The Rapids

US EPA's Trash Free Waters Monthly Update

June 2023

epa.gov/trash-free-waters

Introduction

Hello everyone,

I wanted to give you all a reminder that EPA's **Draft National Strategy to Prevent Plastic Pollution** is out for public comment until June 16. Please take a look and **send us any comments** you may have.

The **Second Session of the Intergovernmental Negotiating Committee on Plastic Pollution** was held from May 29-June 2 in Paris. The aim is to reach agreement on treaty provisions by the end of 2024 and to open the agreement for adoption in 2025.

Frontiers in Science recently put out a **special issue** containing ten articles exploring plastic pollution issues and potential solutions. This special issue came about as a project from the **Duke University Plastic Pollution Working Group**.

Please share any upcoming events with Cassidy Fredette-Roman (fredetteroman.cassidy@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

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EPA Announcements

Biden-Harris Administration Announces Availability of $30 Million for Great Lakes Projects in Underserved Communities
On May 10, the Biden administration announced the new availability of $30 million to assist with Great Lakes projects in underserved communities. Considering the cultural, economic, and environmental role that the Great Lakes serve, this funding will help further the Great Lakes Restoration Initiative. In addition, considering the limitations that lack of funding pose, especially in areas with environmental justice concerns, the funding will likely make projects possible that would otherwise not be completed.

Judge Panel Orders U.S. EPA To Regulate Perchlorate-Contaminated Drinking Water
In 2020, the EPA chose not to regulate perchlorate – a chemical found in food packaging, amongst other places – in drinking water, rolling back a previous finding that the chemical poses a serious health risk to millions of people. However, a recent three-judge panel agreed unanimously that the EPA must reverse this decision. EPA must now issue a drinking water standard for the contaminant.

Funding Opportunities

Research to Action: Assessing and Addressing Community Exposures to Environmental

Contaminants
This National Institute of Health Funding Opportunity Announcement encourages applications using community-engaged research methods to investigate the potential health risks of environmental exposures of concern to communities and to implement an environmental public health action plan based on research findings. The overall goal is to inform and support efforts to prevent or reduce exposure to harmful environmental exposures and improve community health. Researching the disproportionate impact of emerging and ongoing exposures like microplastics is an eligible topic. **This is a rolling application, but the next review will take place on June 5, 2023.**

EPA Pollution Prevention Grant: Environmental Justice in Communities
This EPA grant is intended to provide businesses with technical assistance, including information, training, and expert advice on pollution prevention (P2). The resources must go towards improving the health of disadvantaged communities and must take a P2 approach. A P2 approach should reduce the use and release of hazardous substances into the environment while also reducing resource use, expenditures, waste, and liability cost. **The deadline for this application is June 6, 2023.**

USDA Individual Water and Wastewater Grants
The USDA Rural Development branch provides grants to households in an area that was recognized as a Colonia before October 1, 1989. This money can be used to install plumbing, kitchen sinks, showers, water heaters, etc. This is an opportunity that could be used to install equipment in these households that would limit pollution from water runoff. The money can also be used to close abandoned septic tanks, preventing potential contaminants from entering the waterway. The amount awarded is dependent on the type of work proposed with a maximum of $5,000. **Applications are accepted year-round.**

USDA Water and Waste Disposal Loan and Grant Program
This opportunity provides funding for clean and reliable drinking water systems as well as stormwater management. Most states and local governments, private nonprofits, and federally recognized tribes are eligible applicants. The loans available are long term and low interest. Additionally, a grant and a loan can be provided in tandem if funding allows. **Applications are accepted year-round.**

Upcoming Events

Circularity 23 Livestream Sessions
June 5-6, virtual
This circular economy livestream will discuss a variety of problems and solutions regarding single use plastics and plastic pollution. Many speakers will deliver presentations on current circular economy approaches to ending plastic pollution from sustainable packaging to turning trash into art.

National Nanotechnology Initiative Public Webinar Addressing Micro- and Nanoplastics Issues
June 6 (1:00-2:30 PM EST), virtual
This webinar will give an overview of U.S. government agencies addressing micro- and nanoplastics as well as describing innovative solutions being used to tackle the problem. A panel of experts has been assembled to speak on the coordination of activities across Federal agencies. This webinar will emphasize regulatory responsibilities of various agencies. To view the recording after its posting, click **here**.

National Resilience Listening Session 5
June 6 (3:00 PM EST), virtual
This series of 60-minute listening sessions, hosted by FEMA, will gather input to develop guidance that will help stakeholders understand critical roles in community resilience. The sessions also include facilitated discussions open to all attendants.

Trash Free Waters: The Voyage of 5 Gyres Webinar
June 13 (2:30-4 PM EST), virtual
This webinar follows the story of Anna Cummings and Dr. Marcus Eriksen. They will discuss their experience crafting and sailing a raft made of plastic from California to Hawaii. They became life partners and co-founded the 5 Gyres Institute. They will discuss their passions for aquatic debris removal and prevention as well as their experience working together.

National Resilience Listening Session 6
June 15 (3:00 PM EST), virtual
This series of 60-minute listening sessions, hosted by FEMA, will gather input to develop guidance that

will help stakeholders understand critical roles in community resilience. The sessions also include facilitated discussions open to all attendants.

CLU-IN | Training & Events > Microplastics
June 13 (1:00-3:15 PM EST), virtual
This course, hosted by Interstate Technology and Regulatory Council, will provide a background and introduction to microplastics. It will discuss the human health and ecological risks associated with microplastic pollution in the environment. Different examples of how to manage and reduce microplastics from entering waterways will be discussed.

Innovation and Emerging Plastics Technologies Conference
June 21-22, Penn State University
This conference includes presentations by several industry experts on alternative materials to plastic for packaging. There is also a tour of the Penn State University plastic lab. At 10,000 square feet this is the largest, most comprehensive plastic lab in the country. The conference includes presentations on injection molding technology, materials technology, and executive/management practices followed by a three-hour hands-on activity. Time for networking is also included.

Plastic-Free Seas: Diving Into How Plastic Impacts Health, Climate, and Our Oceans
June 22 (3-4 PM EST), virtual
The Plastic Pollution Coalition is hosting a webinar to discuss how plastics are impacting the marine ecosystems around the world as well as climate globally. There will also be a discussion on the impact of plastic pollution on mental and physical health.

Stormwater Summit 2023
June 27-29, Missouri
The Water Environment Federation's Stormwater Summit is a gathering of stormwater experts where their knowledge can be deepened through discussions and provided materials. The summit includes presentations on technical knowledge and also provides forums where various topics will be discussed.

Save the dates for future months...
2023 U.S. Product Stewardship Forum - Product Stewardship Institute
September 11-14, Oregon
From September 11 to September 14, the Product Stewardship Forum conference will focus on Extended Producer Responsibility (EPR). Stakeholders from around the globe will gather to discuss product stewardship. Previously enacted packaging EPR laws will be discussed as well as the anticipated EPR laws.

In case you missed it...

Sustainable Packaging: The Innovations and Players Pushing the Circular Economy Forward: IDTechEx Webinar
This webinar focused on addressing plastic pollution in every sector, specifically the fast-moving consumer goods from the packaging sector. The webinar provided information on technology and materials that can make sustainable packaging more obtainable, an analysis on the main barriers to circular economy, and a market outlook on the growth of sustainable packaging.

Draft National Strategy to Prevent Plastic Pollution
This webinar (link is to slide deck) provided an overview of the National Strategy to Prevent Plastic Pollution. This strategy focuses specifically on actions to reduce, reuse, collect, and capture plastic waste. EPA will collect comments from the public until June 16. **Here** is a link to the docket.

Bioplastics 101 Webinar
This webinar provided information on the future of plastics as society switches to a circular economy for plastics. Some plastics will still need to be produced as society makes this transition, but this webinar focused on the use of biobased plastics rather than plastics from fossil fuels.

Second session of Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, including in the marine environment (unep.org)
The second session of the Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution was held in Paris at the UNESCO headquarters. The session was preceded by regional consultations.

MICROPLASTIC REMOVAL

Microplastics and Their Interactions with Microbiota

Parsaeimehr A, Miller CM, Ozbay G

This article highlighted that microplastics (MPs) are easily taken up by the ecosystem in a variety of organisms due to their small size, and cause immunological, neurological, and respiratory diseases in the impacted organism. The authors further noted that MPs can release toxic additives and act as a vector and scaffold for colonization and transportation of specific microbes, leading to imbalances in microbiota and the biogeochemical and nutrients dynamic. Some autotrophic, and heterotrophic microbes capable of colonization on the MP surfaces were described as using MPs as a way to move through various habitats. These microbes can form biofilms on the surface of MPs and use them as a carbon source for becoming the predominant species in the impacted microbiota. Microbial biodegradation was described as an effective approach to address the global concerns on the MPs control. Biodegradation was defined as the process by which microorganisms degrade materials into environmentally acceptable products (i.e., water, carbon dioxide, and biomass). In the case of MPs, degrading enzymes could be used to target the polymer chains of MPs and break them down into monomers, which is then used as a carbon source in the microorganism energy cycle. Additionally, the article observed that bacterial species (*Pseudomonas, Escherichia, Arthrobacter,* and *Bacillus*) have been found to have the capacity to break down MPs as well. Future actions/research areas were identified, for example, studies on the compositions of the plastics products, research on the source, sink, and vectors of MPs; and studies on the interactions of the MPs and their surrounding environment. **Read the full abstract here**: **https://europepmc.org/article/pmc/pmc10113872#sec3**

The Role of Different Sustainable Urban Drainage Systems in Removing Microplastics from Urban Runoff: A Review

Eduardo García-Haba, Carmen Hernández-Crespo a, Miguel Martín a, Ignacio Andrés-Doménech

The goal of this literature review, which was based on research collected beginning in September 2021, was to analyze studies that assess the role of sustainable urban drainage systems (SUDS) as nature-based solutions for removing microplastics (MPs) from urban runoff. Five different SUDS types were determined to have been studied under diverse land use conditions: urban wetlands, including urban park water bodies; stormwater detention ponds and basins; bioretention structures, that comprise rain gardens, biofilters, bioretention cells and bioretention basins; sand filter; and permeable pavements. Polypropylene, polyethylene terephthalate, polyethylene and polystyrene were identified as the most frequent and abundant polymers in urban runoff. According to the authors, their analysis of the literature provided strong indication that SUDS are an effective solution for MP management, in terms of particle reduction from stormwater runoff. Specifically, they asserted that bioretention structures, stormwater detention ponds and basins, sand filter and urban park water bodies demonstrated a similar level of high rates of in MP reduction. The authors found that the variables which seemed to influence the overall quantity of MPs removed were: maximum rainfall intensity, antecedent dry days, rainfall depth, land use, dwelling density, imperviousness, hydraulic loading, SUDS age, and the presence of forebays or gross pollutant traps. They noted that these results were not always statistically significant. The article identified some research areas that warrant further investigation, for example, the role of vegetation in MP sequestration; the fate of MPs in the vertical and horizontal profiles of sediment or filter material, which the authors asserted could provide information on how incoming pollutant loads have been retained in the system, as well as signs of biodegradation; and the evaluation of MP concentration in different matrices (water, sediments or filter media, fauna at different levels of the trophic web) to assess potential accumulation and biomagnification processes. **Read the full abstract here: https://www.sciencedirect.com/science/article/pii/S0959652623013550#sec5**

Superhydrophobic Cotton Fabrics for Effective Removal of High-Density Polyethylene and Polypropylene Microplastics: Insights from Surface and Colloidal Analysis

O. Rius-Ayra, M. Carmona-Ruiz, N. Llorca-Isern

As described, this study was a follow up to the researchers' investigation of the effectiveness of three different types of materials - coatings, powdered materials, and meshes - for removing microplastics (MPs). This study replicated and verified the previous findings (that are summarized in this article), which demonstrated that **superhydrophobic** materials were effective in removing MPs, and also provided an explanation of the removal process. The authors described how they created a superhydrophobic non-woven cotton fabric which they used to remove high-density polyethylene and polypropylene MPs from water. They determined that this fabric achieved an MP removal efficiency of 99%. The article's conclusion section described the benefits of this removal method as avoiding the breakdown of MPs and allows for them to be collected easily and quickly. It was noted that despite the fact that the use of superhydrophobic materials show high removal efficiencies, the capacity to be used in large-scale wastewater treatment plants is still a challenge because of issues including balancing the cost

and their performance, avoiding any potential negative impact on the environment (including using sustainable materials), as well as the need to comply with regulatory standards and requirements. In addition, the conclusion included the recommendation for continued research on superhydrophobic materials not only for the removal of MPs, but also other environmental applications that will be useful in the near future such as oil/water separation, desalination, removal of heavy-metals, dyes elimination among others. **Read the full abstract here:**
https://www.sciencedirect.com/science/article/pii/S0021979723009244#s0045

MICROPLASTICS ENVIRONMENTAL IMPACTS

The Need for Environmentally Realistic Studies on the Health Effects of Terrestrial Microplastics
C. Lauren Mills, Joy Savanagouder, Marcia de Almeida Monteiro Melo Ferraz & Michael J. Noonan
The authors reviewed 114 papers (73 in vivo lab studies, and 41 soil studies) with the stated goal of understanding how the concentrations and types of microplastics being administered to rodents in lab studies compared to those found in terrestrial soils. The reviewed lab studies were found to have fed rodents microplastics at concentrations that were hundreds of thousands of times greater than they would be exposed to in nature. Specifically, the median concentration of microplastics fed to laboratory rodents in in vivo studies was 39,051,103 items/kg, which was described as being close to 42,000 times greater than the median concentration of 930 items/kg found in soil. The researchers found that health effects have been studied for only 20% of the microplastic polymers that are known to occur in soils; they observed that 31 different plastic polymers have been found to occur in soil but the health effects of only 6 polymers have been studied to date, with the overwhelming majority of in vivo experiments focusing on polystyrene. The authors asserted that performing more true-to-life research will be of the utmost importance to fully understand the impacts of microplastics. **Read the full abstract here:**
https://link.springer.com/article/10.1186/s43591-023-00059-1

A Systematic Review of the Effects of Microplastics and Nanoplastics on the Soil-Plant System
Jacqueline Zanin Lima a, Raul Cassaro a, Allan Pretti Ogura b, Marilda Mendonça Guazzelli Ramos Vianna
This review article asserted that although the number of studies has increased over the last decade, the impacts of plastics on terrestrial environments have not been sufficiently defined and delimited. The goal of the review was to present the progress of research focused on the interaction of microplastics (MPs) and nanoplastics with soil-plant systems and to identify questions for future research. Based on their review of the literature, which included articles published until March 1, 2023, the authors found that MPs/NPs can influence the germination and development of plants (wheat, rice, maize, and lettuce being the most studied). The authors asserted that hydroponic systems were excluded from their analysis because of existing research that indicated that the effects of MPs/NPs can differ between plants grown in soil and in a hydroponic system. For example, they described a 2022 study which found that lettuce grown in hydroponics was more impacted by low doses of PE MPs, while soil-grown lettuce was more affected by high doses. Their analysis also indicated that MPs/NPs may have more aboveground than belowground effects on plant growth. The combined presence of plastic waste with other contaminants or substances were found to be able to change the physical, chemical, and biological properties of the soil, directly and indirectly affecting plant growth and soil health. According to the authors, the studies' main assessed endpoints were length and biomass, often segmented between root and shoot, and a comparative analysis between treatments containing MPs and NPs and the control (without contamination) provided different results, namely positive, negative, and no significant differences. MPs and NPs were found to be able to travel to different parts of plants, including edible parts, making them a potential exposure route for humans. All of the studies that were reviewed measured the time of exposure of plants to MPs/NPs; however, it was also observed that the time needed for plastic residues to degrade in the soil requires further evaluation. Furthermore, it was noted that MPs and NPs tend to fragment over time, which leads to smaller sizes and altered mobility and bioavailability. This review concluded with a discussion of gaps in knowledge and the research that could address them; for example, how MPs/NPS may affect soils with different characteristics (e.g., granulometry, pH, and organic matter content). **Read the full abstract here**: **https://www.sciencedirect.com/science/article/pii/S2352550923000829**

MICROPLASTIC FATE AND TRANSPORT

Occurrence of Microplastics Derived from Tyres in Bottom Sediments of Guanabara Bay, Brazil: A Form of Pollution that is Neglected or Difficult to Detect?
José Antônio Baptista Neto, Christine C. Gaylarde, Diego G. de Carvalho, Marcos F. P. Lourenço, Estefan M. da Fonseca
This study aimed to develop a method to detect tire wear particles (TWPs) in the sediments of Guanabara Bay in Southeast Brazil. The article noted that microplastics have been found in the Bay but TWPs have never been included as a separate class despite the fact that Guanabara Bay receiving a great impact from urban surface runoff and being crossed by a bridge connecting two cities, and there are already several articles published about microplastics in the bay. As described, nine sediment samples were taken at

different depths from various locations across the bay. MPs were separated using peroxide degradation of organic matter followed by floatation and filtration. TWPs were identified using a binocular stereo microscope Scanning Electron Microscopy and Fourier transformed infrared spectroscopy. This combination detection approach enabled the visualization and identification of high numbers of TWPs in the Bay sediments. However, the authors asserted, exact quantification was impossible because of the large size range of the particles and the lack of an appropriate method. They concluded that characterizing the ecological impact of TWPs will require further analyses and a standardized and improved methodology. Accordingly, they identified the development of a reliable and generally accepted method for the identification of TWPs as the most important future development in this area of study. **Read the full abstract here** : **https://www.oaepublish.com/wecn/article/view/5746**

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

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