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THE FLOW OF...TRASH FREE WATERS

ISSUE 20

INSIDE THIS ISSUE

This newsletter is intended to provide the latest information to all of our Trash Free Waters (TFW) partners and friends.

The Flow...of Trash Free Waters is our opportunity to highlight recent successes, as well as shine a spotlight on news and other related items. It is produced by the U.S. Environmental Protection Agency, with support from IEc. Mention of commercial products, publications, or Web sites in this newsletter does not constitute endorsement or recommendation for use by the EPA, and shall not be used for advertising or product endorsement purposes.

HOW'S IT FLOWING?

Henderson Island Expedition - Monitoring Pollution at the End of the World by Dr. Hanna Dijkrsa, Howell Conservation Fund

Henderson Island, which is part of the Pitcairn Island group, is one of the most remote islands in the world. The island is located about halfway between South America and New Zealand and requires two days of sailing to reach from the nearest departure point. Despite the island's remoteness, it has become a magnet for floating ocean plastic due to a convergence of wind and currents. The 1.5-mile stretch of the island's East Beach is inundated with waste and is known as one of the most densely polluted beaches in the world despite having no permanent human population and hardly any visitors.

Figure 1 - Location of the Pitcairn Islands

In 2019, an expedition went to Henderson Island with the mission to clean up this polluted UNESCO World Heritage Site. A scientific study on the island found that the miniscule island was estimated to have billions of pieces of micro and nano plastic littering the shores. Though the mission to monitor waste and conduct a comprehensive beach clean-up succeeded, unfortunately the expedition was unable to get the bagged waste off the island due to unsafe water conditions.

Photo Credits: Hanna Dijkstra

Bagged trash and buoys prepared for removal during the 2024 expedition.

In 2024, a new expedition by Plastic Odyssey and Howell Conservation Fund was planned to finally remove the waste from East Beach and monitor how much more debris had accumulated since the 2019 clean-up. The 2024 expedition team found that the beach has continued to collect debris over the years. The team knew it was critical to collect data, and not just plastic, to tell the story of waste accumulation on remote islands.

Straining sand on East Beach revealed countless microplastic particles. Credit: Hanna Dijkstra

On the week-long visit to Henderson Island, the team conducted scientific studies, collected all

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HOW'S IT FLOWING?

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the new plastic that washed ashore (almost 8,000 pounds) and prepared the waste for removal. Notable findings include the staggering amount of fishing gear and maritime waste, suggesting that most of the beached trash came from boats. A brand audit on almost 1,000 PET bottles identified dozens of countries and brands from around the world. It is impossible to say if the bottles, buoys or nets were intentionally discarded or lost at sea, but these results stress the importance of maritime waste disposal policies. Finally, density studies confirmed that although plastic continues to accumulate on Henderson Island, significantly lower densities and weights were recorded, indicating the effectiveness of the 2019 beach clean-up (See Figure 2).

Howell Conservation Fund is working to publish the results of the scientific studies and develop training materials and guidelines to support the local community on Pitcairn Island in the management of marine plastic. Since the islands are so remote, empowering the residents of nearby islands with tools and knowledge to conduct studies and maximize cleanup efficiency will contribute to effective future management.

Bottles organized for analysis at East Beach. Credit: Hanna Dijkstra

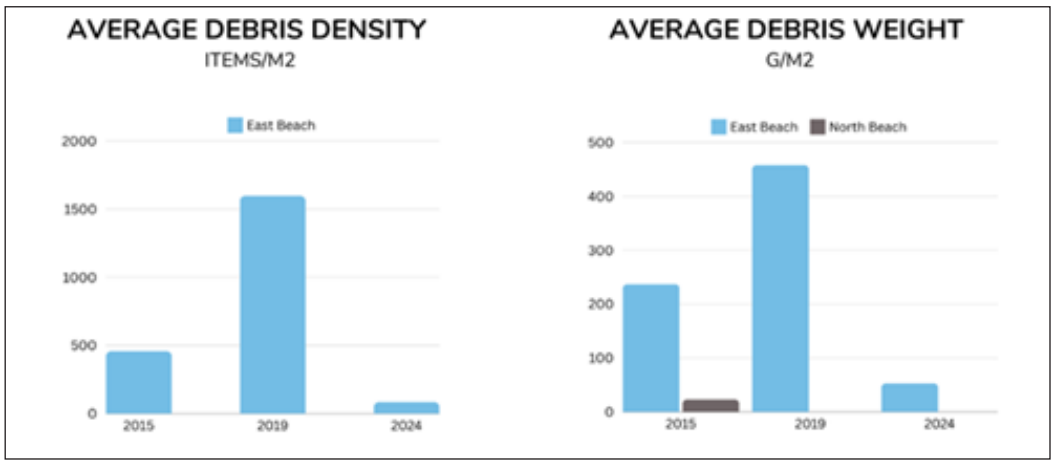

Figure 2: Data from Lavers & Bond (2017), Nichols et al. (2021) and the 2024 expedition

HOW'S IT FLOWING?

A Global Approach to Integrated Marine Debris Data Through the Integrated Marine Debris Observing System

A study by Borrelle et al. estimated that in 2016, up to 23 million metric tons of plastic waste entered the ocean and waterways around the world from land-based sources. This number does not include marine debris items not made of plastic, or ocean-based sources of marine debris (such as lost fishing gear and vessels). In 2021, the United Nations Environment Programme estimated that the total weight of plastics in the oceans ranged between 75 and 199 million tons. Although plastic is the most common type of solid waste material in the ocean — and is especially noteworthy because of its duration in the environment and its impacts on marine life — it is not the only material of concern.

Given the scale and impact of the marine debris issue, GEO Blue Planet, the Global Ocean Observing System and UNEP's Global Partnership on Plastic Pollution and Marine Litter jointly developed the Integrated Marine Debris Observing System, or IMDOS, to "provide guidance and coordination of a global sustained observing system for marine debris addressing knowledge gaps and diverse stakeholder needs with adequate data and information." IMDOS was formally launched during the June 2022 UN Ocean Conference in Lisbon. The idea was for IMDOS to enable the integration and synthesis of global marine debris monitoring and modelling efforts into indicators and decision-support tools through relevant data centers and knowledge platforms.

IMDOS established an Interim Steering Committee in 2022, which developed and adopted the IMDOS Strategy in November 2023. However, it is only now that the final, permanent IMDOS Steering Committee is being formed, with its first meeting to be held in January 2025. The steering committee will be comprised of experts representing various observing approaches, data management expertise, geographic balance and other criteria. The steering committee "aims to be an independent coordination body, responsible for overseeing the execution of strategic objectives." The steering committee will be made up of two sub-committees:

- The Advisory Committee providing advice on high level strategic directions and connections. It helps identify and, where possible, contribute resources. It is made up ex Officio members.
- The Work Programme Committee is responsible for coordinating IMDOS activities. It is made up of Task Teams chairs.

In addition to the steering committee, IMDOS will establish fourteen task teams – open to relevant experts – that will be organized around five thematic data groups, six technical coordination activities and three engagement activities.

Thematic Data Groups

	Partical Size	Observing Platform	Compartment
• Remote Sensing	Macro	Remote Sensing	Sea Surface
• Sea Surface Microplastics	Micro	In situ	Sea Surface
• Seafloor Litter	Macro	In situ	Seafloor
• Modeling	All	Modeling	Sea surface and Water Column
• Beach Litter	Macro	In situ (* remote sensing by drone)	Coastlines

Task Teams breakdown by category: Thematic Data, Technical Coordination, and Engagement

HOW'S IT FLOWING?

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Technical coordination activities

- **Data Harmonization and Management**
  Promote guidelines for harmonization, standardization, and quality control of MD data towards federated and interoperable data management systems
- **Design of Monitoring System**
  Provide recommendations on the design and evolution of a global MD observing system
- **Technical Innovations**
  Promote and integrate innovative MD observing initiatives.
- **Citizen Science in situ Monitoring**
  Promote and integrate citizen lead MD observing initiatives.
- **Professional Science in situ Monitoring**
  Give guidance on assessment and harmonization of MD monitoring methodologies
- **Development of Indicators**
  Provide expert support in the development of the definition of the Essential Ocean Variables and Indicators

Engagement activities

- **Data for Policy**
  Foster communication and synergies within the expanding MD community, and especially between researchers and decision-makers.
- **UN Global treaty**
  Foster communication and synergies within experts in the framework of the Global treaty negotiations and implementation
- **Regional Observing Systems/Groups**
  Foster communication and synergies within regional groups

Task Teams breakdown by category: Thematic Data, Technical Coordination, and Engagement

Once established, the steering committee and task teams will work towards a global and integrated marine debris monitoring system to enable scientists to assess the true extent of marine debris and provide informed guidance for effective actions by the myriads of actors involved in addressing this important issue.

REGIONAL PROJECT SUCCESS STORIES

R7: Trash Free St. Louis by Region 7 Environmental Finance Center at Wichita State University

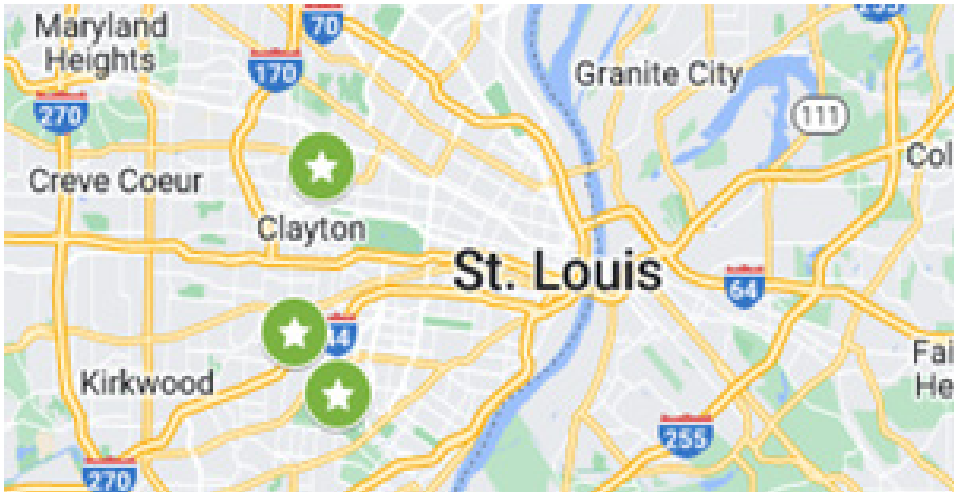
The Environmental Finance Center at Wichita State University and Missouri Confluence Waterkeeper, with additional support from Blue2Blue Conservation, partnered to conduct a study on in-stream litter. The purpose of the Trash Free St. Louis project was to facilitate cleaner rivers through targeted capture, collection and documentation of waterborne litter. The pilot program occurred throughout St. Louis, Missouri, in three streams that all flow into the Mississippi River. This pilot project was a collaborative effort among several community partners and local governments in St. Louis. The Trash Free St. Louis project was the first of its kind in EPA Region 7 and is a template for launching additional and more comprehensive programs for litter prevention and reduction.

This pilot project was designed to reduce floating debris entering the Mississippi River from three St. Louis urban waterways by collecting, quantifying and characterizing trash trapped by floating booms and has inspired further community outreach and education and an additional pilot program for Wichita, Kansas. Between the EPA Region 7 and Headquarters Trash Free Waters programs, $35,000 was provided to the Environmental Finance Center at Wichita State University to support the project.

In-stream Devices

Three devices were procured and installed in three tributaries in the St. Louis Metro area. At each location, Missouri Confluence Waterkeeper and volunteers installed a different type of in-stream litter collection device known as a "trash trap."

A trash trap is a floating boom that attaches easily to embankments, stormwater outfalls, canals or creeks. These booms are often made of buoys, foam floats or some other type of floatable device held together by rope or encased in a net or plastic. Sometimes these booms also include a cage structure to collect debris that would otherwise flow over the boom wall. All traps explored by the Environmental Finance Center are designed to stop floating debris before it reaches the main waterway creating a larger pollution problem. For this project, three options were selected:



Trash Trap locations in the greater St. Louis area.

Osprey Initiative's Litter Gitter Boom

Blue2Blue Conservation's Beaver Trash Dam

Asheville Greenworks' Trash Trout

REGIONAL PROJECT SUCCESS STORIES

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Volunteers removing litter from waterways and organizing it for data analysis

Community Engagement and Data Collection

Throughout the year of the project, volunteers participated in collection and categorization events at each location. Volunteers gathered, separated, counted, evaluated and logged the trash collected on data logs adapted from the Escaped Trash Assessment Protocol.

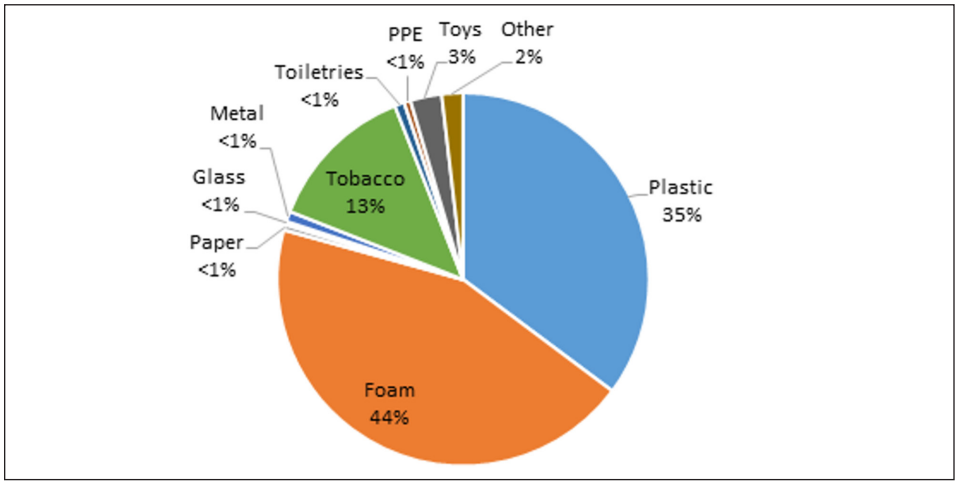
Data Results

Over the course of one year, 3,992 pieces of litter were counted and logged by volunteers. This reflects all pieces of litter pulled out of the waterways by the trash collection devices. The following data represent monthly collections and tallies except for months in which data was unavailable due to trash traps breaking away due to weather issues. Data is unavailable for a total of five monthly cleanouts across all traps.

Next Steps

The Environmental Finance Center at Wichita State University is working with environmental educators at Missouri Botanical Gardens to use the information from the Trash Free St. Louis project to inform the community about the data collected and how to reduce litter in St. Louis.

Additionally, the Environmental Finance Center is expanding on the Wichita Litter Study by conducting a similar Trash Free Waters project by using an Osprey Initiative Litter Gitter to study instream litter in Wichita. The Trash Free ICT methodology and project were adjusted from the Trash Free St. Louis project to accommodate the Wichita stream. This project is made possible by efforts from the Region 7 Environmental Finance Center at Wichita State University, Missouri Confluence Waterkeepers, Blue2Blue Conservation, St. Louis Aquarium Foundation, Brightside St. Louis, City of Maplewood and University City.



Data was organized by item type.

Material	Count	Intact	Partially Intact	Degraded
Plastic	1405	1216	97	92
Foam	1760	1184	82	494
Paper	19	12	7	0
Glass	11	8	0	3
Metal	36	28	8	0
Tobacco	522	511	2	9
Toiletries	34	32	2	0
PPE	22	22	0	0
Toys	109	108	1	0
Other	74	72	2	0
Total	**3992**	**3193**	**201**	**598**

Data was counted and assessed for condition.

REGIONAL PROJECT SUCCESS STORIES

GMD: Virtual Realty Trash Experience Final Report by Calista Mills, EPA Gulf of Mexico Division

Mississippi State University is using an immersive Virtual Reality approach to make marine debris education more interactive. The three-marine debris-related VR modules developed focus on: what marine debris is, what marine debris impacts are, and how to mitigate marine debris. The goal of the modules is to increase engagement with the problem and lead participants toward action for a solution. To validate the performance of the VR approach, researchers compared VR with traditional video-based education. The researchers measured sickness caused by the simulation, system usability, user experience, knowledge gained and motivation. The developed VR tool led to a significantly higher motivation for action and acceptable performance for sickness caused by the simulation, system usability and user experience. This implies that the VR tool has potential to lead to large scale prevention and management of marine debris among users. The VR headsets have been permanently installed in Mississippi State University-Coastal Extension and will continue to be used for marine debris related activities and outreach. The results of the VR study have been published in journal of Marine Pollution Bulletin.

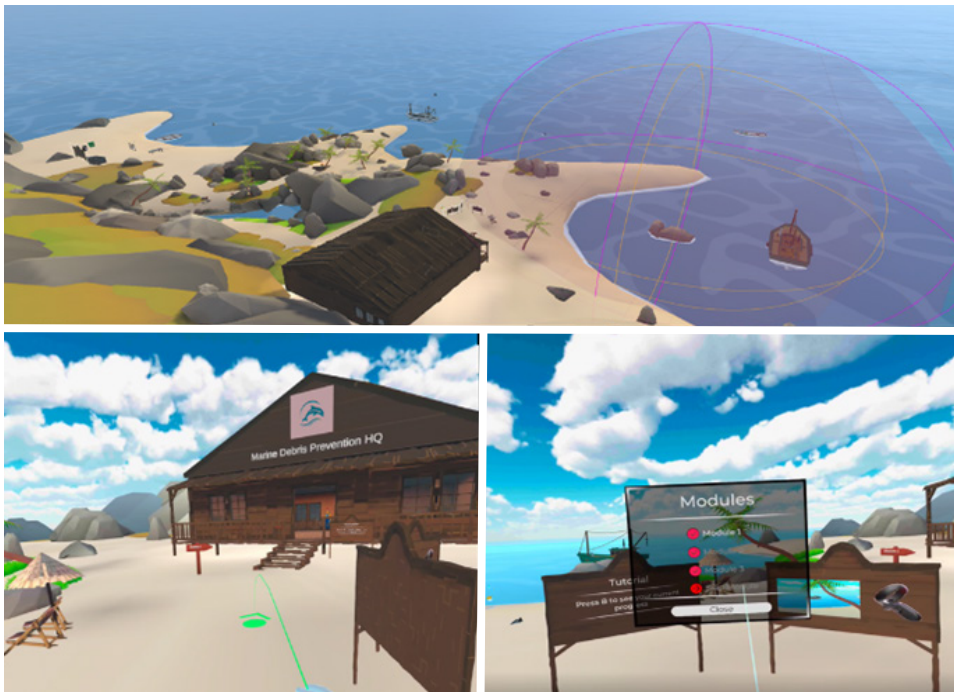


Figure 1. Marine Debris VR Module Overview and Starting Environment

Figure 2. What is Marine Debris Scenario Screenshots

In addition to using digital technology, the project employed in-stream debris removal technology. Partnering with Osprey Initiative, LLC, two Litter Gitters were installed in Biloxi, Mississippi, in Bayou Auguste and Keegan Bayou. The Litter Gitter is an instream device that collects floating litter and debris. Tactical cleanups were also completed in proximity to the Litter Gitters. In one year just over 1,000 pounds of litter was collected because of these efforts. Many factors were considered during the site selection of Litter Gitters which are important anywhere placement of the in-stream tech is being considered. The results of the site selection

REGIONAL PROJECT SUCCESS STORIES

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GMD: Virtual Realty Trash Experience Final Report by Calista Mills, EPA Gulf of Mexico Division

analysis involved to determine the appropriate placement of an in-stream collection device like the Litter Gitter was published in the journal of Sustainability.

This work was made possible through grant funding from the EPA Gulf of Mexico Division. The Gulf of Mexico Division is one of the EPA's Great Water Body Programs whose geographic focus is on the major environmental issues of the Gulf of Mexico region and its watershed. The Gulf of Mexico Division is committed to voluntary, nonregulatory actions and solutions that are based on sound scientific and technical information. For the latest on what is happening at Gulf of Mexico Division, including funding priorities, visit the EPA's Gulf of Mexico Division website.

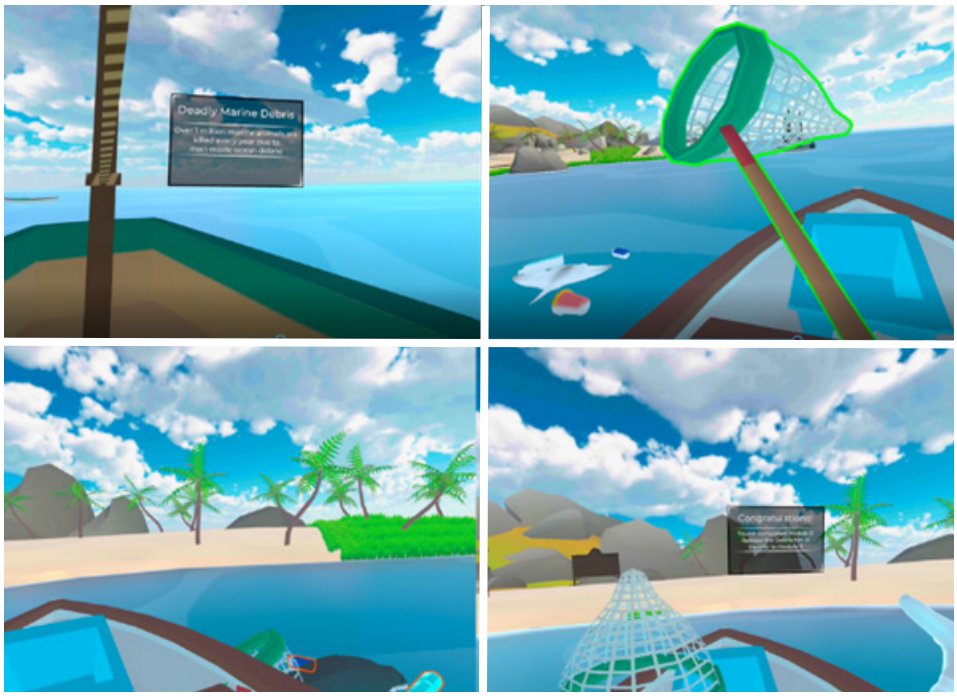


Figure 3. What are the impacts of marine debris Scenario Screenshot

Figure 4. How to mitigate Scenario Screenshot

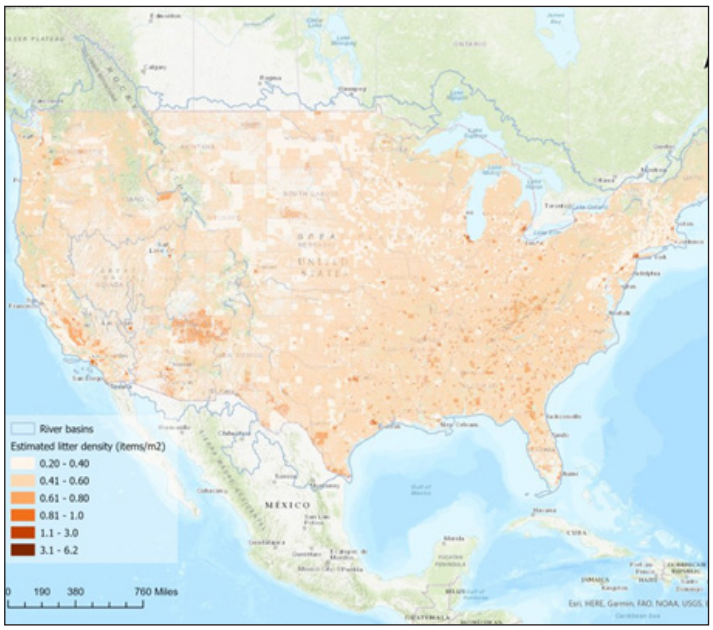
NEW AND FORTHCOMING RESOURCES & PUBLICATIONS

Escaped Trash Risk Map—EPA Trash Free Waters and University of Georgia Team Up on New Tool

The Trash Free Waters team at EPA HQ worked with the University of Georgia and Sea Education Association to develop the Escaped Trash Risk Map. "Escaped trash" refers to litter that leaks out from waste management systems, whether through spillage from non-secured containers, intentional littering or other means. This tool is designed to help local governments and communities identify areas with an estimated high-density of escaped trash so that increased potential interventions can be evaluated for their usefulness in addressing the problem.

The map displays estimated escaped trash densities in the United States at a snapshot in time, down to the one km2 scale. The map also shows floodplain areas, indicating where there is a higher risk for trash getting into local waterways. Furthermore, the most commonly found escaped trash item types and a percentage break down of material types are available at the river basin level. Finally, the project partners identified more than 65 studies of microplastic contamination in freshwater systems across the United States. The map shows the proportion of samples in each study in which microparticles, either presumed or analytically confirmed to be plastic, were detected. The microplastics information is only shown for specific freshwater systems and could not be extrapolated across all U.S. waterbodies.

The methodology for the creation of the map featured three key elements. First, litter surveying of 945 transects was performed randomly at 315 sites within 52 cities across the U.S., distributed among the 20 U.S. river basins. Across varied socioeconomic and land use environments within each site, litter was recorded in three randomly selected 100m2 transects adjacent to roadways. Second, to understand how litter was distributed across the U.S., the team designed a hierarchical mixed model using Bayesian inference to predict the distribution of escaped trash. The predictors of interest that correlated with litter density were the Human Development Index (HDI; a normalized index of income, education and life expectancy) and a high proportion of developed, high-intensity land cover based on the National Land Cover Database. Third, litter characterization data collected by citizen scientists was used to characterize litter by item count at the river basin level. An analysis on more than 11.5 million debris items tracked between 2021 – 2023 shows 80% of the items logged were plastic, and the most common litter items were plastic and foam fragments. Using the total estimated litter count for the U.S., these characterization data, and a database of average weights of marine debris from the University of Georgia, the total mass of litter in the U.S. is estimated to be around 361,000 metric tons [with an estimated range of 305,000 to 427,000 metric tons], though this estimate drops to around 72,000 metric tons [61,000 to 85,000 metric tons] if the weight of tires is not counted.



Litter density in the US modeled by the Escaped Trash Risk Map

Example from the map using the ArcGIS interface showing microplastic studies used to inform the model.

Through the ArcGIS interface, users can access this free resource to search exact locations or scroll the map of the country to compare between river basins, cities, or other points of interest.

The Trash Free Waters program's intention is to continue escaped trash data collection in the future to measure trends over time.

NEW AND FORTHCOMING RESOURCES & PUBLICATIONS

White House Council on Environmental Quality Releases Mobilizing Federal Action on Plastic Pollution: Progress, Principles, and Priorities

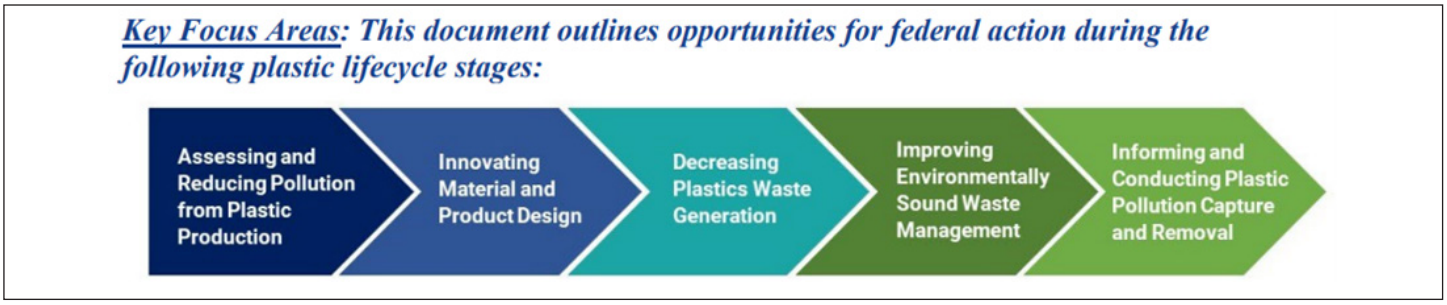
The Council on Environmental Quality-led Interagency Policy Committee document Mobilizing Federal Action on Plastic Pollution: Progress, Principles, and Priorities was released to the public, along with a fact sheet, on July 18th. The document covers principals and priorities, current federal focus areas and federal opportunities that are consistent with existing authorities to combat plastic pollution.

Originated in 1969 by the National Environmental Protection Act, CEQ serves as an advisory body to the President on climate change, environmental justice, federal sustainability, public lands, oceans, wildlife conservation- and other topics to uphold NEPA through relevant programs and policies. The Biden Administration has continued to make environmental and human health a priority, and the Mobilizing Federal Action on Plastic Pollution document supports these goals by addressing the pressing issue and direct threat of plastic in our social and natural systems.

As seen in the figure below, the document identifies five focus areas for the federal government to take action in.

"Opportunities for Action" for various federal government agencies, consistent with their existing authorities and programs, are identified within each focus area. CEQ will work with federal agencies to develop a plan to monitor implementation of these actions over time.

To learn more, read the associated Fact Sheet from CEQ.



Credit: CEQ

Trash Free Waters Program October 2024 Webinar: The Report on Microfiber Pollution

The Trash Free Waters webinar series continued in October with a new webinar titled "Microfibers are a Macro Issue: Interagency Report on Microfiber Pollution." The webinar covered details from the Report on Microfiber Pollution – a report to Congress mandated by Section 132 of the Save Our Seas 2.0 Act of 2020 - which was developed by the Trash Free Waters program and NOAA's Marine Debris Program on behalf of the Interagency Marine Debris Coordinating Committee. The webinar also covered major ongoing efforts addressing microfiber pollution in the U.S. and beyond.

The webinar featured three speakers who worked closely on the development of the report:

- Carlie Herring, NOAA Marine Debris Program.
- Nizanna Bathersfield, EPA Trash Free Waters Program
- Krystle Moody Wood, Materevolve

Thanks to all who were able to attend the webinar! Please find the recording of the event and presentation slides on our Trash Free Waters webinar series website.

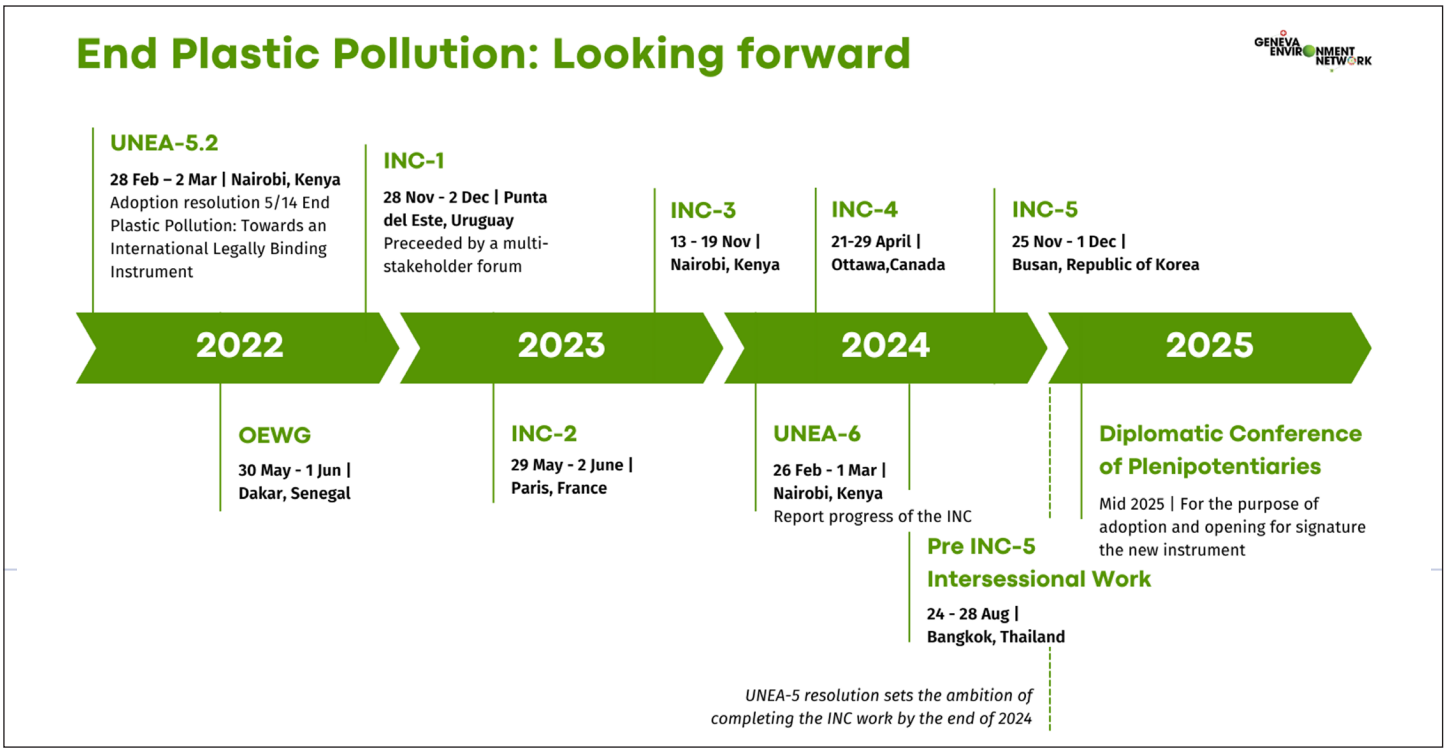
IN THE NEWS

Fifth Session of the Intergovernmental Negotiating Committee to Develop an International Legally Binding Instrument on Plastic Pollution: November-December 2024 in South Korea

From November 25 through December 1, 2024, the Intergovernmental Negotiating Committee, or INC, will meet for a fifth session in Busan, Republic of Korea. This gathering will once again bring together world leaders and experts as they resume efforts to develop an international legally binding agreement on plastic pollution. From the first session in the fall of 2022 in Punta del Esta, Uruguay, dozens of nations have spent countless hours on research, writing and roundtable discussions.

As reported by the United Nations Environment Programme, the INC has established two Ad Hoc Intersessional Open-ended Expert Groups: "The expert groups have each commenced their work with three virtual meetings starting from 16 July, ahead of in-person meetings in Bangkok from 24 to 28 August. These are not negotiating nor decision-making meetings under the INC and are not part of an INC session but are established to inform and help advance the work of the INC." Ahead of the fifth session, the unedited advance version of the Compilation of draft text of the international legally binding instrument on plastic pollution, including in the marine environment is available for review.

The latest from the negotiation process can be tracked on the Programme's homepage for negotiations.



Credit: Geneva Environment Network

IN THE NEWS

Oregon's U.S. Senator Jeff Merkley introduced the Fighting Fibers Act of 2024 to address microfiber pollution from clothing

The Fighting Fibers Act of 2024, sponsored by Senator Jeff Merkley (OR), was introduced in July to help address microfiber pollution from laundered clothing — one of the main sources of microfiber pollution discussed in the Report on Microfiber Pollution. In announcing the introduction of the Act, policymakers contributing to the legislation reference one study that estimates 700,000 "micro fleeces" are released from each garment we wash through domestic laundry. To address the current state of microfiber pollution and ensure continued attention to the subject, the bill is comprised of two main elements: ensuring washing machines include microfiber filtration and requiring future research on the impact of microfibers. The bill has been referred to the Committee on Commerce, Science, and Transportation.

Vacation or Business Trip Planned for 2025? Consider an "Ocean Friendly" Hotel

The Surfrider Foundation has launched an Ocean Friendly Hotels Program. In a September press release, the Surfrider explained, "This program celebrates hotels that have eliminated unnecessary single-use plastic and offers a simple, straightforward framework to help them implement practices that are better for the health of our ocean."

The Ocean Friendly Hotels Program serves as a sister program to their nationally recognized Ocean Friendly Restaurants Program that has grown to incorporate over 560 food establishments since its launch in 2013.

To join the ranks as an Ocean Friendly Hotel, establishments must follow a full set of mandatory criteria that focus on reducing single-use plastic.

Mandatory Criteria: Hotels must meet all 7

1. No plastic beverage bottles or plastic bags are sold or used onsite.
2. No expanded polystyrene is used anywhere onsite (aka Styrofoam).
3. Cups, utensils, straws, condiments and other accessory items in rooms are reusable or made from naturally occurring materials and are not packaged in plastic.
4. Toiletries (shampoo, conditioner, shower gel, lotion, etc.) are not packaged in small plastic bottles.
5. Water refill stations are available for guests onsite.
6. If applicable, restaurants or cafes onsite are Surfrider Ocean Friendly Restaurants.
7. Proper solid waste recycling procedures are followed, and bins are amply provided for guest use.

In addition to meeting the seven mandatory criteria, hotels must also commit to at least three of the nine optional criteria.

Optional Criteria: Hotels must meet 3

1. Coffee and tea stations do not use single-use pods or plastic packaging in rooms.
2. Concessions and pre-packaged food items are not sold or distributed in plastic packaging, including in room mini bars.
3. Room keys are reusable or made from naturally occurring materials.
4. Energy efficiency efforts are in place. At minimum, rooms must have signage that reminds guests to turn off lights and air/heat when leaving the rooms.
5. Water conservation and pollution mitigation efforts are implemented. At minimum, rooms must have signage which asks guests to consider using their towels and linens more than once in the rooms.
6. Inspired by Surfrider Kauai Chapter's Ocean Friendly Visitors Program, solo trash cleanup kits are available for guests.
7. Onsite gift shops only sell or provide sunscreen that is reef friendly.
8. Outdoor light pollution is minimized.
9. Hotel landscaping follows Surfrider's Ocean Friendly Garden Program criteria or there is an Ocean Friendly Garden onsite.

Surfrider Foundation wants to create a thriving culture for hotels looking to minimize plastic waste and set a new standard forsustainability in the hospitality sector. Upon launching the program, the organization has set an ambitious goal to add 100 hotels during the first five years. According to their estimations, achieving this goal will eliminate over 4.1 million plastic water bottles and 6.1 million mini toiletry bottles annually from reaching landfills and the oceans.