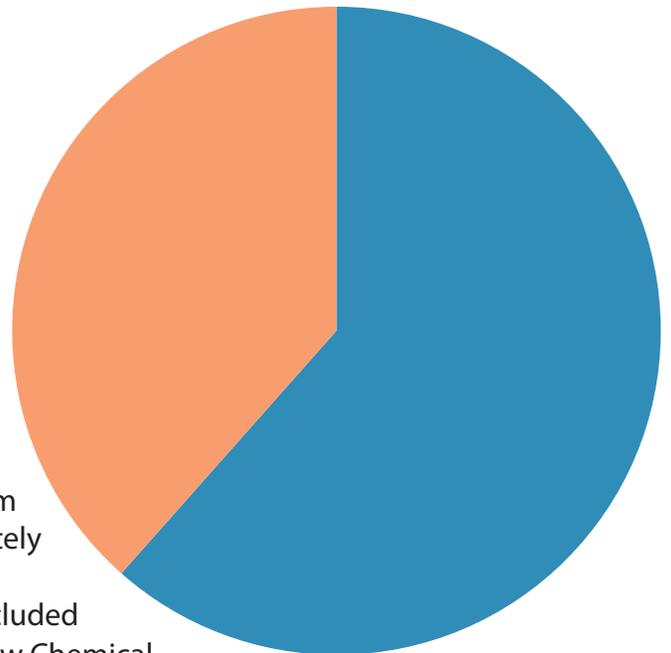
5 In Progress

0 Not Started

Goal Accomplishments

Bi-Nationally Remove Marine Debris (Objective 4.1)

The Alliance for the Great Lakes, the Great Canadian Shoreline Cleanup, the Ocean Conservancy, Partners for Clean Streams, and other volunteer cleanup organizations have annually reported the amount of debris removed from Great Lakes shorelines. Over the past five years approximately 306,665 pounds (153.3 tons) of land-based marine debris was removed from the environment by volunteers. This included collaborating with industry and manufacturers, such as Dow Chemical and Amcor, on volunteer employee cleanups. Additional cleanup opportunities are found on the [Great Lakes Marine Debris Collaborative Portal](#).



Best Management Practices for Removing and Preventing Debris (Objective 4.2)

The Ohio Clean Marinas Program adapted marine debris removal best management practices (BMPs) for the marina and boating community and incorporated these BMPs into the Program's outreach materials. In spring 2018, a revised Clean Marina Program Tiered Checklist was completed, with the following required BMPs specifically addressing land-based marine debris removal:

- Cigarette disposal containers are available for patrons and staff.
- Collection bins for solid recyclables are available throughout the marina.

- Trash cans are emptied and litter pick-ups are conducted within the marina and along the shoreline daily.
- Derelict vessels are removed from the property.
- Shrink wrap is recycled or dry rack storage is available for winterization of boats.
- All storm drains are labelled to notify patrons of outfall points (i.e., “No Dumping, Drains to Lake”).
- Boaters are required to sign an environmental commitment pledge.

In summer 2018, staff began certifying marinas using this revised checklist, and collaborated with Cuyahoga and Summit County Soil and Water Conservation Districts to provide Clean Boater BMPs as part of their outreach materials and social media posts.

Additionally, Old Woman Creek National Estuarine Research Reserve (OWC NERR) has begun to construct, paint, disseminate, and track monofilament fishing line recycling receptacles along Ohio’s Lake Erie coastline. These recycling bins are placed at prominent fishing piers, marinas, beaches, and parks. Line is collected by volunteers and shipped to Berkley, Inc. to be recycled into other fishing products. OWC NERR has hosted workshops to educate adopters on the benefits of removing gear from the environment, and how to care for a bin.

Goal 4: The impacts of land-based marine debris are reduced through removal and tracking efforts.

Objective 4.1: By 2019, bi-nationally record and report count and weight (in tons) of land-based marine debris removed from Great Lakes shorelines and watersheds by volunteer programs.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
4.1.1. Investigate Canadian volunteer program reporting mechanisms and see how they align with U.S. efforts.	Coordinator: Alliance for the Great Lakes Partners: Surfrider Foundation, Ocean Conservancy	Complete	GCSC has a similar system to the Alliance for the Great Lakes for tracking volunteer cleanups through an online database tool. The GCSC is now also encouraging year-round cleanups in addition to the traditional ICC event. They use the same data collection card as the Alliance and the other groups in the Great Lakes hosting the ICC event.
4.1.2. Identify a centralized location that will direct people to sources of volunteer coastal cleanup data.	Coordinator: Alliance for the Great Lakes	Complete	The Great Lakes Marine Debris Collaborative Portal provides links to cleanup opportunities, and sources of cleanup data. Partners, like the Alliance for the Great Lakes, continue to host their Adopt-a-Beach data on their own websites and databases, which are linked to on the portal.

Objective 4.2: By 2019, develop and publish recommendations for best practices for removing land-based marine debris.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
4.2.1. Investigate existing removal methods for land-based marine debris and analyze for similarities, as well as benefits and challenges.	Coordinator: NERRs Partner: Great Lakes Sea Grant Network	Complete	<p>OWC NERR has worked with partners on plastics reduction strategies workshops in the northern Ohio area. These involve the construction, painting & dissemination of monofilament fishing line recycling receptacles along Ohio’s Lake Erie coast at prominent fishing piers, marinas, beaches and parks, and include a literacy component.</p> <p>OWC NERR has also installed one cigarette butt recycling receptacle at their visitor’s center, and plans to install another at their beach/boat house, as well as a mobile receptacle for off-site trainings.</p> <p>The OWC NERR Coastal Training Program Coordinator would still like to survey other coastal entities’ stormwater control measures/policies and methods of removal regarding land-based marine debris.</p> <p>OWC and LS NERRs have also discussed the potential for surveying other NERRs outside of the Great Lakes to gain insight on different marine debris removal tactics (e.g., removal of derelict crab pots, disposal/recycling of monofilament fishing line). OWC NERR would like to disseminate a survey to the other NERRS despite LS NERR’s recent inactivity in the plan.</p>

Objective 4.2: By 2019, develop and publish recommendations for best practices for removing land-based marine debris.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
<p>4.2.2. Develop or adapt BMPs to target specific environments or debris types.</p>	<p>Coordinator: Great Lakes Sea Grant Network</p>	<p>In Progress</p>	<p>OSG is working with the Toledo Tennis Club and Mentor Heisley Racquet Club to obtain and distribute personal monofilament recycling containers to anglers. OSG received 400 bins from the Toledo Tennis Club through Partners for Clean Streams, and three bins from Heisley Racquet Club. They are in the process of writing a grant to purchase the other items needed to complete the personal monofilament bins.</p> <p>OSG has seen great success having students or children write letters to the angler who will receive the personal monofilament bins, thanking them for removing their waste, protecting wildlife, humans, and the environment. Additionally, many youth volunteers from Cleveland Metroparks have helped to construct the personal monofilament bins, and in the process, have learned more about marine debris while receiving volunteer hours for school. OSG will also work with senior citizen groups in Lake County to help put together the personal monofilament containers. Cleveland Metroparks has requested a building session to incorporate into one of their public events, as well.</p>

Objective 4.2: By 2019, develop and publish recommendations for best practices for removing land-based marine debris.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
4.2.3. Incorporate land-based marine debris BMPs into existing guides (e.g., Clean Marina).	<p>Coordinator: Great Lakes Sea Grant Network</p> <p>Partner: Wisconsin Coastal Management Program</p>	Complete	<p>The Ohio Clean Marinas Program Tiered Checklist has been completed and is being used to certify marinas for implementing environmental BMPs across Ohio. The checklist includes seven items related to marine debris:</p> <ol style="list-style-type: none"> 1. Cigarette disposal containers are available for patrons and staff. 2. Collection bins for solid recyclables are available throughout the marina. 3. Trash cans are emptied and litter pick-ups are conducted within the marina and along the shoreline daily. 4. Derelict vessels are removed from the property. 5. Shrink wrap is recycled or dry rack storage is available for winterization of boats. 6. All storm drains are labelled to notify patrons of outfall points (i.e., "No Dumping, Drains to Lake"). 7. Boaters are required to sign an environmental commitment pledge. <p>The Ohio Clean Marinas Program also partnered with the Ohio Department of Natural Resources and Cleveland Metroparks to create a video on how to prepare boat shrink wrap for recycling. The link to the video and more information about the recycling program are available on a draft fact sheet, to be formally published in 2020.</p>
4.2.4. Share BMP recommendations with stakeholders.	<p>Coordinator: Great Lakes Sea Grant Network</p>	In Progress	<p>At outreach events, OSG and the Ohio Clean Marinas/Clean Boater Programs educate stakeholders on marine debris and share current research to create an informed public. Over the past five years, numerous presentations were given to resource and watershed management groups.</p>

Objective 4.3: Within five years, target removal efforts towards land-based marine debris items that are expected to have the greatest impact or which are most abundant in number.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
4.3.1. Analyze existing cleanup data to identify land-based marine debris types, quantities by type, and impact. Reports may be separated by geography due to variations in data.	<p>Coordinator: Alliance for the Great Lakes</p> <p>Partner: Ocean Conservancy, University of Michigan, Loyola University</p>	In Progress	<p>In 2017, the Alliance for the Great Lakes shared Adopt-a-Beach data with multiple research partners across the Great Lakes basin. In January of 2017, Adopt-a-Beach data was featured in an article in Science of the Total Environment Vol. 577, entitled “Citizen science datasets reveal drivers of spatial and temporal variation for anthropogenic litter on Great Lakes beaches.” Dr. Timothy Hoellein from Loyola University was the lead author on the paper with several Alliance for the Great Lakes staff members.</p> <p>Additionally, the Alliance for the Great Lakes has shared Adopt-a-Beach data with other partners working on analysis, such as the Shedd Aquarium.</p>
4.3.2. Partner with industry, manufacturers, and packaging companies to participate in and support removal efforts.	<p>Coordinator: Ocean Conservancy</p>	Complete	<p>Each year during the ICC, the Ocean Conservancy usually hosts at least one cleanup in the region, often in partnership with Alliance for the Great Lakes, which engages companies and their employees at cleanups. For example, in September 2018, an Ocean Conservancy team hosted a cleanup for Dow Chemical employees in Saginaw and Midland, MI, and removed 7,074 lbs of land-based debris. As another example, Amcor, a member of the Trash Free Seas Alliance, leads their own cleanup events and completed one on Belle Isle, MI during the 2018 ICC.</p>

Objective 4.4: Create a natural disaster preparedness plan (by state or lake) for land-based marine debris within five years.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
4.4.1. Review lessons-learned from Hurricane Sandy response.	<p>Coordinator: NOAA MDP</p> <p>Partner: Alliance for the Great Lakes, Ohio Department of Natural Resources/Ohio Emergency Management Association, ECCC</p>	Complete	<p>In the fall of 2012, marinas in the Great Lakes found themselves dealing with towering waves of up to 20 feet, and winds of over 60 miles per hour as a result of Hurricane Sandy. After the event, OSG pursued and obtained a NOAA Coastal Storms Grant in partnership with the OSU School of Environment and Natural Resources, Pennsylvania Sea Grant, and Wisconsin Sea Grant to understand how marina owners in the Great Lakes prepare for these natural hazards and to develop tools to help marinas now, and in the future. The Preparation, Adaptation and Response Tool (PART), is complete.</p>

Objective 4.4: Create a natural disaster preparedness plan (by state or lake) for land-based marine debris within five years.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
4.4.2. Review preparedness plans from other regions and industry partners.	Coordinator: NOAA MDP Partner: ECCC	Complete	The following resources were reviewed: Great Lakes Clean Marina Network Best Management Practices Regarding Increasing Resilience, Boat U.S. Hurricane Preparedness for Boaters, NOAA MDP Storm Preparedness Fact Sheet, and other NOAA MDP response guides from other states.
4.4.3. Engage the U.S. Coast Guard, FEMA, and the Canadian equivalents on land-based marine debris issues in the region, as well as the creation of the preparedness plans.	Coordinator: NOAA MDP Partner: ECCC	In Progress	NOAA MDP staff are participating in trainings and networking with the U.S. Coast Guard and FEMA.

Objective 4.5: By 2019, remove 200 tons of land-based marine debris from Great Lakes environments.

Action Strategies	Coordinating & Partner Organizations	Status	Progress Description
4.5.1. Understand the current baseline of land-based marine debris removed by volunteers in the region. Report on these values.	Coordinator: Alliance for the Great Lakes Partner: Ocean Conservancy, GCSC	In Progress	From 2014 to 2018, volunteers in the U.S. and Canada have removed approximately 306,665 pounds of marine debris from the Great Lakes watershed.
4.5.2. Identify funding opportunities and potential land-based marine debris removal projects throughout the region.	Coordinator: None – captured in annual reporting Partner: Everyone	Complete	Funding opportunities are now available on the Great Lakes Marine Debris Collaborative Portal .



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