

The Rapids

US EPA's Trash Free Waters Monthly Update

February 2024

epa.gov/trash-free-waters

Introduction

Hello all,

The 5 Gyres Institute published findings from [Plastic-Free Parks TrashBlitz](#), an annual community science project that tracks waste trends in U.S. national parks. Data from the blitz indicates that plastic is the most prevalent material polluting national parks and federal lands. Single-use plastic items made up the bulk of waste found, with food wrappers, cigarette butts, wipes, bottles and bottle caps, film, and bags included in the top ten identifiable items. 25% of the items were plastic fragments, which is indicative of the tendency of plastic items to break up into smaller pieces once in the environment.

In late December, the New York State Department of Environmental Conservation released the [New York State Solid Waste Management Plan: Building the Circular Economy through Sustainable Materials Management](#). The 10-year plan includes six major focus areas with goals to help improve the circular materials and management industry in New York State: Waste Reduction and Reuse, Recycling and Recycling Market Development and Resiliency, Product Stewardship and Extended Producer Responsibility, Organics Reduction and Recycling, Toxics Reduction in Products, and Advanced Design and Operation of Solid Waste Management Facilities and Related Activities. The report also outlines Issues, Challenges and Opportunities, including discussion of the ecosystem impacts of marine debris and the conservation benefits of a circular economy.

Please share any upcoming events with me at nandi.romell@epa.gov so that the Trash Free Waters Team can advertise these opportunities.

Romell Nandi
US EPA
Trash Free Waters National Program Lead

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EPA Announcements

[Biden-Harris Administration Announces Availability of \\$3 Million in Grants to Establish National Stormwater Centers of Excellence](#)

The EPA announced that \$3 million of President Biden's Bipartisan Infrastructure Law funding will be distributed as grants to establish the Centers of Excellence for Stormwater Infrastructure Technologies to expand stormwater infrastructure technology across the United States. These centers will develop and enhance stormwater best practices by conducting research on innovative stormwater control infrastructure technologies; providing technical assistance to Tribal, state and local governments; and collaborating with regional institutions. See the Funding Opportunities section for more information on this grant.

Funding Opportunities

[Centers of Excellence for Stormwater Control Infrastructure Technologies Grant Program](#)

The EPA is accepting applications for new regional Centers of Excellence for emerging stormwater control infrastructure technologies, as well as applications to create and maintain a national electronic clearinghouse to collect and distribute the work of these Centers. Eligible applicants include colleges and universities, research institutions, and nonprofit organizations with the core mission of water management that have demonstrated excellence in researching and developing new and emerging stormwater control infrastructure technologies. The EPA expects to make three awards of up to \$980,000. **The application deadline for this grant program is March 18, 2024.**

[Healthy and Resilient Gulf of Mexico Bipartisan Infrastructure Law Funding](#)

The EPA Gulf of Mexico Division is accepting applications for funding to implement activities under the following priority areas: 1. Water Quality Improvement; 2. Protect, Enhance, or Restore Habitat; 3. Environmental Education; and 4. Strengthen Community Resilience. Applicants must form a partnership of five or more eligible entities, and two of the partners must be small community-based organizations. The EPA will make approximately five awards of up to \$6,000,000. **Applications are due on April 4, 2024.**

[21st Annual P3 Awards: A National Student Design Competition focusing on People, Prosperity, and the Planet](#)

The EPA is accepting proposals for the People, Prosperity, and the Planet Program that demonstrate innovative solutions to real world challenges. Applicants are encouraged to create interdisciplinary collaborations to address environmental and public health challenges across the U.S., and especially in small, rural, Tribal, and underserved communities. Proposed projects should support one of the four program goals and objectives: Clean and Healthy Air, Clean and Safe Water, Safeguard and Revitalize Communities, and Ensure Safety of Chemicals. Public and private colleges within the U.S. are eligible to apply to support teams of students. A total of approximately \$1.2 million will be awarded for this year's program, with individual awards of up to \$75,000. **The application deadline for this funding opportunity is February 21, 2024.**

Upcoming Events

[Sustainable Plastics Live](#)

February 6, 2024 (10 am ET), virtual

Hosted by Sustainable Plastics, this webinar will focus on bio-based plastics and their role in reducing carbon emissions. The webinar will also provide a regulatory update including bioplastics and the UN plastics treaty talks. The webinar will be moderated by Sustainable Plastics editor, Karen Laird.

[Microplastics? Macro Problems: Human and Environmental Health Impacts of Microplastics](#)

February 7, 2024 (9 pm ET), virtual

This webinar is part of the City of Sunnyvale's Sustainability Speaker Series. Dr. Imari Walker-Franklin, research scientist at Research Triangle International and an expert on microplastics, will discuss how microplastics impact the environment and human health.

[Beyond Plastics Virtual Grassroots Organizing Training](#)

February 10, 2024 (12 pm ET) OR February 13, 2024 (7 pm ET); virtual

February 12, 2024 (7 pm ET) OR February 15, 2024 (7 pm ET), virtual

Beyond Plastics is hosting a virtual two-part training on grassroots organizing to teach practical, powerful ways to help end plastic pollution and engage communities. The trainings will cover a range of topics, including a background on the plastics crisis, how to make legislative change, essential media skills, grassroots organizing skills, and community education. There are two sessions of each training: Session 1 – "Laying the Foundation," and Session 2 – "The ABC's of Activism". Sessions may be attended in any order.

[Indisposable Live: Defining "Reuse" for Policymakers](#)

February 15, 2024 (11 am ET), virtual

Upstream's livestream series, Indisposable Live, is kicking off 2024 with this webinar on reuse policy. Nathan Dufour from Zero Waste Europe, Matt Littlejohn from Oceana, and Sydney Harris from Upstream will have a

conversation on how to properly define reusable packaging in the policy context. They will discuss the problems of vague definitions as well as recommendations and best practices for helping pass effective reuse policy.

[From the Frontline: Petrochemicals, Plastics, and Cancer Alley](#)

February 15, 2024 (5 pm ET), virtual

This webinar, hosted by Plastic Pollution Coalition, will feature a conversation with four frontline activists from communities of color within industrial plastic and petrochemical corridors across the United States. Dr. Robert Bullard of the Bullard Center for Environmental & Climate Justice, Shamyra Lavigne of RISE St. James Louisiana, and Reverend Lennox Yearwood of Hip Hop Caucus, will discuss the actions they are taking against pollution and injustice. Erica Cirino, author of *Thicker Than Water: The Quest for Solutions to the Plastic Crisis*, will moderate the conversation.

[How New York is Holding Pepsi Accountable for Its Plastic Pollution—and Your State Can, Too](#)

February 20, 2024 (7 pm ET), virtual

This Beyond Plastics webinar will discuss the recent lawsuit filed by the New York Attorney General against PepsiCo for its false claims about its goals to eliminate single-use plastic. The office cited the fact that 17 percent of the single-use plastic trash in and along the Buffalo River originated from PepsiCo. Lemuel Srlovic, the Chief of the Environmental Bureau of the New York Attorney General's Office will discuss the details and significance of the suit, and Judith Enck and Dawn Henry of Beyond Plastics will discuss how residents of other states can encourage their own Attorneys General to file similar lawsuits.

Save the date for future months...

[Microplastics in the Coastal Region- 2024 Conference](#)

April 8-9, 2024, Charleston, SC

NOAA's National Centers for Coastal Ocean Science and the South Carolina Sea Grant Consortium are hosting this conference with a goal of understanding microplastics' impacts to biota, facilitating potential collaborations, and identifying priority research for the future. This conference will focus on impacts in the target region of North Carolina, South Carolina, and Georgia.

In case you missed it...

[Material Reuse Forum 5: Reuse in Climate Action Plans](#)

This webinar, hosted by Northeast Recycling Council, discussed the growing trend of incorporating reuse practices into climate action plans. The forum featured: Amanda Jordan, Circular Economy Project Manager for the City of Phoenix; Gary Feinland, Waste Reduction & Recycling Outreach and Education Section Supervisor for New York State Department of Environmental Conservation; Julianne Sammut, Climate Change Coordinator for EPA Region 1; and Kate Bartelt, Resources Sustainability and Resiliency Lead at Henningson, Durham & Richardson, Inc.

[Strengthening Routing and Collection for Improved Waste Management](#)

U.S. Agency for International Development's Clean Cities, Blue Ocean program hosted this virtual training on how cities can improve waste collection systems to use resources and prevent waste from entering waterways more efficiently. The webinar provided an overview of the program's suggested approach and examples from implementation experiences in Peru and Sri Lanka.

[The Pollution Pandemic in the Deep Ocean](#)

The Deep-Ocean Stewardship Initiative hosted a webinar series to celebrate their 10th anniversary. This webinar was the third of the six-webinar series and focused on the perils of plastic pollution in the deep ocean. Panelists included: Agnes Wangui Muthumbi from University of Nairobi, Rufino Varea from Pacific Islands Development Program, and João Miguel Pereira from University of the Azores.

[Plastic-Free Resolutions: Protecting Your Health in 2024](#)

The Plastic Pollution Coalition's first webinar of the year offered tangible solutions for reducing plastic in everyday life. Panelists included Queer Brown Vegan Isaias Hernandez; Zero Waste Farmer Manju Kumar; and Co-Owner & Co-Founder of Life Without Plastic Jay Sinha. The conversation was moderated by MADE SAFE Founder Amy Ziff.

A Primer on Compliance and Enforcement Issues for Plastics Pollution

The Environmental Law Institute, International Network for Environmental Compliance and Enforcement, Asian Environmental Compliance and Enforcement Network, and Institute for Global Environmental Strategies recently hosted a webinar on compliance and enforcement issues for plastics pollution. The webinar featured panelists from the host organizations, as well as from the U.S. Department of Justice Environmental Crimes Section and the Monterey Bay Aquarium. The panelists outlined the landscape for compliance and enforcement issues under existing laws, identified critical issues in designing new laws to enhance enforceability, and identified capacity building needs to support enforcement of plastics laws.

Guiding the Development of Bioplastics and Biochemicals to Decarbonize the Chemical Sector

Hosted by the Program on Plastics, Ecosystems, and Public Health at the Paula M. Trienens Institute for Sustainability and Energy at Northwestern University, this hybrid presentation reviewed Argonne National Laboratory's recent developments in decarbonizing chemicals and plastics. Troy Hawkins, a senior scientist and leader of the Fuels and Chemicals Group at Argonne's System Assessment Center, discussed their work in modeling bio- and waste-based chemicals and plastics and advanced plastic recycling processes, as well as priorities for further advancement.

Global Criteria to Address Problematic, Unnecessary, and Avoidable Plastic Products

This virtual session, hosted by the Nordic Council of Ministers and the Geneva Environment Network, discussed the Nordic Council of Ministers' new report on addressing problematic, unnecessary and avoidable plastic products at the global level. This event aimed to give stakeholders an opportunity to explore and discuss possibilities for addressing problematic, unnecessary, and avoidable plastics, drawing insights from the recent publication.

The Microplastics Breakdown

HUMAN EXPOSURE TO MICROPLASTICS

Effect of Microplastics Deposition on Human Lung Airways: A review with Computational Benefits and Challenges

Suvash C. Saha, Goutam Saha

The authors conducted a literature review focused on the presence, accumulation and impacts of microplastics in the human respiratory system. They also explored some of the challenges associated with research in this area. Microplastics in the respiratory system were found to be associated with a range of adverse effects, including inflammation, oxidative stress, and impaired lung function. According to the researchers, these findings raised concerns about long-term health consequences, such as the development of respiratory diseases and the potential for translocation to other organs. The authors also considered the study methods and concluded that computational approaches have been instrumental in understanding the impacts of microplastics on the respiratory system. They observed that computational models and simulations enabled the investigation of particle dynamics, deposition patterns, and interactions at a range of complexity. The authors further noted some of the challenges associated with using these methods, including that their effectiveness relies: (1) on the accurate representation of complex anatomy and physiological processes of the respiratory system; and (2) on obtaining sufficient relevant data for model validation and parameterization. Further challenges in this kind of research, they asserted, stemmed from the characteristics of microplastics (e.g., size shape, and chemical composition) and the resulting difficulty of capturing their full range of behaviors and potential toxicological effects. **Read the full abstract here:** [https://www.cell.com/heliyon/pdf/S2405-8440\(24\)00386-4.pdf](https://www.cell.com/heliyon/pdf/S2405-8440(24)00386-4.pdf)

Microplastics from Disposable Paper Cups are Enriched in the Placenta and Fetus, Leading to Metabolic and Reproductive Toxicity During Pregnancy

Qiong Chen, Chen Peng, Haoteng Xu, Zhuojie Su, Gulimire Yilihan, Xin Wei, Yueran Shen, Chao Jiang

This study investigated the accumulation, the metabolic and the reproductive toxicological effects of microplastics from disposable plastic cups that were filled with hot water on tissues in a pregnant mouse model. Microplastics were detected in all 13 of the tissues they examined. The highest accumulation of microplastics were found in the cecal[1] contents, followed by significant depositions in the fetus, placenta, kidney, spleen, lung, and heart. A significant amount of smaller microplastics (< 10 µm) were found in brain tissues. The researchers found that exposure to the microplastics induced dose response harmful effects on fetal development and maternal physiology as well as dose-responsive changes in functional microbiome and gene pathways. Additionally, results indicated that there are potential toxic effects on metabolic and reproductive systems at exposure levels that had been presumed to be non-hazardous. These risks that may impact vulnerable groups (such as pregnant women and fetuses) are currently unaddressed by food safety regulations. **Read the full abstract here:** <https://www.biorxiv.org/content/biorxiv/early/2024/01/21/2024.01.20.576431.full.pdf>

[1] The cecum is a large blind pouch filled with air (black) and stool (intermediate gray), located in the right lower quadrant. <https://www.sciencedirect.com/topics/medicine-and-dentistry/cecum>

Paint has the Potential to Release Microplastics, Nanoplastics, Inorganic Nanoparticles, and Hybrid Materials

Cheng Fang, Wenhao Zhou, Jiaqi Hu, Cuiqin Wu, Junfeng Niu and Ravi Naidu

Researchers used Raman imaging to identify microplastics and nanoplastics in samples of indoor paint, including 5-year old and 20-year old peeled off paint, and compared it to samples of plastics only. The nanoparticles in paint were identified to be different from the pure plastics. The identification of microplastics and nanoplastics was found to be more difficult for the older paints than the fresh ones. The researchers asserted that the ageing process leads to some degree the decomposition of the plastics. They concluded that Raman imaging is a suitable approach to effectively characterize microplastics and nanoplastics, even from the mixture with the hybrid background. However, three main challenges were identified in using Raman for plastic characterization: 1) the potential interference from other components in the paint; 2) the small size of nanoplastics makes it difficult to obtain accurate Raman signal due to the limited amount of material available for analysis; and 3) the generation of a usable image is difficult. Research on microplastics in house and office paint was described as critical in developing effective methods to protect the environment and human health. **Read the full abstract here:** <https://link.springer.com/article/10.1186/s12302-024-00844-6#Sec2>

Tissue Accumulation of Microplastics and Potential Health Risks in Human

Long Zhu, Yulin Kang, Mindong Ma, Zhixin Wu, Le Zhang, Rongxuan Hu, Qiujin Xu, Jingying Zhu, Xiaohong Gu, Lihui An

The article observed that, while humans constantly ingest and inhale microplastics and there are increasing concerns about the health risks of microplastic exposure, limited data impedes a full understanding of the internal exposure to microplastics. The authors investigated human microplastic exposure via the respiratory and digestive systems by examining lung, small intestine, large intestine and tonsil tissue samples. Laser direct infrared spectroscopy was used to identify microplastics greater than 20 µm in size in different human tissues. Microplastics ranging in sizes from 20–100 µm were found in all tissues. The highest abundance of microplastics were detected in the lung tissues, followed by the small intestine, then the large intestine, and the tonsil. Samples from females had significantly more microplastics the ones extracted from males. A total of 14 polymers were identified, including polyvinyl chloride (PVC), polybutylene succinate, polyamide, polyethylene terephthalate and polystyrene. PVC was identified as the most prevalent polymer. The authors observed that PVC particles pose a significant potential health risk. They asserted their study provides evidence regarding the occurrence of microplastics in humans and empirical data to support assessments of the health risks posed by microplastics. **Read the full abstract here:** <https://www.sciencedirect.com/science/article/pii/S0048969724001384>

MICROPLASTICS IN THE ENVIRONMENT AND ECOSYSTEM IMPACTS

Are Microplastics in Livestock and Poultry Manure an Emerging Threat to Agricultural Soil Safety?

Yuannan Long, You Zhang, Zhenyu Zhou, Ruyi Liu, Ziyi Qiu, Yiming Qiu, Juan Li, Wenming Wang, Xiwei Li, Lingshi Yin and Xiaofeng Wen

The authors described the common pollutants in livestock and poultry manure as: microplastics, heavy metals, pathogens, antibiotic resistance genes, and persistent organic pollutants. They observed that little is known

about the behavior and fate of manure-born microplastics coming from livestock and poultry production systems and into agriculture soils. This article focused on the analysis of 1,429 articles focused on microplastics in soil and the results of seven surveys. They summarized the analytical methods for microplastic sampling, separation, and identification, as well as the occurrence of microplastics in livestock and poultry manure. Microplastics in manure were found to become smaller, rougher, and more numerous over time. The authors noted these microplastics could easily form more toxic compound pollution after manure treatment, which could threaten agricultural soil safety. Recommendations for future research is also included. **Read the full abstract here:**

<https://link.springer.com/article/10.1007/s11356-024-31857-6#:~:text=Especially%20after%20complicated%20or%20long,threat%20to%20agricultural%20soil%20safety.>

Microplastics in the Coral Ecosystems: A Threat which Needs More Global Attention

Tanmoy Biswas, Subodh Chandra Pal, Asish Saha, Dipankar Ruidas, Manisa Shit, Abu Reza Md. Towfiqul Islam, Guilherme Malafaia

This literature review observed that invertebrate corals and coral reefs in tropical and sub-tropical countries have suffered immensely from microplastic pollution and there has been a gradually decreasing trend of coral reef concentration on the oceanic surface. The bioaccumulation and ingestion of microplastics debris by coral polyps were found hinder their growth and induced coral bleaching. This review mainly focused on identifying microplastic sources, global distribution, and adverse effects on corals and coral reef ecosystems. The authors found that a limited amount of research has been conducted on coral reef ecosystems in a range of countries, including the Philippines, India, Malaysia, Indonesia, Brazil, Vietnam, Bangladesh, Thailand, Russia, Germany, United Kingdom, Mexico, and Japan despite highest discharge of microplastics debris. Furthermore, their findings highlighted that only a few countries and a few researchers worldwide have worked on microplastic pollution and its impacts on coral ecosystems. Consequently, the researchers recommended future research on microplastic pollution as a global threat to coral ecosystems. It was suggested that microplastic sources should be more precisely identified; the production of microplastics should be minimized; regular monitoring of aquatic ecosystems and microplastic recycling should be instituted. Additionally, the authors highlighted the need for strict government policies to slow down the adverse impact of microplastics on coral reef ecosystems and marine environments.

Read the full abstract here: <https://www.sciencedirect.com/science/article/pii/S0964569123005379>

MICROPLASTICS POLICY

To Curb Plastic Pollution, Industry and Academia Must Unite

Collin P. Ward, Christopher M. Reddy, Brian Edwards and Steven T. Perri

This article asserted that that industry and academia working together is the key to moving away from conventional plastics. The authors pointed to other partnerships, such as those occurring in the computer science and health care sectors, which could serve as models for this kind of collaboration. Stigma is one of the main reasons that such collaborations are less common in the environmental and sustainability sciences, noting that in academia, applied science is often perceived as less prestigious than its fundamental counterpart. Furthermore, the article pointed out that industry is often blamed for environmental problems such as plastic waste and climate change. Thus, these collaborations are sometimes viewed as academics 'selling out' and industrials 'buying' scientific results. The article provided an overview of the plastic industry and emphasized the need for changes to mitigate and reduce pollution. An outline of the benefits and the challenges in establishing and implementing these collaborations was provided. The authors also included a series of recommendations that could foster the effectiveness of industry-academic partnerships. **Read the full abstract here:**

<https://www.nature.com/articles/d41586-024-00155-z>



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