

The Rapids

US EPA's Trash Free Waters Monthly Update

January 2022

epa.gov/trash-free-waters

Introduction

Hello all,

Happy New Year! A recent [paper](#) published in the *Marine Pollution Bulletin* highlights the expected costs of marine litter damage to the global marine economy.

The [7th International Marine Debris Conference \(7IMDC\)](#) - the world's largest and longest-running conference series dedicated to the issue of marine debris and plastic pollution - will take place this September in Busan, Republic of Korea. The call for Technical Session proposals for the conference closes January 7th.

Please continue to share any upcoming events with Layne Marshall (marshall.layne@epa.gov) so that the Trash Free Waters team can advertise these opportunities with all of you on the first Monday of each month.

Thanks,
Romell Nandi
US EPA
Trash Free Waters National Program Lead

EPA Announcements

[Release of TFW Report on Priority Microplastics Research Needs: Update to the 2017 Microplastics Expert Workshop](#)

EPA's Office of Wetlands, Oceans and Watersheds (OWOW), is pleased to announce the release of the "Report on Priority Microplastics Research Needs: Update to the 2017 Microplastics Expert Workshop." This report is intended to assist the scientific research and funding communities in identifying information gaps and emerging areas of interest within microplastics research. Ultimately, the document's objective is to spur action toward solutions that reduce and prevent microplastics and nanoplastics at their source.

[EPA Announces Over \\$3 Million in Funding to Small Businesses to Develop Environmental Technologies](#)

On December 14th, EPA announced \$3,089,894 in funding to 30 American small businesses to develop novel technologies to address pressing environmental and public health problems. These companies are employing a number of innovative approaches including an automated waste sorting system at the point of disposal, a portable environmental sensor for rapid microplastic isolation and identification to better understand microplastic pollution, and a fully compostable packing film made from renewable resources using green chemistry and non-toxic production processes.

Funding Opportunities

[Research to Reduce Consumer Food Waste in the United States \(EPA-G2022-STAR-E1\)](#)

EPA, as part of its Science to Achieve Results (STAR) program, is seeking applications proposing cutting-edge transdisciplinary research (integrating diverse disciplines such as behavioral science, psychology, economics, public health, and sociology) to develop, apply, and test innovative and creative community-engaged approaches/methods to reduce U.S. household food waste through prevention. **The deadline for submissions is February 9.**

Other opportunities...

[Kellogg-Morgan Stanley Sustainable Investing Challenge](#)

Teams of graduate students from around the world are invited to develop and pitch creative financial approaches to tackle pressing social and environmental challenges through this competition. Plastic waste is specifically mentioned as a potential project focus. A total of 414 students from 87 schools across 50 countries competed last year. The first-place winner will receive \$10,000. **Project prospectuses are due February 13.**

[World of 7 Billion Student Video Competition](#)

Through the World of 7 Billion student video contest, hosted by Population Connection, middle and high schoolers are given the platform to think critically about global challenges related to population and share what they think we should do to fix it. Each entry must focus on one of following global challenges as it relates to population growth: Ocean Health, Urbanization, or Agriculture and Food. The maximum video length is 60 seconds. **The deadline for submissions is 5PM ET February 22.**

[EPA's "Companies Crushing Pollution" Video Challenge](#)

The "Companies Crushing Pollution" Video Challenge invites students and others including people who live near industrial facilities to create videos illustrating how businesses in the U.S. are reducing toxic chemical releases through innovative pollution prevention (P2) practices, and by having a positive impact on the environment and communities. Participants have a chance to win up to \$5,000. **All videos must be submitted by March 1.**

[EPA Environmental Justice Video Challenge for Students](#)

EPA and partners have launched the Environmental Justice Video Challenge for Students to enhance communities' capacity to address environmental and public health inequities. The goals of the challenge are to: Inspire students at accredited colleges and universities in the U.S. and its territories to work directly with communities in the identification and characterization of EJ challenges using data and publicly available tools and help communities address EJ challenges and/or vulnerabilities to environmental and public health hazards using data and publicly available tools. Video submissions should be less than 6 minutes in length. **Submissions are due April 1.**

Upcoming Events

[Shifting Tides: Trends in Beverage Container Deposit and Packaging Legislation](#)

January 10th (11:30AM -5:30PM ET)

From national beverage container deposit legislation proposals, to state bottle bill modernizations, to passage of Extended Producer Responsibility (EPR) for packaging laws, and more, this online conference presented by the Container Recycling Institute will provide comprehensive insights into the latest U.S. recycling legislation developments and trends. Free for Container Recycling Institute members, \$150 for non-members.

UN System Response to Marine Litter and Plastic Pollution | Geneva Beat Plastic Pollution Dialogues

January 13th (8AM ET)

The Geneva Beat Plastic Pollution Dialogues aim to facilitate further engagement and discussion among the stakeholders in International Geneva and beyond. This session, organized in partnership with the United Nations Environment Management Group (UN-EMG) and GRID-Arendal, features the launch of the UN-EMG Report on mapping the UN response to marine litter and plastic pollution. Experts at this session will discuss the key recommendations emerging from the report and areas of work which need to be deepened to move this global agenda forward and develop effective response to address marine litter and microplastics.

Recyclability vs Recycling Infrastructure: How to Engage Stakeholders and Align Solutions

January 18th (1PM ET)

Please join Lauren Phipps, Vice President & Senior Analyst of Circular Economy at the GreenBiz Group and guest speakers Jason Pelz, Vice President of Sustainability at Tetra Pak and Ashley Elzinga, Director of Sustainability & Outreach at the Foodservice Packaging Institute in a discussion on blending existing infrastructure and new innovations to reduce food packaging. Topics include: understanding the total impact of innovation, best practices on identifying and building strategic and collaborative relationships along the value chain, and aligning strategy with infrastructure and considering product lifecycles.

Flip the Script on Plastics in Hollywood: Rethinking Single-Use Plastics in Film & TV

January 19th (5PM ET)

Join the Plastic Pollution Coalition for a deep-dive discussion on “Flip the Script on Plastics,” an initiative to empower the entertainment industry to model real solutions to the plastic pollution crisis, both on set and in storylines. We will be joined by Hollywood activists and artists Yareli Arizmendi, Ed Begley Jr., and Kyra Sedgwick, along with Dana Weinstein, Project Specialist for the Media Impact Project at the Norman Lear Center, USC. Tune into the discussion about what these incredible panelists have been able to implement on the sets of their films and TV shows despite the challenges to going plastic free in the entertainment industry.

EBNet: Biological and Technological Solutions to Microplastic Pollution

January 20th (7- 9:30AM ET)

This fascinating session is brought to you by the Environmental BioTechnology Network (EBNet) and Dr. Alice Horton of the National Oceanography Centre, Southampton and leader of the UK Microplastics Network, part of the UK’s Circular Plastics Network. The webinar will feature a range of microplastics research experts from the University of Surrey, University of Portsmouth, University of Edinburgh and University of Bangor.

Outreach and Education for Trash Free Waters – What Makes a Successful Campaign?

January 20th (1- 2:30PM ET)

The next installment in EPA’s TFW Webinar Series, “What Makes a Successful Campaign?” will feature three expert speakers: Adam Lindquist, Director of the Waterfront Partnership of Baltimore’s Healthy Harbor Initiative; Katie Register, Executive Director of Clean Virginia Waterways of Longwood University; and Ellie Moss, Founder and Principal at Moss and Mollusk Consulting and primary author of “[Reducing Plastic Pollution: Campaigns That Work](#).” Webinar speakers will provide examples of

innovative source reduction and anti-littering education efforts and reflect on best practices and lessons learned.

Watershed Academy: How's My Waterway January 2022 Webcast

January 20th (2-3:30 PM ET)

EPA's How's My Waterway tool has added several new features over the past year that will be featured in this webcast. How's My Waterway answers questions about the health of waters in supporting swimming, the eating of fish, drinking water protection and delivery, the health of aquatic communities, and the restoration and protection of waterways. The public has access to water information in their community, state and at a national level via this tool.

Ocean Plastic Virtual Summit

January 25-26th (7AM- 1PM ET)

Ocean Plastic virtual summit 2022 is a new free event created to bring together the emerging ocean plastic industry, to learn, network, and discuss tackling the issue of valuable plastics escaping into the environment. Speakers from Asia, Europe, and the Americas will present on topics such as: Multi-stakeholder global supply chains, Traceability and certification, Governance and financing, Offsetting and plastic credits, and Collection and processing technologies.

Gulf of Mexico Marine Debris Cross Team Initiative Mid-Year Meeting

January 25-26th (times TBD)

This virtual meeting hosted by the Gulf of Mexico Alliance (GOMA) will convene Gulf stakeholders to discuss the regional Action Plan, new legislation, and new apps. There will also be a Behavior Change Training taught by Pam Kylstra Sprague.

Save the dates for future months...

Trash Free Texas Webinar: Making the Most of New Resources for Reducing Litter

February 10th (11:30AM ET)

Join the North Central Texas Council of Governments (NCTCOG) for its latest Trash Free Texas webinar, which will include a presentation from Keep Texas Beautiful on how to use the [Texas Litter Database](#) to enter and store litter clean-up data, an overview of two new [Trash Free Texas](#) toolkits and new "Partner Packet," and an update on the next Mayor's Challenge clean-up event to be held in this spring.

Global Waste Management Symposium

February 14-17th, Indian Wells, CA

North America's #1 technical conference for research and case studies on waste management will include world-class content, state-of-the-art breakthrough research, solutions for big challenges, networking opportunities, and innovative presentations. The conference will feature sessions on waste characterization, solid waste planning, environmental justice, recycling, and more.

Plastics Recycling Conference 2022

March 7-9th, near Washington, D.C.

The Association of Plastic Recyclers hosts this gathering of plastics recycling and sustainability professionals, bringing together more than 2,000 industry decision makers for networking and discussion of key trends annually.

EWRI Operation & Maintenance of Stormwater Control Measures

March 13-16th, Wilmington, NC

The Environmental & Water Resources Institute of the American Society of Civil Engineers is hosting a conference where attendees can learn from national leaders in green and gray stormwater infrastructure, including design for maintenance, O&M training programs, new maintenance approaches, advances in municipal program management and implementation, life cycle analysis, and lessons learned from the field.

[State of Lake Erie Conference \(SOLE22\)](#)

March 16 -18th, Cleveland, OH (virtual participation may become possible)

Hosted by the International Association for Great Lakes Research, this conference will feature two days of concurrent sessions, plenaries, field trips, and discussions. The series promotes collaborations between the science and policy communities—particularly lake-specific research, management, education, and nonprofit organizations—to broaden the discussion and provide diverse interaction among stakeholders.

In case you missed it...

[Reckoning with the U.S. Role in Plastic Waste](#)

In this Wilson Center Smart Take, Director of the China Environment Forum Jennifer Turner comments on a recent report that shows the U.S. is the number one generator of plastic waste. The report, "[Reckoning with the U.S. Role in Plastic Waste](#)" was published by the U.S. National Academy of Sciences on December 1, 2021.

[Plastics in the Oceans](#)

This Sierra Club Marine Team webinar featured Stiv Wilson, Emmy-winning Director and Producer of the Story of Plastic; Judith Weis, Professor of Biological Sciences at Rutgers University; Boonie Monteleone, Executive Director of the Plastic Ocean Project; and Lisa Kaas Boyle, environmental attorney and Co-founder of the Plastic Pollution Coalition.

[The Emerging Circular Economy](#)

The Circular Economy is rapidly gaining traction as a means to design and build more sustainable and lower carbon businesses. This GreenTech conference session, moderated by John Lovenburg, Vice President for Environmental at BNSF Railway, began with a summary of key concepts including closed-loop supply chains and the upcycling of materials. A roundtable discussion of expert panelists provides insights on innovative waste-to-product businesses and illuminates the need for a revamped sustainability-focused legal and policy framework.

The Microplastics Breakdown

MICROPLASTICS AND TIRE WEAR

[Dispersion and Fate Models for Microplastics from Tyre \[Sic\] and Road Wear State of the Art and Opportunities](#)

Nina Svensson Yvonne Andersson-Sköld

This literature review focused on microplastics from tire and road wear, which the authors point out constitute a large source of pollutants entering the natural environment and they observed that the largest fraction of microplastic from tire and road wear is emitted to soil and water, but it is not known how emissions are distributed between these media. Furthermore, they noted that the amounts of microplastics in different environments and their dispersion in nature are not well known. Their review provided an overview of microplastic dispersion and fate models in various media (e.g., air, stormwater, oceans),

along with studies that have used them. A few studies were found that have looked at the amounts of microplastics that reach the sea, and how the particle characteristics influence the transport. The ocean was identified as the primary destination for microplastics from road and tire wear, after transportation through soil, water and air. Some of the key research needs that were identified in this article were: better emission estimates and more studies of how the microplastic particles characteristics (density, shape, size) and the various processes (aggregation, degradation, biofouling) in different media affect the transport. Accurate measurements and the development of measurement standards for model validation were also identified as research gaps.

HUMAN EXPOSURE TO MICROPLASTICS AND HEALTH IMPLICATIONS

Disposable Plastic Materials Release Microplastics and Harmful Substances in Hot Water

Guoqiang Liu, Jian Wang, Mengjie Wang, Rongrong Ying, Xuwei Li, Zhewei Hu, Ya Zhang

The stated goal of this study was to explore whether heat treatment of disposable plastic materials in water could result in the release of particles and harmful substances. The authors heated disposable plastic materials under conditions intended to simulate those during heating food or drink. Specifically, they selected plastic packaging, cups, and transparent and expandable boxes because they believed that these products were the most commonly used disposable plastics in the takeaway industry. The study results indicated that submicron and microplastics were released after soaking these plastics materials in 100 °C temperature water. Submicron sized particles were found to be the most prevalent particles released after an hour of agitation in the hot water. Exposure to heat was found to have changed the chemical composition of polyethylene packaging, but it had minor effects on polypropylene cups, transparent boxes and polystyrene expandable boxes. Organic chemicals and heavy metals (mainly arsenic, chromium and lead), were detected in the leachate from plastic packaging, cups and expandable boxes, indicating the potential risk of these materials while holding hot food or drink. The study concluded that the findings suggest an unknown ingestion risk to human beings if frequently using plastic materials to contain hot food or drink. Further studies were recommended.

Association of Zoonotic Protozoan Parasites with Microplastics in Seawater: Implications for Human and Wildlife Health (Prepublication version)

Emma Zhang, Minji Kim, Davis Lezlie Rueda, Chelsea Rochman, Elizabeth Van Wormer, James Moore, Karen Shapiro

This study focused on the interaction between plastic and pathogen pollution of coastal waters. The authors investigated the association of the zoonotic protozoan parasites *Toxoplasma gondii*, *Cryptosporidium parvum*, and *Giardia enterica* with polyethylene microbeads and polyester microfibers. They selected these parasites because they were recognized by the World Health Organization as underestimated causes of illness from shellfish consumption, and due to their persistence in the marine environment. Two sizes of blue polyethylene microbeads, 100 µm and 500 µm, were employed; and two size ranges: 400-700 µm and 800-1200 µm, of microfibers were used. Two experiments were conducted, one in which parasite counts were measured over a 7-day period and another in which counts were compared at the end of a 7-day period. All three selected protozoan parasites were associated with the surfaces of the microbeads and the microfibers. For microbeads and microfibers, the counts of parasites generally increased over time. Overall, more protozoans were found to be associated with the large microfibers as compared to the other microplastic types. The microbeads and small microfibers were largely comparable in their ability to associate with the parasites. The authors concluded that their data suggests a role of microplastics in mediating the ecology of terrestrially derived pathogens in the marine environment. They also postulated that plastic particles that preferentially sink may result in a concentration of pathogens in the benthos, leading to an increased risk of contamination of benthic invertebrates and fish. Conversely, they suggested that microplastic pollutants that float could facilitate pathogen dispersion over large distances to pristine sites that are located far from terrestrial pollution sources.

MICROPLASTICS FATE AND TRANSPORT

Microplastics Washout from the Atmosphere During a Monsoon Rain Event

Sajjad Abbasi

The presence, characteristics, period of washout and potential sources of microplastics (MPs) is explored in this article. MPs deposited with rain in the Shiraz City (Iran's fifth largest city) located in southwest Iran were analyzed following a 30-minute monsoon event on 18th July 2021. Precipitation samples were collected every 10 minutes for 30 minutes in customized metallic deposition collectors. A large number of atmospheric MPs and all microrubbers (tire wear, brake wear, and road wear particles) were deposited in the first ten minutes of rain events. The concentration and sizes of particles decreased gradually for the rest of the precipitation time. Fibrous particles of polyethylene and polystyrene were found to be the most prevalent in the samples. Sampling also identified MPs that exhibited varying degrees of mechanical weathering, photo-oxidation and the provenance. These results were considered along with with satellite imagery as well as other information, including modelling. The author concluded that MPs may more likely have a local or urban origin and some of the small fibrous MPs could originate from the Persian Gulf and/or remote regions. Furthermore, he suggested that globally, intense rain events could represent a significant means of MPs transportation in the atmosphere and an important source of MPs to the continents and oceans.

A Review of Microplastics in Wastewater, Their Persistence, Interaction, and Fate

Nagireddi Jagadeesh, Baranidharan Sundaram

The stated objective of this article was to connect many aspects of microplastics (MPs), their sources, interactions and impacts on bacteria, chemical contaminants and the environment taken from other environmental streams. Wastewater treatment plants (WWTPs) were described as the major source of MPs being released into the aquatic environment. The article described implications of the discharge of MPs into wastewater as: (i) If their concentration is in trace levels, the water can be recycled and reused after their removal from wastewater; (ii) If their concentration is high, MPs have an impact on the operational efficiency of WWTPs and inhibit the growth of microorganisms. The authors observed that there are pressing needs to effectively treat and remove MPs from WWTPs and to determine their effects on aquatic species such as fish, microorganisms and other zooplankton present in freshwater bodies. They found that there is no standard procedure for sampling, pre-treatment, or characterization of MPs in wastewater. As a result, they pointed out, researchers have devised a variety of methods for the sampling, pre-treatment, purification, and characterization of MPs in wastewater. The majority of MPs in WWTPs are trapped in biological sludge, they found, so they recommended more research be conducted that is focused on the effects on animals on land as a result of sludge disposal with MPs is needed. They also suggested more research on the behavior of MPs in wastewater and their potential toxicity.

MICROPLASTIC POLLUTION PREVALANCE

Microplastics in Freshwater

Marie McCallum

This review described plastics as a genuine concern for the management of the health of freshwater ecosystems due to their increasing concentrations and the impact they have on freshwater organisms. The most likely sources of MPs in freshwater were identified as household sewage or industrial wastes. Fibres released from synthetic clothing in washing machines were identified as the most common form of microplastic found in the environment; an estimated 1,900 fibres per item may come out during washing and be released to aquatic and terrestrial environments through wastewater effluents. Another large source of microplastics was identified as anthropogenic activities including littering and the process of waste collection and disposal. The article highlighted the challenge of tracking where microplastics will

end up as their transport is strongly influenced by wind patterns, surface runoff, and flooding. Research focused on organisms in freshwater ecosystems found dietary plastic debris in green algae and in zooplankton. A study conducted on the Great Lakes, was highlighted. According to the article, it found that 97% of 330 fish that were examined had microplastics in their digestive tracts, a majority of which were microfibers; which has consequences for fish, impacting their digestion, metabolism, growth, and brain function, but research also suggests that humans can be impacted by microplastics through the consumption of fish.

Microplastics Pollution Along the Central Atlantic Coastline of Morocco

Mohamed Rida Abelouah, Mohamed Ben-Haddad, Nelson Rangel-Buitrago, Sara Hajji, Noureddine El Alem, Aicha Ait Alla

The objective of this study was to help fill existing gaps in understanding the extent of plastic pollution on the central Atlantic Moroccan coast. To that end, the authors investigated the presence of microplastics (MPs) in seven beaches located in Agadir, a city on the central Atlantic coast of Morocco, defining MP magnitudes, shapes, impacts, and possible sources. The study described this area as one of the most important coastal areas of the Moroccan coastline because it contains a diversity of ecosystems such as wetlands, sandy and rocky beaches, estuaries, sand dunes, coral reefs, and rivers. Samples were collected between January and March 2021 during low tide conditions. Four shapes of MPs (fibers, fragments, films, and pellets) were found. Fibers were identified as the most prevalent; accounting for 73% of the total amount of particles found. There was variation in percentages of the various shapes per beach. The study concluded that the overall quantities of MPs that were found suggest extreme and continuous inputs of plastics (all sizes and types) and the shapes that were identified highlight that a combination of sources (primary and secondary) are contributing microplastics to and within the study area.

Prevalence of Microplastics in the Ocean in Latin America and the Caribbean

Diana-NagyJan, Vázquez-Rowe, Ramzy Kahhat

The objective of this review article is to be useful to researchers and other stakeholders in ocean resources and marine conservation, including policymakers. It examined articles dated from 2017-2021 and focused on the prevalence of microplastics in the ocean in Latin America and the Caribbean. Out of a total of 36 articles gathered, 23 were selected and evaluated in depth. The studies that they found had been performed in relatively small geographic areas and evaluated the presence of marine litter and quantify and classified the different types of particles. Consequently, they asserted, while the studies considered in this review constitute a good baseline to understand the development of site-specific microplastics (MPs) prevalence in marine environments in Latin America and the Caribbean, but do not provide for a comprehensive analysis of the marine litter problem in the region. According to the authors, the majority of the studies assessed point towards mismanaged waste, inland or offshore, as well as mismanaged wastewater as critical sources of plastic pollution into the ocean. This region was determined to have low rates of adequately managed waste and wastewater flows, low recycling rates for plastics. However, they also observed that there is a lack of material flow analyses in the region to identify the main flows of plastics that are responsible for plastic prevalence in the ocean. Most of the evaluated MPs were identified as polyethylene, polypropylene and polystyrene, which could be a consequence of their low densities compared to other type of polymers, such as polyethylene terephthalate or polyvinyl chloride; the low density would make them more likely to be transported longer distances by sea currents and rivers. The article touched on some recommendations for future research, including the need to establish a standardized method for evaluating MP in sandy beaches and coastal areas.

**If you'd like to see your posting in this email, please email
Marshall.Layne@epa.gov with any suggestions!**

