
The Rapids

US EPA's Trash Free Waters Monthly Update

October 2022

epa.gov/trash-free-waters

Introduction

Hello all,

Happy fall everyone!

Last month, 85 businesses from across the plastics value chain, financial institutions, and NGOs announced plans to form a [Business Coalition for a Global Plastics Treaty](#). The coalition, convened by the Ellen MacArthur Foundation and World Wildlife Fund, sees the [Global Treaty to End Plastic Pollution](#) as the single most important opportunity to accelerate progress towards a circular economy in which plastic never becomes waste or pollution, and the value of products and materials is retained in the economy.

In addition, several authors from the International Marine Climate Change Center (iMC3) recently published [“Marine litter and climate change: Inextricably connected threats to the world's oceans.”](#) I encourage you to take a look at this study, which outlines the interactions and effects of marine litter and climate change and the potential for ecosystem resilience approaches to address these combined threats.

I also wanted to share the good news that the National Oceanic and Atmospheric Program announced last week – 14 organizations have been selected as [NOAA 2022 Marine Debris Removal and Prevention grant](#) recipients.

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.

Romell Nandi
US EPA
Trash Free Waters National Program Lead

EPA Announcements

[Soliciting Public Comment on the Report on Microfiber Pollution](#)

EPA's TFW Program and NOAA's Marine Debris Program are pleased to share the draft [Report on Microfiber Pollution](#), according to Section 132 of the Save Our Seas 2.0 Act of 2020. The report is now available for public comment until 11:59PM Eastern Time on October 17th, via Federal Register Notice. Please take a look!

[Release of the South Atlantic Strategy for Trash Free Waters Funding Compendium](#)

The South Atlantic Strategy (SAS) for TFW Funding Compendium compiles known grants, funds, and searchable databases that could help support [SAS](#) project implementation. This living resource includes both nationwide funding opportunities and those specific to North Carolina, South Carolina, Georgia, and Florida.

[Podcast Episode on TFW's Curbside Disposal Project](#)

The [Curbside Disposal Education Campaign Pilot](#) published by TFW this spring was recently featured on an Engaging Local Government Leaders (ELGL) "GovLov" podcast. During the podcast, Layne Marshall and local project partner Julie Patton Lawson outlined the project's intention, methodology, key findings, and recommendations for other local governments interested in adopting a similar approach to reducing curbside leakage.

[Recipients of EPA Pollution Prevention Grants Announced](#)

EPA recently announced the selection of 39 recipients that will receive nearly \$12 million in pollution prevention (P2) grants made possible by President Biden's Bipartisan Infrastructure Law's (BIL) historic \$100 million program investment. These grants will allow states and Tribes to provide businesses with technical assistance to help them develop and adopt P2 practices to prevent or reduce pollution before it is even created, while also reducing business and liability costs. Proposed projects include reducing PFAS contamination in food packaging and food waste recycling streams, increasing awareness of green cleaning chemicals in businesses and schools, and helping underserved communities implement P2 best practices to reduce waste and emissions from industrial plants. These grants are the first of five P2 grant programs over the next five years that will be funded by the BIL.

[Three Gulf of Mexico Trash Free Waters Grants Announced at MRCTI Annual Meeting](#)

On September 14th, the EPA Region 4 Administrator, Daniel Blackman, and EPA Region 7 Administrator, Meg McCollister, attended the Mississippi River Cities and Towns Initiative Annual Meeting to announce several Gulf of Mexico Trash Free Waters grants awarded to St. Louis, Memphis, and Baton Rouge.

Funding Opportunities

[Coastal Habitat Restoration and Resilience Grants for Underserved Communities](#)

The principal objective of this solicitation is to support opportunities for underserved communities, tribes, and/or tribal entities to meaningfully engage in coastal habitat restoration activities. Through this funding opportunity, NOAA intends to support capacity-building and restoration project activities that have the greatest potential to lead to habitat restoration that enhances the resilience of underserved communities in marine, estuarine, coastal, and Great Lakes areas. NOAA anticipates up to \$10 million will be available under this opportunity in FY22 and typical federal funding awards will range from \$250,000 to \$500,000 over three years. **The deadline for submissions has been extended to October 5.**

[Research to Action: Assessing and Addressing Community Exposures to Environmental Contaminants](#)

This National Institutes 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. **The first deadline for submissions is October 5, with additional opportunities every 4 months until September 2025.**

FY2022 Tribal Wetland Program Development Grants (EPA-OW-OWOW-22-03)

Tribal Wetland Program Development Grants (WPDGs) assist tribal governments and intertribal consortia to develop or refine tribal programs which protect, manage, and restore wetlands. The primary focus of these grants is to develop/refine tribal wetland programs. The goals of EPA's wetland program include increasing the quantity and quality of wetlands in the U.S. by conserving and restoring wetland acreage and improving wetland conditions. In pursuing these goals, EPA seeks to develop the capacity of all levels of government to develop and refine effective, comprehensive programs for wetland protection and management. **The deadline for submissions is October 7.**

FY22 NOAA Marine Debris Removal under the Infrastructure Investment and Jobs Act

The NOAA Marine Debris Program will award up to \$56 million through funding provided by the Bipartisan Infrastructure Law. This competition focuses on two priorities: removing large marine debris and using proven interception technologies to capture marine debris throughout the coastal United States, Great Lakes, territories, and the Freely Associated States. These two priorities will be reviewed as separate, parallel tracks with different application requirements. Federal requests for Priority 1 must be between \$1 million to \$15 million. Federal requests for Priority 2 must be between \$100,000 to \$1 million. **The deadline for submissions has been extended to October 14.**

NOAA US IOOS FY 2023 Ocean Technology Transition (OTT) Funding Opportunity

The U.S. Integrated Ocean Observing System (IOOS) is soliciting proposals for the transition to operations of sensors, data management, and other technical capabilities that will improve our ability to monitor and forecast ocean, coastal, and Great Lakes environmental conditions with greater efficiency. In FY 2023-2024, it is estimated that up to \$7.5 million per year will be available. Awards are for up to \$400,000 per year for up to three years. Letters of Intent (LOI) are highly recommended but not required. **LOIs are due on October 21. Full proposals are due on January 17, 2023.**

PADI AWARE Mission Hub Community Grants

This grant is open to funding projects that align with PADI's Blueprint for Ocean Action, in direct support of the United Nations Decade of Science for Sustainable Development. Project proposals should focus on the following areas: Marine Debris, Vulnerable Species Protection, Coral Reefs, Climate Change, and Marine Protected Areas. Grantees will be selected based on conservation needs, community feedback, and budget. The maximum grant amount is \$10,000. **The deadline for submissions is October 22.**

2022 EJ Thriving Communities Technical Assistance Centers RFA

This Request for Applications provides a total of up to \$50 million in funding for the establishment of 5-10 Environmental Justice Thriving Community Technical Assistance Centers across the nation to provide technical assistance, training, and capacity-building support to communities with environmental justice concerns and their partners. Funds per award will total approximately \$6 million depending on funding availability and other applicable considerations. Awards will be incrementally funded with periods of performance of three years. Awards will be issued as cooperative agreements and EPA will be substantially involved in the operation of the centers. **The deadline for submissions has been extended to November 1.**

FY22 and FY23 EPA Region 2 Source Reduction Assistance in Communities Grants

EPA Region 2 is announcing a grant competition to fund assistance agreements that support research, investigation, study, demonstration, outreach, education, and training using source reduction approaches (also known as "pollution prevention," or "P2"). P2 means reducing or eliminating pollutants from

entering any waste stream or otherwise released into the environment before recycling, treatment, or disposal. EPA is particularly interested in receiving applications that offer hands-on practical P2 tools, information, and/or innovative P2 approaches to measurably improve public health and the surrounding environment, by reducing the use of hazardous substances, reducing toxic pollutants, supporting efficiencies in reducing resource use (e.g., water and energy), and reducing business expenditures and liability costs. **The deadline for submissions is November 14.**

EPA Green Chemistry Challenge Awards Program

The EPA Green Chemistry Challenge Awards promote the environmental and economic benefits of developing and using novel green chemistry. These prestigious annual awards recognize chemical technologies that incorporate green chemistry into chemical design, manufacture, and use. Focus areas of the challenge include Greener Synthetic Pathways, Greener Reaction Conditions, and The Design of Greener Chemicals. **The deadline for submissions is December 9.**

Solid Waste Management Grant Program

The U.S. Department of Agriculture's Solid Waste Management (SWM) Grant Program has been established to assist communities through free technical assistance and/or training provided by the grant recipients. Public bodies, nonprofits, Federally recognized tribes, and academic institutions within rural areas and towns with a population of 10,000 or less are eligible to receive SWM grant funds to reduce or eliminate pollution of water resources in rural areas and improve planning and management of solid waste sites in rural areas. Funds may be used to evaluate current landfill conditions to determine threats to water resources, provide technical assistance and/or training to enhance operator skills in the operation and maintenance of active landfills, and provide technical assistance and/or training to help communities reduce the solid waste stream. **The deadline for submissions is December 31.**

Building Resilient Infrastructure and Communities

The Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities (BRIC) grant program will support states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. The BRIC program's guiding principles are supporting communities through capability and capacity building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility, and providing consistency. **The deadline for submissions is January 27, 2023.**

20th Annual P3 Awards: A National Student Design Competition Focusing on People, Prosperity and the Planet

The EPA seeks applications proposing to take a holistic approach, grounded in research and innovation, to develop and demonstrate solutions to real world challenges. The People, Prosperity, and the Planet (P3) Program highlights the use of scientific principles in creating innovative technology-based projects that achieve the mutual goals of improved quality of life, economic prosperity and environmental protection. This award program is split into four separate funding opportunities: Clean and Healthy Air (EPA-G2023-P3-Q1), Clean and Safe Water (EPA-G2023-P3-Q2), Safeguard and Revitalize Communities (EPA-G2023-P3-Q3), and Ensure Safety of Chemicals (EPA-G2023-P3-Q4). **The deadline for submissions is February 1, 2023.**

Other opportunities...

U.S. Plastics Pact's Reuse Catalyst Program

The U.S. Plastics Pact's Reuse Catalyst is a pillar of the U.S. Pact's broader reuse efforts to accelerate the cross-industry uptake of reusable and refillable packaging in the United States. Facilitated by the U.S. Pact

and in collaboration with Closed Loop Partners, the Reusable Packaging Association, and World Wildlife Fund, the Reuse Catalyst aims to bolster the development of emerging and established reuse and refill innovators, and the broader industry, through shared learnings, expertise, connectivity, and amplification. Eligible companies must be either already deploying or will deploy before October 19, a reusable or refillable packaging model for a short or long-term testing period in market conditions. **Applications are due October 20.**

[EPA Seeks Input on New Environmental Justice-Focused Pollution Prevention Grant Opportunity](#)

EPA is collecting input on the development of a new grant opportunity made possible by the \$100 million investment in the agency's Pollution Prevention (P2) program from President Biden's Bipartisan Infrastructure Law (BIL). The new grant opportunity will encourage businesses that are working in, or working with, underserved or overburdened communities to adopt P2 practices. EPA is interested in understanding how these grants can be most accessible and useful to applicants. **Written feedback on this new grant opportunity will be accepted through October 28 by contacting P2-EJ-Grants@epa.gov.**

Upcoming Events

[Sustainability and Circular Economy Summit 2022](#)

October 11th, Washington, D.C.

This event is being hosted by the U.S. Chamber of Commerce Foundation and will convene corporate responsibility professionals, government leaders, academics, and sustainability changemakers to learn and educate one another on replicable, successful sustainability and circular economy initiatives. This year's conference will feature top leaders to discuss how companies are navigating today's uncertainties, cutting-edge strategies for achieving sustainability goals, and how to leverage collaboration and innovation to channel emerging trends into lasting systemic change.

[North American Association for Environmental Education \(NAAEE\) Conference and Research Symposium](#)

October 11-15th, Tucson, AZ, and virtual

NAAEE's 2022 Conference (Oct 12-15) will focus on the powerful role education can play in creating healthier communities and tackling today's complex environmental and social issues. The conference will cover vital topics such as climate change education and climate justice, the benefits of connecting to nature, building a green workforce, protecting biodiversity, and centering equity in our work. This year's NAAEE Research Symposium (Oct 11-12) brings together new and experienced researchers from around the globe to explore the current state and future directions of environmental education research and advance the use of practices proven to be effective.

[Tribal Disaster Debris and Climate Resilience Planning Training: Course II](#)

October 12th (1-4PM ET), virtual

During this virtual training offered by the EPA, tribal staff will have the opportunity to work in small groups with staff from other tribal and other governmental agencies to begin developing effective and sustainable disaster debris management plans before disasters strike. Direct technical assistance will be offered to up to 10 tribes following the training to help with writing and implementing effective climate resilient disaster debris management plans. Attendance at all three training sessions is strongly recommended.

[North Carolina Marine Debris Symposium](#)

October 12-14th, Beaufort, NC, and virtual

Coastal Carolina Riverwatch hosts this annual symposium that brings together marine debris and plastic pollution prevention stakeholders to discuss recent research, infrastructure, best management practices, policy development, removal projects, and advocacy that prevents plastic pollution. This year's event will take place at the Duke University Marine Lab on Pivers Island in Beaufort, but attendance will also be available virtually through live-stream access.

2022 Keep Florida Beautiful Annual Conference and Awards Social

October 19th-21st, New Port Richey, FL

Keep FL Beautiful is excited to be working alongside host affiliate Keep Pasco Beautiful to bring you an innovative and engaging conference experience. This conference is for affiliates, board members, community partners, local governments, state agencies, elected officials, businesses, and like-minded organizations. Conference sessions will include presentations on microplastics, reuse, sustainable tourism, and more.

2022 National Stormwater Roundtable

October 19th-21st, Boston, MA

The 2022 National Stormwater Roundtable supports the implementation of federal and state municipal, industrial, and construction stormwater programs nationwide by sharing best management practices, showcasing innovative programs and initiatives, highlighting new technologies, facilitating discussion on national program enhancements and improvements, identifying state resource needs, and proposing solutions to challenges and barriers faced by regulators and other stakeholders. This meeting is specifically organized by state and federal regulators for EPA and state program staff representatives.

Tribal Disaster Debris and Climate Resilience Planning Training: Course III

October 20th (1-4PM ET), virtual

During this virtual training offered by the EPA, tribal staff will have the opportunity to work in small groups with staff from other tribal and other governmental agencies to begin developing effective and sustainable disaster debris management plans before disasters strike. Direct technical assistance will be offered to up to 10 tribes following the training to help with writing and implementing effective climate resilient disaster debris management plans. Attendance at all three training sessions is strongly recommended.

Reusable Packaging Pavilion and Learning Center at PACK EXPO International

October 23rd-26th, Chicago, IL

The Reusable Packaging Association (RPA) Pavilion at Pack Expo International will welcome 47 RPA members who will be exhibiting the latest trends and innovations in reusable packaging. In addition to the Pavilion, RPA will also feature their Reusable Packaging Learning Center with 18 education sessions taking place over two days, including four panel discussions featuring the collective expertise of suppliers, technology providers, end users, and service providers in the reusable packaging industry.

EPR Masterclass on Compostable Plastics

October 27th (11:30AM-1PM ET), virtual

The Product Stewardship Institute will gather experts to discuss the opportunities and challenges of compostable plastics, including achieving clarity on definitions and labeling, addressing materials in packaging Extended Producer Responsibility (EPR) laws, how EPR funding can be used to create new infrastructure for compostable plastics, and strategies for best managing these materials in a rapidly evolving industry.

Save the dates for future months...

17th Annual Chesapeake Watershed Forum

November 4-6th, Shepherdstown, WV

The Alliance for the Chesapeake Bay is hosting this 17th annual watershed forum, a watershed-wide event reaching over 400 restoration and protection practitioners to inspire and empower local action towards clean water. Attendees can expect to learn about successful tools and techniques from on-the-ground examples as well as how to build capacities of local organizations, foster partnerships, and incorporate new initiatives and emerging practices into their work.

Trash Free Texas Single-Use Plastic Reduction Workgroup Meeting

November 7th (3:30PM ET), virtual

The Trash Free Texas team from the North Central Texas Council of Governments and the Houston-Galveston Area Council cordially invites Texan cities, restaurants, third-party delivery providers, chambers of commerce, and restaurant patrons to participate in the next meeting of the Trash Free Texas Single-Use Plastic Reduction Workgroup. The purpose of this meeting is for the Trash Free Texas team to receive feedback on two draft toolkits (one for cities and one for restaurants) that include resources, templates, and strategies for voluntarily reducing the use of single-use plastics in restaurants.

74th Annual Gulf & Caribbean Fisheries Institute Conference

November 8-12th, virtual

The theme of this year's Gulf and Caribbean Fisheries Institute (GCFI) conference is "A Changing Time: Interactions between Science and Governance." The meeting will bring together regional stakeholders to share experiences and present success stories from around the Gulf and Caribbean. Several conference presentations will be dedicated to marine litter, including microplastics research and Abandoned, Lost, and Discarded Fishing Gear (ALDFG).

EPA Stakeholder Meeting on Rubber, Miscellaneous Plastics, and Miscellaneous Manufacturing

November 9th (1-2:30PM ET), virtual

EPA is hosting a series of public meetings in Fall 2022 to inform updates to [EPA's industrial stormwater fact sheet series](#), which guides each of the 29 industrial sectors covered under the Multi-Sector General Permit (MSGP). These resources are an important part of EPA's industrial stormwater program to assist facilities in managing their stormwater discharges. This particular meeting will focus on hearing stakeholder input on common activities, pollutant sources, and associated pollutants at facilities in Rubber, Miscellaneous Plastics, and Miscellaneous Manufacturing (Sector Y); and stormwater control measures or best management practices, including source control and good housekeeping/pollution prevention measures for potential pollutant sources at facilities in the sector.

Starting Community Composting Programs on Tribal Lands (EPA Region 9)

November 9-10th, Maricopa, AZ

This in-person training workshop will be hosted by the Ak-Chin Indian Community in Maricopa, Arizona, and is organized by EPA Region 9 with the support of Booz Allen Hamilton. Attendees will learn how to compost, identify community composting practices that may work well in your community, and chart a path towards developing a community composting program. We will visit current on-farm composting operations and hear from other Tribes about their composting experiences. This event is intended for employees of federally-recognized Tribes and Tribal consortia. Participants from outside of EPA Region 9 are welcome, though travel stipends are not available.

Electronics Reuse Conference

November 14-16th, Denver, CO, and virtual

Join the world's brightest minds in reuse to learn and connect. This conference will bring together more than 10 industries, consisting of hyper-focused speeches, panels, and live Q&A sessions to help take your business to the next level. The all-in-one repair, reuse, and refurbishing event will bring you closer to leading companies and brands than ever before in the mile-high city.

MICRO 2022, Atlas Edition: Plastic Pollution from Macro to Nano

November 14-18th, virtual

Questions about plastics have continued to multiply as the research community grows and public concern heightens. MICRO 2022 provides an opportunity to share what we know, fill in gaps, identify new questions and develop commitments to operationalize this knowledge into meaningful actions addressing plastic pollution from macro to nano.

Product Sustainability Summit USA 2022

November 15-16th, Arlington, VA, and virtual

This conference will be held by ChemicalWatch and feature expert speakers to help explore how businesses can benefit from a sustainable product strategy. The building blocks for a sustainable product strategy start with responsible sourcing and supply chain transparency. This then leads to circular economies, including compliance with laws in chemicals on products that are being made circular. Designing for sustainability is the next building block to be considered and this includes trends for 'Safe by Design' in the U.S. and EU. The final building block to be covered in this conference is sustainable packaging.

Restore America's Estuaries Coastal and Estuarine Summit

December 4-8th, New Orleans, LA, and virtual

Restore America's Estuaries (RAE) proudly presents the 2022 Coastal & Estuarine Summit with support from Coalition to Restore Coastal Louisiana (CRCL). In its 11th year, the 2022 Summit will bring together the coastal restoration and management communities to explore issues, solutions, and lessons learned in their work. The Summit Program will address all aspects of coastal and estuarine restoration and management, including the Great Lakes and international locales. These topics are crucial as coastal communities pursue new, more robust strategies to effectively manage, protect, and restore their resources in a changing climate.

WasteCon 2022

December 5-8th, San Diego, CA

WASTECON is The Solid Waste Association of North America's (SWANA) executive leadership summit. The solid waste industry is going through exciting changes that bring both challenges and opportunities. With a mix of keynotes addressing the hot topics in the industry, development and learning sessions, and lots of networking time, this event will provide you and your team with what you need to best respond to change, seize opportunity, and keep stakeholders aligned and supportive.

In case you missed it...

The Challenges & Opportunities of Making Your Business Plastic Free

This Plastic Pollution Coalition webinar recording includes a discussion with business owners who have succeeded in going plastic free. Guest speakers include Joshua Onysko, Founder & CEO of Pangea Organics; Cassia Patel, Director of Programs at Oceanic Global; and Alejandra Warren, Co-Founder & Executive Director of Plastic Free Future.

How Environmental Toxicity, Inequity, and Capitalism Affect Reproductive Health

This Center for Biological Diversity webinar highlighted a new [report](#) outlining how invisible environmental threats - such as toxic chemicals in the air and water and extreme temperatures - impede reproductive justice and cause harm to pregnant people, fetuses, infants, and children. Case studies referenced in the report and webinar call out “Cancer Alley”, the connection between plastic phthalates and endometriosis, agricultural toxics pollution in Indigenous communities, and redlining’s effect on extreme heat exposure.

Trick or Trash: Fostering Circular Economy Participation through Education

The materials used for candy packaging are notoriously difficult to recycle, with the vast majority ending up in landfills. That’s why Rubicon created Trick or Trash™, an educational program designed to help reduce the waste that accumulates every year around Halloween. This GreenBiz webcast features a panel of Trick or Trash partners to discuss their learnings from the front lines of sustainability education.

The Microplastics Breakdown

HUMAN EXPOSURE TO MICROPLASTICS

Foodborne pathogens in the plastisphere: Can microplastics in the food chain threaten microbial food safety?

Raffaella Tavelli, Martijn Callens, Charlotte Grootaert, Mohamed F. Abdallah, Andreja Rajkovic

The authors of this literature review observed that microplastics (MPs) can be found in various parts of the food chain, including in drinking water and fishery products. Therefore, they asserted, ingestion is considered the main route of human exposure to MPs. This article focused on the state of knowledge regarding the potential role of MPs in serving as a vector for pathogenic bacteria and the uptake of MPs and pathogens in the human gut. The biofilm ecosystem that forms on plastic debris, they stated, is often referred to as the “plastisphere.” They observed that the specific microbial composition of the plastisphere depends on many factors, such as geographical location, season, and polymer type. As described in this article, recent literature found that a core microbiome may be shared by different plastisphere communities. Based on their research finding that human foodborne pathogens are in the plastisphere, together with the ability of MPs to adsorb microbial toxins present in the environment and food, the authors concluded that there are major concerns for MP contamination in the food chain. However, they noted that more realistic data is needed to support the hypothesis that MPs can mediate the entry of pathogens. The article later suggested that the gastrointestinal uptake of biofilm-loaded MPs and associated health effects should be tested further. Additionally, it pointed out that focusing on the possible pathways for indirect toxicity would help fill existing knowledge gaps related to human health impacts.

Indoor microplastics and bacteria in the atmospheric fallout in urban homes

Jiawen Cui, Chen Chen, Quan Gan, Tongfei Wang, Wei Li, Wen Zeng, Xiaowen Xu, Gang Chen, Li Wang, Zhaogeng Lu, Jiana Li, Biao Jin

Researchers in this study looked at indoor airborne MPs and the presence of bacteria. They selected the homes of twenty families in Yangzhou, Jiangsu, China, and were classified into four groups based on the family composition: group I (old people, young people, and a child), group II (middle-aged people and a child), group III (two young people [a couple]); and group IV (two old people [a couple]). Five room types were examined: bedroom, dining room, living room, bathroom, and study based on the duration of usage of each room. Samples of bacteria were collected in Petri dishes that had been placed in the same sampling locations at the same time; one sample from each sampling location was also taken for MP detection using LDIR. The article reported that synthetic polymers (23,889 MP particles of 21 types) and bacterial communities (383 genera belonging to 24 phyla) were found. The abundance and composition of MPs

were related to the duration of usage, human activities, goods, cleanliness, and the composition of occupants in households. Additionally, the homes of elderly families (age 68-81 years) were found to have demonstrated higher bacterial concentrations than those of young families (age 28-35 years), indicating that age markedly affects the structure of household microbiota. Furthermore, a significant correlation between MP concentration and bacterial community structure was observed. The abundances of polyamide (PA), polyurethane (PU), and polyethylene (PE) showed positive correlations with the relative abundances of major bacterial phyla. The authors concluded that their study results suggest that various rooms in the home exhibit distinct MP abundances and bacterial structures that may be affected by age, cleanliness, and human activities.

The neglected potential source of microplastics from daily necessities: A study on protective mobile phone cases

Qilu Li, Meng Yuan, Yuan Chen, Xinjie Jin, Jingfang Shangguan, Jinle Cui, Shixiang Chang, Mengran Guo, Yan Wang

This study examined different protective mobile phone cases (PMPCs), the majority of which are made from polycarbonate, thermoplastic polyurethane, and silica gel. According to the article, the researchers selected phone cases as a representative plastic commodity in contact with the human body for long periods. The stated goal of this research was to explore the generation and transportation of MPs during 3 months of actual use. Six volunteers were recruited for the experiment, and every two volunteers used the PMPCs, purchased in China, of the same material as parallel samples. The MPs generated by the use of the PMPCs were collected by wiping the surfaces of the PMPCs and volunteers' palms with a non-woven fabric. A total of 104 experimental MP samples were collected. Four main kinds of MPs were found to have been produced during the use of different PMPCs: polyurethane (PU), polypropylene (PP), polyethylene terephthalate (PET), and acrylonitrile butadiene styrene (ABS). The authors pointed to the combined effect of ultraviolet aging and friction as the main reason for MP generation during daily PMPC use. The researchers calculated the mean MP counts from the PMPCs and palm surfaces before and after 4 hours of use as part of their evaluation of the short-term pollution characteristics of MPs. PU and PET accounted for a high proportion of MPs when the PMPCs were used for 0 hours, whereas PET accounted for the highest proportion of MPs when they were used for 4 hours. Overall MP abundance was found to increase over time; notably increasing rapidly after about 33 days of use. The authors asserted that their study results demonstrate there are potential risks to human health associated with using PMPCs.

Raman imaging for the identification of Teflon microplastics and nanoplastics released from non-stick cookware

Yunlong Luo, Christopher T. Gibson, Clarence Chuah, Youhong Tang, Ravi Naidu, Cheng Fang

The investigators used Raman imaging to scan the surfaces of different non-stick pots to identify MPs and nanoplastics (NPs). They employed certain techniques to mimic the cooking process on six non-stick cooking pots (4 brand new pots and 2 old pots). For example, stirring a more than two-year-old used steel turner in the pot. The variation in technique was based on the investigators' hypothesis that different cooking styles might lead to differences in the quantities of released fragments, such as turning speed, force/strength, and directions (stirring or turning-over). Study results indicated that Teflon MPs and NPs can be potentially released from non-stick pots during the cooking process. According to the authors, their results provide a strong warning that people must be careful with selecting and using cooking utensils, to avoid potential contamination of their food with MPs. The authors recommended more research to better assess the risk of Teflon MPs and NPs.

MICROPLASTICS IN THE ENVIRONMENT AND IMPACTS ON ORGANISMS

How can “my shoes” affect the amphibian health? A study of the toxicity of microplastics from shoe sole (Polyvinyl chloride acetate) on *Physalaemus cuvieri* tadpoles

Amanda Pereira da Costa Araújo, Thiarlen Marinho da Luz, Sandy de Oliveira Gonçalves, Rajakrishnan Rajagopal, Md. Mostafizur Rahman, Daniela de Melo e Silva, Guilherme Malafaia

Researchers investigated whether MPs from the soles of shoes could have harmful health effects on *Physalaemus cuvieri* (a species of South American frog) tadpoles. MPs were obtained from a black sports shoe purchased at a Brazilian store. Initially, approximately 4 cm long fragments were removed from the shoe sole using metallic scissors. After 30 days of exposure to different MP concentrations, the researchers found that the tadpoles ingested particles and irregular shapes, which accumulated in the intestinal tube. Such accumulation was determined to be associated with deformities such as non-uniformity in the keratinized structures of the jaw sheath, alterations in the intestine position in the abdominal cavity, bowel tube winding condition, and the emergence of dark regions in the intestine like pseudomelanosis. Effects on components of the immune system were also found. The MPs retrieved from the tadpole intestines were found to have undergone a significant size reduction (area, perimeter, and diameter) after ingestion, which suggested to the authors that tadpoles can act as vectors for the dispersal of MPs from shoe soles in the environment. The article described the study results as demonstrating that sneakers, while seemingly harmless, can pose a health risk to amphibians. The authors recommended that future studies should explore the influence of leachate from MPs from shoe soles (both in exposure waters and in the gastrointestinal tract of animals) on the toxicity of these polymers.

Litter in Urban Areas May Contribute to Microplastics Pollution: Laboratory Study of the Photodegradation of Four Commonly Discarded Plastics

Lisa Öborn, Heléne Österlund, Jonathan Svedin, Kerstin Nordqvist and Maria Viklander

This study focused on commonly found litter: a plastic bag, a chocolate bar wrapper, a plastic coffee cup lid, and a plastic bottle, made of low-density polyethylene (LD-PE), polypropylene (PP), polystyrene (PS), and polyethylene terephthalate (PET), respectively. All of these tested materials were from new plastic products to ensure no previous wear and they were described as white except for the transparent blue PET bottle. The sample materials were cut into pieces to allow comparison between the different litters and then were put into glass beakers which were placed under UV light with three exposure times. The concentrations of MPs in the UV-exposed samples showed different degradation behaviors over time for the polymers included in this study. For LD-PE, no clear pattern of UV degradation was demonstrated, because the number of particles released from exposed and unexposed (control) samples was in the same order of magnitude. PS and PET showed similar patterns, where the number of particles released increased with exposure duration. PP produced the largest number of particles after 28 days of exposure, which then decreased after 56 days. It was hypothesized that the number of particles increased with exposure time and that the generated particles then further fragmented into pieces of undetectable particle size. The researchers recommended future studies to investigate the degradation of plastic litter and its contribution to MPs in stormwater. Another research suggestion was the exploration of the same polymers from different sources because degradation is not only dependent on the polymer, but also on additions of additives, pigments, and UV stabilizers.

MICROPLASTICS PUBLIC POLICY AND EDUCATION

Past, Present, and Possible Future Policies on Plastic Use in the USA, Particularly Microplastics and Nanoplastics: A Review

Rachel M. Sorensen, Rameshwar S. Kanwar, Boris Jovanović

This paper examined the published literature on the current U.S. laws passed by Congress and regulations developed by various federal agencies such as the EPA and the FDA that could be used to regulate MPs and NPs. The authors asserted that existing environmental statutes such as the Clean Water Act, Safe

Drinking Water Act, Toxic Substances Control Act, Resource Conservation and Recovery Act, and Clean Air Act can all be used to address plastic pollution. However, they acknowledged that these statutes have not been invoked for MP and NP waste in water or air. Existing regulations applicable to plastics were also highlighted. For example, the FDA recommended that acceptable levels of ingestible contaminate from recycled plastic is less than 1.5 µg /person/day – 476,000 times less than the possible ingested daily dose. State and local regulations such as bans on plastic bags and plastic straws were also discussed. This paper pointed to TSCA as being “the future of MP regulation” in the United States; specifically, this authority could be used to test the safety of plastics. In the context of FDA’s authorities, the authors suggested that MPs should be redefined to allow for set tolerance levels for MPs in food and beverages.

Plastics Crash Course: A Website for Teaching Plastics Recycling and Microplastics Prevention through Infographics

Madison R. Reed and Wan-Ting Chen

As described in this article, the authors hypothesized that outreach activities using infographics or e-comics could effectively train students in creative thinking and could attract more people to learn about sustainability in the plastics industry. They investigated this hypothesis by developing the “Plastics Crash Course,” an interactive website designed for people with any background to learn about plastics recycling by reading infographics. The site included a survey to gauge the base knowledge level of the participants. Participants were next invited to read the infographics and blog posts tailored to recycling before completing a post-survey to determine if anything was learned. As part of the authors’ outreach efforts, local high school students were invited to design their infographics after reading literature about plastic materials, MPs, and plastic recycling. The pre-survey received 407 responses total with participants from towns across Massachusetts and in every age range. The pre-survey determined that 86% of the participants (the majority of whom are between the ages of 16 and 25) recycle. The majority of participants answered 7 out of the 9 pre-survey questions correctly. The post-survey had 120 responses in total. Similar to the pre-survey, most people scored well, with only one question not being answered correctly by a significant majority. More than 95% of participants in the post-survey said they had learned something from participating, with only seven people saying that they did not learn anything new or that it reinforced what they had already learned. The authors concluded there is a public need for a convenient and comprehensive source for plastics education and recommended future work in the area of plastics sustainability knowledge, including promoting STEM education at a young age.

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