Proceedings of the Great Lakes Land-Based Marine Debris Workshop

NOAA Marine Debris Program
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
Technical Memorandum NOS-OR&R-47
December 2013

PROCEEDINGS OF THE GREAT LAKES LAND-BASED MARINE DEBRIS WORKSHOP

May 22-23, 2013
Cleveland, OH, USA

Sarah Opfer[1,2] (ed.)

[1]National Oceanic and Atmospheric Administration
Office of Response & Restoration
NOAA Marine Debris Division
Silver Spring, MD 20910, USA

[2]Earth Resources Technology, Inc.
Laurel, MD 20707, USA

National Oceanic and Atmospheric Administration
Technical Memorandum NOS-OR&R-47
December 2013

This document should be cited as follows:
Opfer, S.E. (ed.). 2013. Proceedings of the Great Lakes Land-Based Marine Debris Workshop. May 22-23, 2013. NOAA Technical Memorandum NOS-OR&R-47.

For copies of this document, please contact:
NOAA Marine Debris Division
N/ORR, SSMC-4
1305 East-West Highway
Silver Spring, MD 20910

www.MarineDebris.noaa.gov

Contents

Background

Marine debris is defined as any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes. While perhaps more commonly thought of as an oceanic problem, the Great Lakes region, with its complex system of habitats, wetlands, rivers, and tributaries, is an area that is also affected by debris. In the Great Lakes, marine debris affects the beauty of our environment, is a health and safety hazard, threatens our wildlife and natural resources, and comes at an economic cost. From a beach covered in trash to an animal entangled in fishing line, marine debris is a problem we cannot ignore.

Figure 1. Map of the Great Lakes Basin. Credit: EPA.gov

Debris in the Great Lakes ranges from trash and litter items which are small in size to large abandoned and derelict vessels. Marine debris is generally classified into two broad categories of sources: ocean or lake-based and land-based. Ocean or lake-based debris are those materials that may be dumped, swept, or blown off both commercial and fishing vessels, as well as any stationary platforms at sea. Land-based debris is generated on land and may be blown, swept, or washed out to sea. This includes debris from littering, dumping in rivers and streams, storm water discharges, poor waste management practices, and industrial losses during production, transportation, and processing. Beach and shoreline cleanups like those conducted by the Adopt-a-Beach™ program typically target this type of debris.

Land-based marine debris in the Great Lakes is largely monitored by volunteers in the Adopt-a-Beach™ program, organized by the Alliance for the Great Lakes. This cleanup

effort began in 1991 and now operates year-round. Data gathered on the type and amount of debris that is collected is entered into an online database. This data can be exported to the public and other agencies for use in monitoring marine debris. Along with marine debris monitoring, volunteers collect information on beach health.

In 2011, Alliance for the Great Lakes collected 595 litter monitoring forms for entry into the database. Initial results indicate that 48 percent of the land-based debris collected by volunteers is food-related items such as food wrappers/containers, beverage containers, bags, eating utensils, etc. The second highest category of items collected during these cleanups in 2011, at 41 percent, was smoking-related and included cigarette filters, lighters, cigar tips, and tobacco product packaging.

Other items of interest included a significant collection of balloons and balloon strings, as well as firework debris. Balloon strings are significant because one of the most notable types of impacts from marine debris is wildlife entanglement. Entanglement can lead to injury, illness, suffocation, starvation, and even death. Adopt-a-Beach™ volunteers in the Great Lakes record wildlife entanglements and have found several instances of wildlife entangled in balloon strings as well as monofilament fishing line and rope.

A subtype of land-based marine debris that is of growing interest is plastic pellets, used in plastic manufacturing. These plastic pellets are often referred to as "nurdles" and are considered a type of microplastic. Microplastics are debris particles that are composed of primarily synthetic particles and are less than five millimeters in size (Arthur et al. 2009). Plastic pellets typically enter the environment through accidental losses such as spillage of plastic resin pellets during production, transportation, and processing. Other sources of microplastics include the breakdown of larger plastic pieces through weathering and abrasion, and also potentially from use in personal care products.

Western University in Ontario has done some research into the distribution of plastic, including these pellets, by collecting data from beaches, wetlands, and boat landings along the shorelines of Lakes Huron. Initial results from this study indicate that most plastics in the Great Lakes are composed of polyethylene, polypropylene, and polyethylene terephthalate. Plastic pellets were found primarily on the southern Canadian beaches of Lake Huron, with the Sarnia Beach area having the highest amount of plastic pellets. Researchers speculate that this is likely due to current patterns in Lake Huron (Zbyszewski and Corcoran 2011). Further investigation is needed to determine the extent and distribution of these plastic pellets on the shorelines of the other Great Lakes, as well as their potential impacts to the region.

Besides being an eyesore and degrading the aesthetics of coastal environments, land-based marine debris typically impacts humans and the environment in several ways. In addition to entanglement, wildlife can also ingest land-based marine debris, whether through the item being mistaken for food or the animal's accidental ingestion with natural food items. Debris ingestion may lead to loss of nutrition, internal injury, intestinal blockage, starvation, and death.

Humans are also impacted by land-based marine debris. Human health and safety becomes a concern with unsanitary forms of marine debris, such as medical waste, as well as encounters with unsafe types, such as broken glass. Economic impacts are increasingly a concern. These impacts are felt by those whose livelihoods are linked to the water, yet in many cases, the costs remain unknown. Less commonly considered are the impacts to navigation through the blockage of intake valves on boats and the ability of debris to transport alien or invasive species.

The marine debris community in the Great Lakes first came together at a one-day convening hosted by the John G. Shedd Aquarium in Chicago, IL on July 22, 2011. Through a NOAA Office of Education grant, the Shedd Aquarium worked with the NOAA Marine Debris Program and the Alliance for the Great Lakes to bring together a diverse group to discuss the issues related to marine debris in the region. Participants identified a number of issues associated with Great Lakes debris, then grouped them into nine broad categories and prioritized them for action. One of the top-tier issues they identified was the need to further refine the scope of the problem and to better define what is currently known on debris issues. In an effort to move forward with the results from the workshop in July 2011, the NOAA Marine Debris Program coordinated a follow-up two-day workshop on December 1-2, 2011.

At the Great Lakes Marine Debris Workshop in December of 2011, NOAA and other federal and state agencies, and non-governmental organizations worked to develop a collective vision statement for a regional action plan, further define the state of knowledge on land-based debris, derelict fishing gear, and sawmill debris, and identify knowledge gaps (Opfer 2011). Land-based debris discussions centered on data collected by the Alliance for the Great Lakes, as well as Western University in Ontario. The final vision and mission statements for the framing of a future action plan were refined post-workshop by a small working group and are as follows:

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

***Mission Statement*: 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.**

Recognizing that marine debris is a global problem, the wider marine debris community came together at the 5th International Marine Debris Conference in 2011 and developed the *Honolulu Strategy*. This strategy document is a framework document and is intended to be used as: 1) A planning tool for developing or refining spatially or sector-specific marine debris programs or projects; 2) A common frame of reference for collaboration and sharing of best practices and lessons learned; and 3) Monitoring tool to measure progress across multiple programs and projects (NOAA and UNEP 2011). As such, the *Honolulu Strategy* was used as guidance for this Great Lakes workshop.

Workshop Structure

Following the December 2011 workshop, it was evident that there is more known about land-based marine debris in the Great Lakes than all other classifications or types. To further efforts to address this debris type and meet our vision and mission statements, a workshop and series of follow-up webinars were held to develop a strategic action plan. Participants included NOAA, other federal and state agencies, local groups, academic institutions, and non-governmental organizations. Some stakeholders participated via webinar at the workshop.

Workshop Objectives:

- Develop realistic goals and objectives to address land-based marine debris in the Great Lakes. At the conclusion of the workshop, groups engaged in land-based marine debris issues in the regions will have the ability to use the publicized goals to prioritize their own internal plans and make significant headway in addressing this issue.
- Initiate the brainstorming of actions to meet developed goals and objectives. These draft actions will be further refined and organizations will have the opportunity to commit to actions at follow-up meetings.
- Connect federal agencies, states, tribal nations, and non-governmental organizations in the Great Lakes region to identify potential opportunities for collaboration related to marine debris.
- Regionally support and contribute to the *Honolulu Strategy*, specifically Goal A: Reduced amount and impact of land-based sources of marine debris introduced into the sea; & Goal C: Reduced amount and impact of accumulated marine debris on shorelines, in benthic habitats, and in pelagic waters.

The two day workshop was held May 22-23, 2013 in Cleveland, OH at the City of Cleveland's Sustainability Office and hosted by the NOAA Marine Debris Program, the Alliance for the Great Lakes, and Old Woman Creek National Estuarine Research Reserve (NERR) (see Appendix I agenda, and Appendix II participants). The workshop was facilitated by Heather Elmer from Old Woman Creek NERR.

The beginning of the first day included a review of national marine debris issues and in the Great Lakes, with particular focus on land-based marine debris, background information on the *Honolulu Strategy*, an overview example of a marine debris action plan from the state of Hawaii (NOAA 2010), and a review of past meetings and our current step in the strategic and action plan development process.

Participants then walked through the strategic planning process with the use of a NOAA job aid (NOAA 2013). In preparation for the first round of small group work, the group reviewed goal statements and received background what they are, why groups have them, and some examples (Appendix III).

The largest portion of the first day was spent on developing goals for the land-based debris strategic plan. Participants were divided into breakout groups of 4-6 people and were instructed to follow Job Aid 2: Goal Development Worksheet (NOAA 2013). Each group member filled out the worksheet to the best of their ability, and included information on audience, the particular niche for their organization, and a list of outcomes each organization is working toward. The small groups then discussed these worksheets and developed draft goals from the commonalities and unique ideas.

Groups were then brought back together to report out and analyze similarities and differences between the goals developed by the breakout groups. Goals were synthesized or merged and each draft goal was discussed. At the end of the discussion, a dot poll was conducted to determine which goals were fully supported or potentially the most important to focus on during the remaining workshop time. To achieve this, everyone in the room was given 12 sticky dots and instructed to put them next to whichever goals they support. Those participants participating via webinar were asked to gauge their support through an online poll.

At the end of the first day, participants were able to visit Flotsam & Jetsam, two new boats used by the Port of Cleveland to remove floating debris from the Cuyahoga River and the downtown Cleveland Lake Erie shoreline. Both boats have the ability to scoop or crane debris, which is then placed in onboard disposal containers. The debris collected is then transferred to sites along the shore for pickup. It is a unique way to remove land-based debris in the community.

Figure 2. Workshop participants viewing the Port of Cleveland cleanup vessels.
Credit: NOAA MDP

During the second day of the meeting, goals were reviewed from the day before and SMART (Specific Measurable Audience Realistic Time-bound) objectives were defined with examples. Participants were then broken up into three groups and assigned a goal from the day before. Each group was tasked in developing SMART objectives for their assigned goal. On this day, objectives were only developed for goals 1-3. Objectives for goals 4 and 5 were developed at two follow-up webinars on July 9 and 30, respectively. Developed objectives for each goal were discussed, moved, and refined where necessary.

Lastly, workshop participants were given the opportunity to brainstorm potential action strategies under each objective. These action strategies are the specific steps that organizations could undertake to achieve the objective and goal. Draft actions will be further discussed and expanded upon at a future meeting.

The workshop finished with a discussion on next steps. Goals 4 & 5 webinars were tentatively scheduled and a timeline was presented for the completion of the land-based debris plan.

Results

Goals

There were five themes that were in the draft goals from the first day's breakout groups. These themes included: behavior change, research, removal, collaboration, and policy. The goals were refined and structured around these five themes.

The following goals were developed and refined to address land-based marine debris in the Great Lakes:

Goal 1: Knowledge gaps are identified and filled through research and monitoring of land-based marine debris.
Goal 2: A science-based and strategic approach is used to guide land-based marine debris policy and management decisions in the Great Lakes.
Goal 3: Land-based marine debris is prevented and reduced through an educated and involved community.
Goal 4: The impacts of land-based marine debris are reduced through removal and tracking efforts.
Goal 5: Strategic partnerships are developed to add value and invest resources to address Great Lakes land-based marine debris.

Results of polling indicated that Goal 3 was of highest priority for participants and Goals 1, 2, and 4 also ranked strongly. Goal 5 scored the lowest in the poll.

Objectives & Potential Action Strategies

The following objectives and potential actions were drafted under each of the above goals. Potential action strategies will be further refined at future meetings.

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

- *Objective 1*: By the end of 2015, develop a platform for researchers to collaborate on Great Lakes marine debris research.
    - *Potential Action Strategies*:
        - Create a web-based repository/forum to identify funding opportunities, problems, etc. This would include international opportunities.
        - Examine existing platforms to determine future use
        - Identify user preferences of the research community
        - Examine feasibility of different options
        - Explore use of the NOAA MDP Clearinghouse as a platform
- *Objective 2*: By 2015, convene researchers to foster partnerships and collaboration
    - *Potential Action Strategies*:
        - Examine venues and opportunities (ex. conferences, non-marine debris opportunities, etc.)
        - Set up round-table webinars
        - Identify the expertise that should be involved and target for inclusion
        - Connect with global marine debris community through NOAA
        - Identify a potential lead/convener
        - Identify potential funding sources for any in-person convening.
- *Objective 3*: Over the next five years, create summary documents of existing research on land-based marine debris and key data gaps for research community.
    - *Potential Action Strategies:*
        - Engage Great Lake management communities to help prioritize relevant research topics.
        - Identify potential funding sources
        - Identify a lead for the effort
        - Publish results in peer-reviewed literature
        - Complete synthesis of all land-based debris literature globally
        - Assess existing synthesis papers
        - Identify potential collaborators on the paper(s)
- *Objective 4*: Through 2018, ensure data collection consistency and quality assurance by multiple users.
    - *Potential Action Strategies:*
        - Share recommended standardized protocols
        - Identify and compare protocols that are already in use
        - Develop quality assurance standards
        - Identify obstacles or challenges within quality assurance

        - Establish training opportunities or resources to share across organizations.
- *Objective 5*: Through 2018, engage Great Lakes management communities to prioritize and foster implementation of relevant research topics.
    - *Potential Action Strategies*:
        - Identify appropriate communities and platforms for communication
        - Identify which spatial scale is effective
        - Identify problems that could be addressed/researched from management input
        - Find a leader or collaborators on the efforts
        - Inform research community and funding sources of manager needs

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 1*: By the end of 2016, create summary document of existing land-based marine debris policies and management systems in the Great Lakes.
    - *Potential Action Strategies*:
        - Develop surveys for agencies/organizations to identify those policies that are related to marine debris/litter
        - Identify funding sources and fellowship/graduate programs that could support the activity. Might be good for law student intern.
        - Evaluate the summary to identify potential target/weak areas and those that are successful.
- *Objective 2*: Share the developed land-based marine debris action plan with policy and management community upon its completion.
    - *Potential Action Strategies*:
        - Present action plan at relevant conferences
        - Identify relevant management and policy stakeholders

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

- *Objective 1*: By 2018, develop a social marketing plan, including 10 communication products to address land-based marine debris in the Great Lakes.
    - *Potential Action Strategies*:
        - Evaluate effectiveness and impact of existing programs (ex. recycling, etc.) and littering behavior on national and regional level
        - Evaluate different communication methods
        - Identify funding sources and resources as well as team to lead
        - Perform public-opinion research/focus groups
        - Identify social scientists at universities to collaborate with
        - Review existing research on public opinions/values in the Great Lakes (ex. Biodiversity Project)
        - Conduct targeted research to understand barriers
        - Design & implement programs to achieve behavior change using compiled information and research results.

        - Create a summary of current marine debris status and trends in the Great Lakes for public and policy makers
        - Develop a handout for local sewer/water districts to include in bills
        - Develop a short public service announcement
        - Create a twitter account for Flotsam and Jetsam
        - Develop social networking tools
        - Investigate and make connections to those organizations that work on beach health (ex. impact brochure).
        - Storm drain stenciling/stickers with messaging
        - Investigate magnetic messaging or sand graffiti
- *Objective 2*: Conduct 5 informal education activities on land-based debris per year, per lake, to the general public.
    - *Potential Action Strategies:*
        - Coordinate with a Beach Ambassador Program
        - Organize an annual Boat Float
        - Community stops during research cruises
        - Coordinate outreach events with area museums or aquariums (ex. visiting scientist)
        - Put up displays at local fairs
        - Connect with media outlets (ex. weather forecasts)
- *Objective 3*: Conduct 5 formal education activities per year, per lake to targeted audiences.
    - *Potential Action Strategies:*
        - Host regional webinars for education/outreach professionals
        - Coordinate with other existing programs and resources (Keep America Beautiful – Litter in Place, Hi-Cone Ring Leader Program, Great Lakes in My World)
        - Host a teacher workshop or class at Stone Laboratory
        - Present at teacher in-service days at schools
        - Identify funding sources for field trips
- *Objective 4*: By the beginning of 2015, conduct a needs assessment for education (formal & informal) to inform the Great Lakes outreach community.
    - *Potential Action Strategies:*
        - Identify target audiences
        - Inventory what is currently available
        - Create a repository or share existing information
        - Engage target audiences
        - Use assessment to identify collaboration and network opportunities to identify gaps and program and regional needs.
- *Objective 5*: By the end of 2015, launch 1 awareness campaign for Great Lakes communities regarding land-based marine debris.
    - *Potential Action Strategies*:
        - Develop consistent messaging
        - Identify partnership opportunities
        - Evaluate existing campaigns that could be leveraged

        - Engage a marketing expert to assist in the development of the campaign
        - Develop a brand

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

- *Objective 1*: By 2018, bi-nationally record and report count and weight (in tons) of land-based marine debris removed from Great Lakes shorelines by volunteer programs.
    - *Potential Action Strategies*:
        - Investigate Canadian volunteer program reporting
        - Gather beach grooming data
        - Engage International Joint Commission
        - Identify centralized organization that will coordinate and host data
- *Objective 2:* By 2018, develop and publish recommendations or best practices for removing land-based marine debris.
    - *Potential Action Strategies:*
        - Investigate similarities between, and use of existing methods.
        - Identify lead organization
        - Incorporate land-based marine debris best management practices into Clean Marina guide
- *Objective 3:* Within 5 years, target removal efforts towards land-based marine debris items or types that are expected to have the greatest impact or which are most abundant in number.
    - *Potential Action Strategies:*
        - Investigate and identify debris quantities and impacts
        - Work with sewer treatment plants on designing catchment for microplastics
        - Partner with industry on targeted removal projects
- *Objective 4*: Review and prioritize storm water control practices at 5 municipal districts in the Great Lakes by 2018.
    - *Potential Action Strategies:*
        - Train storm-water professionals on land-based marine debris impacts and removal options
        - Include stormwater groups in future meetings
        - Investigate what information is available and if it is already tracked
        - Engage Ohio Coastal Training Program to assist
- *Objective 5*: Create a natural disaster preparedness plan for land-based marine debris in the Great Lakes within 5 years.
    - *Potential Action Strategies:*
        - Review lessons-learned from Hurricane Sandy
        - Review preparedness plans from other regions
        - Coordinate with Coast Guard and FEMA

- *Objective 6*: By 2018, remove 200 tons of land-based marine debris from Great Lakes environments.
    - *Potential Action Strategies:*
        - Understand current baseline of land-based marine debris removed by volunteers (ex. ICC, Adopt-a-Beach)
        - Identify funding opportunities and potential projects

Goal 5: Strategic partnerships are developed and maintained to add value and invest resources to address Great Lakes land-based marine debris.

- *Objective 1:* Within 5 years, identify and secure new partners and resources that may have a role in addressing land-based marine debris in the Great Lakes
    - *Potential Action Strategies:*
        - Create a dynamic inventory list and keep it up to date
        - Follow-up with identified partners to engage
        - Identify linkages and contacts in non-traditional industries
        - Develop regular communication platforms
- *Objective 2:* Through 2018, identify and work through existing partnerships, networks, and resources to address land-based marine debris in the Great Lakes.
    - *Potential Action Strategies:*
        - Promote successful partnerships, networks, etc.
- *Objective 3*: Over the next 5 years, develop two strategic partnerships to address potential sources of land-based marine debris.
    - *Potential Action Strategies*:
        - Investigate partnership opportunities for product material changes as well as disposal options (ex. recycling) of products
        - Engage waste-management organizations
- *Objective 4*: Within the first 2 years of the plan, identify one national strategic partnership that can be adopted at the regional level.
    - *Potential Action Strategies*:
        - Reach out to other regions to identify strategic partnerships
        - Evaluate successes from other regions

Next Steps

At the end of the two-day workshop, a timeline for follow-up actions was presented. Because goals 4 & 5 were not discussed at this meeting, it was determined that objectives for these two goals would be developed in two follow-up webinars before the end of July. The completed first draft of these proceedings was scheduled for September.

The potential action strategies that came out of this workshop will be further refined into a formal action plan to address land-based marine debris in the Great Lakes at a workshop in December 2013 or January 2014. During this future workshop, organizations will commit to accomplishing specific actions strategies under each of the established objectives. For

each action strategy, partners and potential funding sources will be identified, cost and duration will be estimated, and a lead organization will be named.

References

Arthur, C., J. Baker and H. Bamford (eds). 2009. Proceedings of the International Research Workshop on the Occurrence, Effects and Fate of Microplastic Marine Debris. Sept 9-11, 2008. NOAA Technical Memorandum NOS-OR&R-30.

National Oceanic and Atmospheric Administration, Coastal Services Center. 2013. Writing Your Strategic Plan: Social Science Tools for Coastal Programs. Social Science Workbook Series.

National Oceanic and Atmospheric Administration, Marine Debris Program. 2010. Hawaii Marine Debris Action Plan. Honolulu, HI. Prepared by TetraTech EMI (Contract No. WC133F-04-CQ-0003).

National Oceanic and Atmospheric Administration, Marine Debris Program and United Nations Environmental Program. 2011. The Honolulu Strategy: A Global Framework for Prevention and Management of Marine Debris.

Opfer, S.E. (ed.). 2012. Proceedings of the Great Lakes Marine Debris Workshop. December 1-2, 2011. NOAA Technical Memorandum NOS-OR&R-40.

Zbyszewski, M. and P.L. Corcoran 2011. Distribution and degradation of fresh water plastic particles along the beaches of Lake Huron, Canada. *Water Air Soil Pollut*. 220: 265-372.

Appendix I – Workshop Agenda

Great Lakes Land-Based Debris Workshop
May 22-23, 2013
Sustainable Cleveland Center
230 W. Huron Road, Suite 100.31, Cleveland, OH 44113

Objectives & Outcomes:

- Develop realistic goals and objectives to address land-based debris in the Great Lakes. At the conclusion of the workshop, groups engaged in land-based debris issues in the region will have the ability to use the publicized goals to prioritize their own internal plans and make significant headway in addressing this issue.
- Initiate the brainstorming of actions to meet developed goals and objectives. These draft actions will be further refined and organizations will have the opportunity to commit to actions at follow-up meetings.
- Connect federal agencies, states, tribal nations, and non-governmental organizations in the Great Lakes region to identify potential opportunities for collaboration related to marine debris.
- Regionally support and contribute to The Honolulu Strategy. The Honolulu Strategy sets forth a results-oriented framework of action with the overarching international goal to reduce impacts of marine debris over the next 10 years. Outcomes of this workshop will specifically support Goal A: Reduced amount and impact of land-based sources of marine debris introduced into the sea; & Goal C: Reduced amount and impact of accumulated marine debris on shorelines, in benthic habitats, and in pelagic waters.

Target Audience: Representatives from federal, state, tribal, and nongovernmental organizations directly involved in marine debris activities in the Great Lakes, including those with expertise on land-based debris.

Facilitators: Sarah Opfer, Jamie Cross, Heather Elmer

May 22	**Sustainable Cleveland Center, Suite 100.31**
8:30 – 9:00am	**Registration & Breakfast**
9:00-9:45am	**Welcoming remarks and introductions** • Intros • Venue logistics • Ground rules • Review agenda and meeting objectives

9:45 – 10:45am	**Marine Debris – Big Picture and Background on Previous Efforts** – Sarah Opfer & Jamie Cross
10:45 – 11:00 am	**BREAK**
11:00 – 11:30am	**Strategic Plan Overview and Background** – Heather Elmer
11:30am – 12:15pm	**Introduction to Developing Goals**
12:15 – 1:30	**LUNCH – On-Site**
1:30 – 2:45pm	**Developing Goals** • Develop a list of goals which will fit achieve our mission and vision.
2:45 – 3:00pm	**BREAK**
3:00 – 3:15pm	**Developing Goals Cont. - Voting**
3:15 – 4:00pm	**Check In and Wrap Up**
4:00pm	**Adjourn**
5:00pm	**Dinner (Place TBD)**

May 23	**Sustainable Cleveland Center, Suite 100.31**
8:00 – 8:30am	Breakfast
8:30 – 9:00am	**Recap of Day 1**
9:00 – 10:00am	**Defining Objectives** • Introduction to developing objectives • Development of objectives under each goal.
10:00 – 10:15	**BREAK**

10:15 – 11:30	**Defining Objectives Cont.** • Report out of objectives • Discussion & refinement
11:30 – 12:00	**General Check-in**
12:00 – 1:00	**LUNCH**
1:00-2:00	**Action Development/Brainstorm** • Brainstorm list of actions to achieve objectives
2:00-2:15	**BREAK**
2:15 – 3:30	**Action Development/Brainstorm Cont. & Next Steps**
3:30-4:00	**Wrap-up** • Evaluation and final check-in

Appendix II – Participant List

Todd Breiby
Coastal Nonpoint and Education Coordinator
Wisconsin Coastal Management Program
101 East Wilson Street, 9th floor
PO Box 8944
Madison, WI 53708
608-261-6349
todd.breiby@wisconsin.gov

Keith Christman
Managing Director, Plastics Markets
American Chemistry Council
700 2nd Street NE
Washington DC 20002
202-249-6610
Keith_christman@americanchemistry.com

Patricia Corcoran
Associate Professor
Department of Earth Sciences
Western University in Ontario
1151 Richmond St.
London, Ontario, Canada N6A 5B7
1-519-661-2111 x.86836
pcorcor@uwo.ca

Jamie Cross
Adopt-a-Beach™ Manager
Alliance for the Great Lakes
41 Washington Ave., St. 280D
Grand Haven, MI 49417
616-850-0745 x12
jcross@greatlakes.org

Brenda Culler
Public Information Officer, Internet and Education Coordinator
Ohio Department of Natural Resources Office of Coastal Management
105 West Shoreline Drive
Sandusky, OH 44870
419-626-7980 x4100
Brenda.culler@dnr.state.oh.us

Nate Drag
New York Outreach Coordinator
Alliance for the Great Lakes
PO Box 1172
Buffalo, NY 14213
716-261-9393
ndrag@greatlakes.org

Heather Elmer
Ohio DNR, Division of Wildlife
Old Woman Creek National Estuarine Research Reserve
2514 Cleveland Road East
Huron, OH 44839
419-433-4601
Heather.elmer@dnr.state.oh.us

Joan Eaglesham
Lake Huron Centre for Coastal Conservation
eaglejo@me.com

Tova Handelman
Ocean Trash Scientific Intern
Ocean Conservancy
1300 19th St. NW, Suite 800
Washington D.C. 20036
202-280-6288
thandelman@oceanconservancy.org

Julie Hoganson
Recycling Coordinator/Marketing Associate
Hi-Cone
1140 W. Bryn Mawr
Itasca, IL 60143
630-438-5208
jhoganson@hi-cone.com

Nancy Hughes
Sustainability, Compost & Recycling Coordinator
Cleveland Metroparks Zoo
3900 Wildlife Way
Cleveland, OH 44109
206-661-6500 x4508
neh@clevelandmetroparks.com

Cathi Lehn
Program Manager
Cuyahoga River Community Planning Organization
1299 Superior Ave. E.
Cleveland, OH 44114
216-241-2414 x307
clehn@cmnh.org

Hyle Lowry
Ohio Outreach Coordinator
Alliance for the Great Lakes
PO Box 552
Chagrin Falls, OH 44022
216-630-8140
hlowry@grealakes.org

Lorena M. Rios Mendoza
Assistant Professor
Department of Natural Sciences/Chemistry
University of Wisconsin-Superior
Belknap and Catlin, PO Box 2000
Superior, WI 54880
715-394-8205
lriosmen@uwsuper.edu

Kristen Mitchell
Research Associate
University of Waterloo
Earth and Environmental Science
200 University Ave W
Waterloo, ON N2L 3G1
1-519-888-4567 x31327
Kristen.mitchell@uwaterloo.ca

Sarah Opfer
Great Lakes Regional Coordinator
NOAA Marine Debris Program
240 W. Lake St. - Unit C OSU Extension
Oak Harbor, OH 43449
419-898-3631
sarah.opfer@noaa.gov

Dianna Parker
Legislative and Communications Specialist
NOAA Marine Debris Program
1305 East-West Hwy
Silver Spring, MD 20910
301-713-4248 x103
dianna.parker@noaa.gov

Joe Prada
Marketing Assistant
Greater Cleveland Aquarium
FirstEnergy Powerhouse
2000 Sycamore St.
Cleveland, OH 44113
216-862-8803
jprada@greaterclevelandaquarium.com

Philena A. Seldon
Outreach and Education Coordinator
Mayor's Office of Sustainability
230 W. Huron Rd., Suite 100.31
216-664-2801
pseldon@city.cleveland.oh.us

Stephanie Swart
AOC Coordinator
Office of the Great Lakes, Michigan Department of Environmental Quality
525 West Allegan, P.O. Box 30473
Lansing, MI 48909-7973
517- 335-6721
swarts@michigan.gov

James White
Director, Sustainable Infrastructure Programs
Cleveland-Cuyahoga County Port Authority
1375 E Ninth Street, Suite 2300
Cleveland, OH 44114
216-377-1337
James.white@PortofCleveland.com

Kim Winslow
Resource Planning Analyst
Ohio Sea Grant/Stone Lab
1314 Kinnear Rd., Area 100
Columbus, OH 43212
614-292-8949
Winslow.52@osu.edu

Appendix III – Presentation

Great Lakes Marine Debris Action Plan

A collaborative effort

Objectives & outcomes

- Develop realistic goals and objectives to address land-based debris in the Great Lakes.
- Provide regional groups engaged in land-based debris issues the ability to use publicized goals to prioritize plans and make headway in addressing this issue.
- Brainstorm actions to meet goals and objectives.
- Connect agencies and organizations to identify potential opportunities for collaboration related to marine debris.
- Support and contribute to The Honolulu Strategy.

Ground rules

1. The meeting belongs to YOU and its success rests largely with you.
2. Enter into discussions ENTHUSIASTICALLY.
3. GIVE FREELY of your experiences that focus on the issues at hand.
4. Say what you THINK to the group. (Private conversations while someone else is speaking are distracting)
5. APPRECIATE the other person's point of view.
6. BE PROMPT in RETURNING from breaks.
7. Be MINDFUL of Webex participants – please raise your hand
8. Turn OFF cell phones

What is Debris?

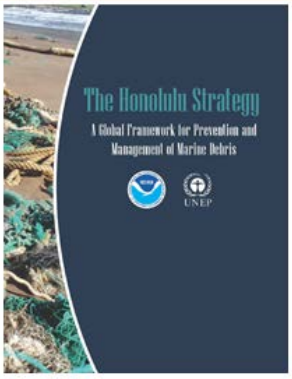
- **Marine Debris**: *Any persistent solid material that is manufactured or processed and directly or indirectly disposed of or abandoned into the marine environment and the **Great Lakes**.*
- Marine debris enters the water in many ways.
- One of the most harmful form of debris – ***Derelict Fishing Gear***- lost or abandoned fishing gear that continues to trap fish and other marine resources.
- Land-Based Debris: Debris generated on land can be blown, swept, or washed out to sea. Sources include: littering, dumping in rivers and streams, and industrial losses such as spillage of plastic resin pellets during production, transportation, and processing.

The "So What" of Debris

Impacts

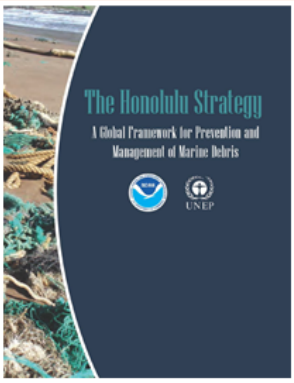
Honolulu Strategy

- How Developed:
  - 5th International Marine Debris Conference (2011) – catalyst
  - International Working Group
    - Conceptual Model/Results Chains
    - Input at 5IMDC
- Use
- What it does NOT do
- Land-Based Debris Goal



Honolulu Strategy

- How Developed
- Use:
  - Planning tool for developing or refining marine debris programs and projects
  - Common frame of reference for collaboration and sharing best practices and lessons learned
  - Tool to support development of a monitoring program to evaluate the effectiveness of the strategy across multiple programs and projects



Honolulu Strategy

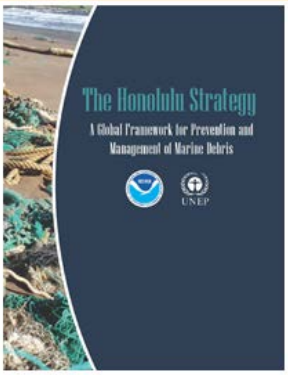
- How Developed
- Use:
- What it does NOT do:
  - Does not prescribe specific marine debris reduction targets or actions
  - These will depend on the social, cultural, environmental and economic context in which they are planned and implemented.

Honolulu Strategy

Table ES-1. Global Framework for Prevention and Management of Marine Debris
Goal A: Reduced amount and impact of land-based sources of marine debris introduced into the sea
Strategy A1. Conduct education and outreach on marine debris impacts and the need for improved solid waste management
Strategy A2. Employ market-based instruments to support solid waste management, in particular waste minimization
Strategy A3. Employ infrastructure and implement best practices for improving stormwater management and reducing discharge of solid waste into waterways
Strategy A4. Develop, strengthen, and enact legislation and policies to support solid waste minimization and management
Strategy A5. Improve the regulatory framework regarding stormwater, sewage systems, and debris in tributary waterways
Strategy A6. Build capacity to monitor and enforce compliance with regulations and permit conditions regarding litter, dumping, solid waste management, stormwater, and surface runoff
Strategy A7. Conduct regular cleanup efforts on coastal lands, in watersheds, and in waterways— especially at hot spots of marine debris accumulation

Honolulu Strategy

- http://5imdc.files.wordpress.com/2011/03/honolulustrategy.pdf



Current Regional Action Plans

- Hawaii Marine Debris Action Plan
  - Six workshops to develop strategic actions to address marine debris.
  - ID actions in five focus areas:
    - Research & Assessment
    - Outreach
    - Land-based Debris Prevention
    - Beach Cleanup
    - Reef (In-water) Debris Removal
  - Plan rolled out January 12, 2010 with over 75 partners and elected officials in attendance.
  - Vision Statement: The overall goal of the HI-MDAP is to reduce ecological, health and safety, and economic impacts of marine debris in Hawai'i by 2020.

Current Regional Action Plans

- Hawaii Marine Debris Action Plan

Activities	Possible Implementation & Support Partners
Goal 4 - Land-based Debris in Waterways Reduced	
Strategy 4.1: Conduct education and outreach targeted to specific audiences	EPA, DOH, CZM
• Define target audience for education and outreach activities	
• Develop education and outreach materials and activities by target audience	
• Conduct education and outreach activities	
Strategy 4.2: Improve effectiveness of stormwater permitting system	EPA, DOH
• Conduct review of existing permitting system to identify gaps and barriers to debris prevention	
• Develop measures to streamline process and incorporate best practices for debris prevention	
Strategy 4.3: Establish Total Maximum Daily Loads for trash for priority watersheds	EPA, DOH
• Identify priority watersheds for TMDL study for trash	
• Conduct TMDL study for trash in priority watersheds	
• Develop implementation plan with stakeholders	

Current Regional Action Plans

- Hawaii Marine Debris Action Plan

Goal 4 - Land-based Debris in Waterways Reduced

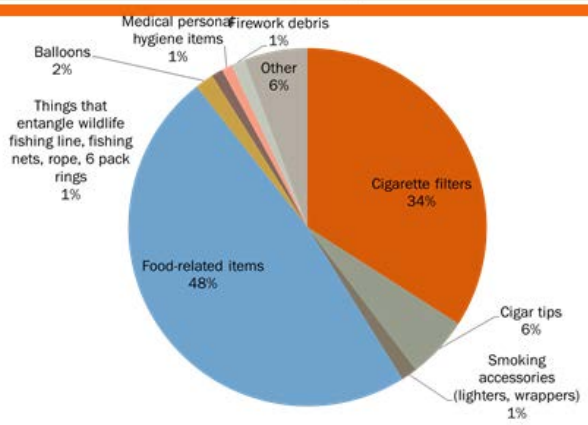
Strategy 4.1: Conduct education and outreach targeted to specific audiences

Action OE6. Develop signage on impacts of marine debris at public shorelines, marinas, piers, boat ramps, beach parks, storm drains, etc.	
Description: Littering on public beaches and marine facilities is a land based source of marine debris. Ocean recreational users leave behind plastic bottles, fishing line, beach toys, cigarette butts, and a variety of non-biodegradable trash that is washed into the marine environment with changing tides. Increased public awareness of the ecological, economic, and social impacts of littering on public beaches and marine facilities is needed through the development of a consistent and concise message that can be posted in high use areas.	
Debris Type: Land-based, Ocean-based	**Location:** State-wide, specific locations
Duration:	**Funding Status:** unfunded
Estimated Cost: ?	**Funding Sources:**
Lead Organization: ?	**Partner Organizations:**
Significance of expected outcomes: Reduced sources of marine debris from public recreational and marine facilities through increased awareness of ecological impacts	

Great Lakes Land-Based Debris

14

Alliance for the Great Lakes Adopt-a-Beach™ results 2012 (IL, IN, MI, NY, OH, WI)



Great Lakes Marine Debris Action Plan

- Develop strategic plan to address marine debris in the Great Lakes
  - Elements of a strategic plan:
    - Vision
    - Mission
    - Goals
    - Objectives
    - Actions
    - Performance Measures
  - Several meetings complete
    - Vision & mission statements developed at Great Lakes Marine Debris Workshop in 2011.
- Regionally support and contribute to Honolulu Strategy
- Developing action plans by debris type

Mission vs. Vision Statement

	Vision Statement	Mission Statement
Definition	Your vision for the future – where you want to be	How you will get there
Answers the question	Why are we here?	What do we do?
Time	Talks about the future	Talks about the present
Function	Inspires you to give your best and shapes the understanding of why you are doing what you are doing.	Lists the broad goals for which the organization/collaboration was formed. Prime function is internal, to define the key measure or measures of success.

Great Lakes Marine Debris Action Plan Vision and Mission

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.

How did we get here?

Great Lakes Marine Debris Workshop December 2011 – hosted by NOAA

- Workshop objectives
  - Establish a shared vision that each organization/entity will work towards in addressing the marine debris program in the Great Lakes
  - Establish the current state of knowledge
  - Connect federal agencies, states, tribal nations and non-governmental organizations in the Great Lakes region to identify potential opportunities for collaboration
- Background on current state of Great Lakes knowledge
  - **Land-based debris** (we will address this workshop)
  - Sawmill debris
  - Derelict fishing gear
  - Others?

Knowledge gaps identified

- Identification of greatest debris impacts
- Identification of all debris types
- Discover all sources of debris (include source tracking)
- Spatial distribution or extent of debris types
- Comprehensive understanding of all regulations
- Comprehensive understanding of existing research
- Methods of marine debris data collection
- Understanding of public's interest and perception
- Looking at social science research
- Open water and under water data collection

Complete list of gaps can be found in proceedings document for Great Lakes Marine Debris Workshop 2011

Vision statement development

- Clear picture of extent of marine debris in GL
- More involved and better educated public, willing to take action
- A measurable reduction in marine debris
- Improved stakeholder coordination
- Sustained funding for marine debris
- Coordination with LAMPs and GL Collaborative
- Better source control
- Established standard ways to collect data and measure impacts

Vision Statement Development – The headlines

Group 1

Marine debris greatly reduced through cooperative stakeholder group

Group 2

Collaborative plan identifies Great Lakes marine debris hot spots and study shows that harmful impacts have been reduced.

Great Lakes Marine Debris Action Plan Vision and Mission

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.

How did we get here?

Getting Started

- Why are we creating a Great Lakes marine debris plan?
- Who is the plan for?
- How does the plan relate to implementation activities within NOAA and other entities in the Great Lakes?

Strategic Plan

- A process to assess direction and priorities
- Requires time, effort, and deliberate steps to be done well
- Participants must
  - Gather and analyze information to detect trends and set directions
  - Decide on strategies, activities, resources, and evaluation methods to reach goals
- Ownership is key to success!
  - Include all parts of the organization or coalition in the writing process
- http://www.csc.noaa.gov/digitalcoast/publications/strategic-plan

EFFECT

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

CAUSE

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

- Goal – The result or achievement toward which effort is directed.
  - Broader and more general than an objective or outcome.
  - The goal is larger than the program or organization and may result from cumulative effect of many outcomes
- How many goals are needed?
  - No perfect number
  - Enough to reach vision and cover all contributions
  - Think about niche and outcome information

What do you see as your role or responsibility in marine debris management and planning?

- "I see education and outreach as a major role for me to play in the management of marine debris, e.g. Great Lake Erie Boat Float. I am also an active member of the City of Cleveland's Disposable Bag Working Group. This Group is looking into the possibility of introducing legislation to place a fee on disposable single-use bags."
- "To not only gather information about the problem, but also to disseminate that information to the multiple constituencies of our program. "Information" includes a basic understanding of the issue at hand as well as actions that can be taken to prevent the issue from worsening."

What do you see as your role or responsibility in marine debris management and planning?

- "Engaging local government to understand the impacts of marine debris and pollution from both an environmental and economic perspective."
- "Coordination among federal and state agencies."
- "Staying abreast of marine debris strategies in the Great Lakes and identifying areas where our organization can support the effort."
- "Informal education"

Developing Goals

Program →	Program A	Program B	Program C	Overarching Synthesis
Audience or target issue				Synthesis of program audiences
Niche				Synthesis of program niches
Outcome				Goal 1: Overarching goal derived from like outcomes
Outcome				Goal 2: Overarching goal derived from like outcomes
Outcome				Goal 3: Overarching goal derived from like outcomes

Developing Goals

Program →	Education & Outreach	Research	Stewardship	Overarching Synthesis
Audience or target issue	K-12 Teachers Visitors	Volunteers Community Stakeholders Visitors	Community stakeholders Visitors	K12 Teachers Visitors Volunteers Community Stakeholders Visitors
Niche	Building literacy with community stakeholders using hands-on activities	Facilitating users for the living laboratory	Managing the living laboratory	Community stakeholders have opportunities to learn about and interact with the living laboratory
Outcome	Neighbors visit, understand, and value the preserve.	A broad understanding of how to manage similar habitat for long-term sustainability and health is developed.	Volunteers and community stakeholders are implementing the preserve management plan.	**Goal 1:** *Community stakeholders understand and appreciate the natural environment of the preserve and volunteer to sustain it.*

Plan Outline

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...

Goal - Result or achievement toward which effort is directed.
Objective(s) - Standards of achievement for improvement in the existing condition
Strategies - activities, outputs, new approaches

Goal examples from other plans

Land-based debris in waterways is reduced

- Number of abandoned and derelict vessels decreased

Goal Development Exercise

- Potential goal thematic areas
  - Behavior change (education and source reduction)
  - Research
  - Removal
  - Collaboration
  - Policy

Proposed Goals

1. Knowledge gaps are identified and filled through research and monitoring on land-based debris.
2. A science-based approach is used to develop action plans and guide decision-making.
3. Land-based debris is prevented and reduced through an educated and involved Great Lakes community.
4. The impacts of land-based debris are reduced through removal and tracking efforts.
5. Strategic partnerships are developed to add value and invest resources to address Great Lakes land-based debris.

- **Objectives** define how goals will be achieved, establish standards of achievement in terms of proportionate improvement in the existing condition
  - **Specific** – Use specific verbs that describe observable change
  - **Measurable** – Add a numerical target– something that can be counted.
  - **Audience- or issue-directed** – Focus on changes within the audience or to the issue being addressed.
  - **Realistic and ambitious** – What is the plausible change within the time frame?
  - **Time-bound** – Set a time limit for achieving the objective

- Using the SMART formula write two to five objectives for each goal
- By_____,_____of_____will be able to _____

- Example:
  - In the next five years, three research projects will investigate the impacts of land-based debris on aquatic and their response to natural change and human activities will be initiated.
  - By 2016, develop, test, and deploy one new remote-sensing technology for detection of land-based debris in the Great Lakes.

- Strategies –Composite of activities and outputs designed to achieve outcomes
  - **Activities** – Those efforts or interventions designed and conducted to produce an outcome
  - **Outputs** – Tangible products and services resulting from activities
  - **Target population** – Individual, community, system, or other unit to which an activity or output is directed

Example strategies

- **Objective 2.1**: Two research projects that investigate coastal food webs and habitats, their underlying physical and biological processes, and their response to natural changes and human activities will be initiated on the preserve before this plan expires in three years.
- **Strategies**:

1. Provide grant funding for fellowships to investigate the ecology of estuarine and coastal habitats and food webs.
2. Research staff members will complete a site profile to provide context for future scientific studies.
3. Outreach and stewardship staff members will develop materials and recruit research scientists to examine natural system responses to human activities.

Measuring success

- Performance measures - objective quantitative variables related to a project's or program's purpose.
  - define what is important
  - provide feedback
  - provide action.
- Numerical targets in objectives can be used to develop performance measures.

Develop and implement the plan

- Next Steps:
  - Send out meeting documents (PP & job aids)
  - Evaluation Survey
  - Follow-up meetings:
    - 2 webex meetings
      - 1) Goal 4 Objectives - June
      - 2) Goal 5 Objectives - July
    - Workshop (Fall/Winter?)
      - Action commitments
      - Performance measures
- Estimated Timeline:
  - First Draft of Goals 1-3: August
  - Draft Goals 4-5: October
  - Final plan including actions, performance measures: March?

Wrap-up

- Developing performance measures
- Action commitments
- Follow-up calls
- Parking lot issues
- Evaluation and final check-in

Appendix IV – Full Text Great Lakes Land-Based Marine Debris Strategic Plan

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

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

- *Objective 1*: By the end of 2015, develop a platform for researchers to collaborate on Great Lakes marine debris research.
    - *Potential Action Strategies*:
        - Create a web-based repository/forum to identify funding opportunities, problems, etc. This would include international opportunities.
        - Examine existing platforms to determine future use
        - Identify user preferences of the research community
        - Examine feasibility of different options
        - Explore use of the NOAA MDP Clearinghouse as a platform
- *Objective 2*: By 2015, convene researchers to foster partnerships and collaboration
    - *Potential Action Strategies*:
        - Examine venues and opportunities (ex. conferences, non-marine debris opportunities, etc.)
        - Set up round-table webinars
        - Identify the expertise that should be involved and target for inclusion
        - Connect with global marine debris community through NOAA
        - Identify a potential lead/convener
        - Identify potential funding sources for any in-person convening.
- *Objective 3*: Over the next five years, create summary documents of existing research on land-based marine debris and key data gaps for research community.
    - *Potential Action Strategies:*
        - Engage Great Lake management communities to help prioritize relevant research topics.
        - Identify potential funding sources
        - Identify a lead for the effort
        - Publish results in peer-reviewed literature
        - Complete synthesis of all land-based debris literature globally
        - Assess existing synthesis papers
        - Identify potential collaborators on the paper(s)
- *Objective 4*: Through 2018, ensure data collection consistency and quality assurance by multiple users.
    - *Potential Action Strategies:*
        - Share recommended standardized protocols
        - Identify and compare protocols that are already in use
        - Develop quality assurance standards
        - Identify obstacles or challenges within quality assurance

        - Establish training opportunities or resources to share across organizations.
- *Objective 5*: Through 2018, engage Great Lakes management communities to prioritize and foster implementation of relevant research topics.
    - *Potential Action Strategies*:
        - Identify appropriate communities and platforms for communication
        - Identify which spatial scale is effective
        - Identify problems that could be addressed/researched from management input
        - Find a leader or collaborators on the efforts
        - Inform research community and funding sources of manager needs

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 1*: By the end of 2016, create summary document of existing land-based marine debris policies and management systems in the Great Lakes.
    - *Potential Action Strategies*:
        - Develop surveys for agencies/organizations to identify those policies that are related to marine debris/litter
        - Identify funding sources and fellowship/graduate programs that could support the activity. Might be good for law student intern.
        - Evaluate the summary to identify potential target/weak areas and those that are successful.
- *Objective 2*: Share the developed land-based marine debris action plan with policy and management community upon its completion.
    - *Potential Action Strategies*:
        - Present action plan at relevant conferences
        - Identify relevant management and policy stakeholders

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

- *Objective 1*: By 2018, develop a social marketing plan, including 10 communication products to address land-based marine debris in the Great Lakes.
    - *Potential Action Strategies*:
        - Evaluate effectiveness and impact of existing programs (ex. recycling, etc.) and littering behavior on national and regional level
        - Evaluate different communication methods
        - Identify funding sources and resources as well as team to lead
        - Perform public-opinion research/focus groups
        - Identify social scientists at universities to collaborate with
        - Review existing research on public opinions/values in the Great Lakes (ex. Biodiversity Project)
        - Conduct targeted research to understand barriers
        - Design & implement programs to achieve behavior change using compiled information and research results.
        - Create a summary of current marine debris status and trends in the Great Lakes for public and policy makers
        - Develop a handout for local sewer/water districts to include in bills
        - Develop a short public service announcement

        - Create a twitter account for Flotsam and Jetsam
        - Develop social networking tools
        - Investigate and make connections to those organizations that work on beach health (ex. impact brochure).
        - Storm drain stenciling/stickers with messaging
        - Investigate magnetic messaging or sand graffiti
- *Objective 2*: Conduct 5 informal education activities on land-based debris per year, per lake, to the general public.
    - *Potential Action Strategies:*
        - Coordinate with a Beach Ambassador Program
        - Organize an annual Boat Float
        - Community stops during research cruises
        - Coordinate outreach events with area museums or aquariums (ex. visiting scientist)
        - Put up displays at local fairs
        - Connect with media outlets (ex. weather forecasts)
- *Objective 3*: Conduct 5 formal education activities per year, per lake to targeted audiences.
    - *Potential Action Strategies:*
        - Host regional webinars for education/outreach professionals
        - Coordinate with other existing programs and resources (Keep America Beautiful – Litter in Place, Hi-Cone Ring Leader Program, Great Lakes in My World)
        - Host a teacher workshop or class at Stone Laboratory
        - Present at teacher in-service days at schools
        - Identify funding sources for field trips
- *Objective 4*: By the beginning of 2015, conduct a needs assessment for education (formal & informal) to inform the Great Lakes outreach community.
    - *Potential Action Strategies:*
        - Identify target audiences
        - Inventory what is currently available
        - Create a repository or share existing information
        - Engage target audiences
        - Use assessment to identify collaboration and network opportunities to identify gaps and program and regional needs.
- *Objective 5*: By the end of 2015, launch 1 awareness campaign for Great Lakes communities regarding land-based marine debris.
    - *Potential Action Strategies*:
        - Develop consistent messaging
        - Identify partnership opportunities
        - Evaluate existing campaigns that could be leveraged
        - Engage a marketing expert to assist in the development of the campaign
        - Develop a brand

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

- *Objective 1*: By 2018, bi-nationally record and report count and weight (in tons) of land-based marine debris removed from Great Lakes shorelines by volunteer programs.
    - *Potential Action Strategies*:
        - Investigate Canadian volunteer program reporting
        - Gather beach grooming data

        - Engage International Joint Commission
        - Identify centralized organization that will coordinate and host data
- *Objective 2:* By 2018, develop and publish recommendations or best practices for removing land-based marine debris.
    - *Potential Action Strategies:*
        - Investigate similarities between, and use of existing methods.
        - Identify lead organization
        - Incorporate land-based marine debris best management practices into Clean Marina guide
- *Objective 3:* Within 5 years, target removal efforts towards land-based marine debris items or types that are expected to have the greatest impact or which are most abundant in number.
    - *Potential Action Strategies:*
        - Investigate and identify debris quantities and impacts
        - Work with sewer treatment plants on designing catchment for microplastics
        - Partner with industry on targeted removal projects
- *Objective 4*: Review and prioritize storm water control practices at 5 municipal districts in the Great Lakes by 2018.
    - *Potential Action Strategies:*
        - Train storm-water professionals on land-based marine debris impacts and removal options
        - Include stormwater groups in future meetings
        - Investigate what information is available and if it is already tracked
        - Engage Ohio Coastal Training Program to assist
- *Objective 5*: Create a natural disaster preparedness plan for land-based marine debris in the Great Lakes within 5 years.
    - *Potential Action Strategies:*
        - Review lessons-learned from Hurricane Sandy
        - Review preparedness plans from other regions
        - Coordinate with Coast Guard and FEMA
- *Objective 6*: By 2018, remove 200 tons of land-based marine debris from Great Lakes environments.
    - *Potential Action Strategies:*
        - Understand current baseline of land-based marine debris removed by volunteers (ex. ICC, Adopt-a-Beach)
        - Identify funding opportunities and potential projects

Goal 5: Strategic partnerships are developed and maintained to add value and invest resources to address Great Lakes land-based marine debris.

- *Objective 1:* Within 5 years, identify and secure new partners and resources that may have a role in addressing land-based marine debris in the Great Lakes
    - *Potential Action Strategies:*
        - Create a dynamic inventory list and keep it up to date
        - Follow-up with identified partners to engage
        - Identify linkages and contacts in non-traditional industries
        - Develop regular communication platforms
- *Objective 2:* Through 2018, identify and work through existing partnerships, networks, and resources to address land-based marine debris in the Great Lakes.

    - *Potential Action Strategies:*
        - Promote successful partnerships, networks, etc.
- *Objective 3*: Over the next 5 years, develop two strategic partnerships to address potential sources of land-based marine debris.
    - *Potential Action Strategies*:
        - Investigate partnership opportunities for product material changes as well as disposal options (ex. recycling) of products
        - Engage waste-management organizations
- *Objective 4*: Within the first 2 years of the plan, identify one national strategic partnership that can be adopted at the regional level.
    - *Potential Action Strategies*:
        - Reach out to other regions to identify strategic partnerships
        - Evaluate successes from other regions

Penny Pritzker
United States Secretary of Commerce

Dr. Kathryn D. Sullivan
Acting Under Secretary of Commerce for Oceans and Atmosphere

Dr. Holly A. Bamford
Assistant Administrator, National Ocean Service