
The Rapids

US EPA's Trash Free Waters Monthly Update

March 2022

epa.gov/trash-free-waters

Introduction

Hello all,

March is already off to an exciting start! Last week in Nairobi, Kenya, the United Nations Environment Assembly voted unanimously to adopt a new resolution on plastics, titled [“End plastic pollution: Towards an international legally binding instrument”](#). The resolution calls for an International Negotiating Committee (INC) to “develop an international legally binding instrument on plastic pollution, including in the marine environment, which could include both binding and voluntary approaches, based on a comprehensive approach that addresses the full lifecycle of plastics....as well as national circumstances and capabilities.”

The Ocean Conservancy recently published a report titled [“Recommendations for Recycled Content: Requirements for Plastic Goods and Packaging”](#). This resource provides an overview of the current landscape of recycled content for plastic packaging in the U.S. as well as insight on how to grow end markets for these materials given their prevalence in the waste stream and in the environment.

In early February, over 180 community and conservation organizations filed a [“Petition to the General Services Administration to Reduce and Eliminate Procurement and Acquisition of Single-Use Plastic Products”](#).

Please help celebrate Keep America Beautiful’s [Great American Cleanup](#) from March 21 through June 22. More details are below in the Upcoming Events section.

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

[Best Practices for Solid Waste Management Online Learning Modules](#)

EPA published "Best Practices for Solid Waste Management: A Guide for Decision-Makers in Developing Countries" in 2020. We are pleased to announce the release of nine online interactive learning modules designed to complement the guide. The modules allow users to explore specific topics related to waste management, ranging from stakeholder engagement to prevention and minimization to recycling. A webinar highlighting the guide is also available in English, Spanish, and French.

[Eckerd College Awarded Funding to Tackle Single-Use Plastics](#)

This EPA Gulf of Mexico Division Healthy and Resilient Gulf grant program will provide \$499,638 in funding for Eckerd College to implement their "Communities Count: Single-Use Plastic Data to Change Policy" project by creating a mobile application that will help Pinellas County residents digitally track their single-use plastic consumption with the goal of keeping waste out of the Gulf of Mexico. Other grant awardee announcements are expected soon.

Funding Opportunities

[New Mexico Recycling and Illegal Dumping \(RAID\) Grants](#)

Offered through the New Mexico Environment Department Solid Waste Bureau and Recycling and Illegal Dumping Alliance, these applications should be used for all recycling, education and non-abatement tire projects or illegal dumpsite abatement projects (tire and non-tire), and illegal dumping outreach and education projects. About \$800,000 will be available for the 2022-2023 grant cycle. Two-thirds of the grant fund is available for scrap tire management, and one-third is available for illegal dumping abatement and recycling projects. **The deadline for submissions is March 25.**

[Alaska Marine Education and Training Mini-Grant Program \(NOAA-NMFS-AK-2022-2007143\)](#)

The National Marine Fisheries Service is soliciting competitive applications for projects seeking to improve education and training on marine resource issues throughout the region and increase scientific education for marine-related professions among coastal community residents. **The deadline for submissions is April 1.**

[OIA Coral Reef and Natural Resources Program 2022 \(OIAOIA-CRNR2200043\)](#)

The U.S. Department of the Interior's Coral Reef and Natural Resources Initiative provides grant funding for management and protection of coral reefs and to combat invasive species in the U.S. insular areas. **The deadline for submissions is April 1.**

[FY22-FY23 Pollution Prevention Grant Program Funded by the Bipartisan Infrastructure Law \(EPA-I-OCSP-OPPT-FY2022-001\)](#)

EPA is announcing a grant competition to fund two-year Pollution Prevention assistance agreements for projects that provide technical assistance (e.g., information, training, tools) to businesses to help them develop and adopt source reduction practices (also known as "pollution prevention" or "P2"). P2 means reducing or eliminating pollutants from entering any waste stream or otherwise being released into the environment prior to recycling, treatment, or disposal. Estimate total program funding is \$13,900,000. **The deadline for submissions is April 11.**

[Michigan Recycling Market Development Grants](#)

These Michigan-specific grants are designed to create new markets or expand existing markets and create supply chains for recycled materials. These grants will also commercialize technologies to replace

materials with recycled content; to improve the quality, increase the quantity, and grow demand for utilizing recycled materials in manufacturing or other uses; and facilitate research and development of new uses for recycled materials. **The deadline for submissions is April 20.** A separate but related grant opportunity, Michigan Small Community Education Grants, has a rolling deadline for submissions.

The PADI AWARE Mission Hub Community Grants

The PADI AWARE Mission Hub Community Grants (Funding Cycle 0222) are open to funding ocean protection initiatives and projects that directly advance the PADI Blueprint for Ocean Action, in direct support of the United Nations Decade of Science for Sustainable Development. Marine debris is one of the five recommended project proposal categories. **The deadline for submissions is April 22.**

The Lawrence Foundation Common Grant

The mission of The Lawrence Foundation is support organizations that are working to solve pressing environmental, human services and other issues. The foundation makes grants to U.S.-based qualified charitable organizations. Grants typically range between \$5,000 - \$10,000. **The deadline for submissions is April 30.**

Environmental Research and Education Foundation General RFP

Pre-proposal topics must relate to sustainable solid waste management practices and pertain to the following topic areas: 1) Waste minimization, 2) Recycling, 3) Waste conversion to energy, biofuels, chemicals or other useful products, 4) Strategies to promote diversion to higher and better uses, and/or 5) Landfilling. Pre-proposals are required prior to submitting a full proposal. Previously awarded grants have ranged from \$15,000 to over \$500,000 with the average grant amount in recent years being \$160,000. Typical project durations are about 2 years. **The deadline for submissions is May 1.**

West Virginia Litter Control Grant

The West Virginia Department of Environmental Protection's Litter Control Grant is a matching fund that assists municipalities and county government agencies with community cleanup and litter enforcement projects. Funding is provided for this grant through litter fines imposed on those who violate state litter laws. The maximum amount of funding for a grant is \$5,000. **The deadline for submissions is May 31.**

Clif Family Foundation Operational Support Grant

These grants support daily operating costs. Address two or more of our funding priorities at the same time: Strengthen our food system, Enhance equitable community health outcomes, and Safeguard our environment and natural resources. Projects should also demonstrate strong community ties and operate within viable and clearly defined plans for positive change. **The deadline for submissions is June 1.**

Kentucky Waste Tire Collection Grant

Kentucky counties can now apply for \$4,000 in waste tire recycling and removal grants through the Energy and Environment Cabinet's Division of Waste Management's (DWM) Waste Tire Trust Fund. "These grants can assist Kentucky counties in managing waste tires collected in litter cleanups or from other sources. **The deadline for submissions is June 7.**

Energize The Environment Grant Program

Quadratec is proud to offer a \$3,500 environmental grant to an individual or group currently pursuing a program or initiative designed to benefit our environment. Some examples of this would be trail building or restoration projects, park beautification events, litter prevention initiatives, community environmental educational projects, and youth educational engagement events. Interested individuals or groups should submit a 1000-1600 word essay to grants@quadratec.com that paints a picture of who you or your organization are, what drives and inspires you or your organization, what you or the organization are

looking to accomplish, and how you plan to apply our grant to your project. **The deadline for submissions is June 30.**

Other opportunities...

[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

[World Ocean Summit Virtual Week](#)

March 1-4th

Attendees can join Economist's 9th annual World Ocean Summit from anywhere in the world, free of charge. This global event will bring together the broadest cross-section of the ocean community while featuring six industry tracks: shipping, fishing, aquaculture, energy, tourism, and plastics. The goal of the plastics track is to identify new solutions to the growing global problem of marine plastic pollution.

[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.

[3rd World Conference on Waste Management](#)

March 10-11th

The theme of this year's Global Waste Management Conference is "Challenges & Practices on Waste Management and COVID-19 Post-Pandemic." One of the conference tracks will focus on the future of plastics recycling.

[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.

[Local Innovation Systems: Waste and "End of Life" Fishing Gear](#)

March 15th (10AM ET)

This webinar is being hosted by The Centre for Sustainable Design, UCA Business School within the Blue Circular Economy project. In 2019, the European Union passed the Single-Use Plastics Directive that included

'Extended Producer Responsibility' (EPR) legislation related to fishing gear that is due to be implemented in December 2024. This webinar will present the key findings and lessons learnt from two prior workshops which brought together stakeholders from both business and fishing communities to discuss challenges and opportunities related to waste and "end of life" fishing gear. It will also present the findings of a new report on local innovation systems related to waste and "end of life" fishing gear.

Oceanology International

March 15-17th

Oceanology International is the leading forum to connect with the world's marine science and ocean technology communities. Its events provide a platform for participants to learn from ocean leaders from around the world, boost their technical and blue economy knowledge, and connect with key buyers in vertical industries. It brings together 500+ exhibitors in the only event that links the three key players in the industry: businesses, academics and government.

Verra Standards for Sustainability, Resilience, and Carbon

March 16th (1PM ET)

Verra is a nonprofit organization that develops and provides standards that drive investment toward high-impact activities addressing environmental and social challenges across the globe. This webinar will present Verra's programs in climate and sustainability focusing on standards in Blue Carbon to sequester carbon dioxide, Coastal Resilience to improve protection of human and environmental assets, and Plastic Waste Reduction to reduce waste ending up in the environment and incentivize recycling.

The Global Plastics Treaty: What You Need to Know

March 16th (5PM ET)

This webinar is being hosted by the Plastic Pollution Coalition. What is the Global Plastics Treaty, and what do we mean when we say it needs to be "legally binding" and "address the full life cycle of plastic"? Hear from the experts as we explore the need and opportunity to negotiate a bold and binding global commitment to address plastic pollution, and find out what happened at UNEA 5.2 from key people who were on the ground in Nairobi.

State of Lake Erie Conference (SOLE22)

March 16 -18th, Cleveland, OH (virtual participation option as well)

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.

Achieving Plastics Circularity: Technology and Partnerships to Close the Loop

March 17th (1PM ET)

This one-hour GreenBiz webinar will address the ways that technology and partnerships can work hand-in-hand to overcome persistent challenges related to plastics recycling processes and infrastructure. Attendees will learn how advanced recycling technologies make it possible to recycle greater volumes of plastic, why the availability of feedstock is the key to achieving true circularity, how companies can make investments to meet their recycled plastics commitments, and how cross-industry partnerships can create a positive feedback loop of collection, recycling, and product production.

Blue Economy Summit

March 18 -19th, Durham, NC

Hosted at Duke University in March 2022, the first-annual Blue Economy Summit will bring together diverse ocean stakeholders from industry, government, non-profits, and academia to identify the most

promising opportunities to bring this vision to life. The Blue Economy Summit will create a collaborative setting where students and professionals can critically reflect on current ocean trends and challenges, facilitate productive conversations, and enable effective ocean stewardship actions.

Keep America Beautiful's Great American Cleanup

March 21st - June 22nd

Did you know that cigarette butts are still the most littered item in America? That nine out of ten pieces of litter on the ground in the U.S. are under four inches in size? The Keep America Beautiful 2020 National Litter Study also found there are 50 billion pieces of litter in the US. That means there are 152 pieces of litter per person in America. So, what can we do? Take part in the Great American Cleanup! Happening March 21 through June 22, cleanups are taking place across the country.

“Connecting People and Places: A Community Conversation About Litter”

March 23rd (8-10AM ET)

Keep America Beautiful and Gwinnett Clean & Beautiful invite everyone to a first of its kind virtual conversation about litter and its impact on communities. This interactive discussion will engage citizens and industry experts in a facilitated conversation to address and prevent littering on a hyperlocal scale. The conversation also serves as a kickoff event for the 2022 Great American Cleanup. Attendees are asked to submit their questions about litter ahead of time, as some of these questions will be selected at random to drive the event discussion.

Save the dates for future months...

Our Ocean - Palau 2022

April 13- 14th, the Republic of Palau

Our Ocean will focus on six Areas of Action, convening partners from across the globe to identify solutions to manage marine resources, increase the ocean’s resilience to climate change and safeguard its health for generations to come. One of the key actions is tackling marine pollution. This panel will focus on opportunities and approaches to stop pollution at its source as well as highlight the need for effective local management of coastal catchments.

Beyond Plastic Pollution Virtual Class- Spring 2022

April 13th - May 25th (Wednesday evenings from 7-9PM ET)

This in-depth seven-week online masterclass on all things plastic pollution-related is offered by the founder and President of Beyond Plastic Pollution, Judith Enck, via Bennington College’s Center for the Advancement of Public Action. The class is open to anyone, from high school student to concerned community member. The cost of enrollment is \$100. Space is limited so reserve a spot now if interested!

EarthX 2022

April 20-24th, Dallas, TX

EarthX is an international, nonprofit environmental forum whose purpose is to educate and inspire people to action towards a more sustainable future. We assemble and connect citizens, educators, students, businesses, nonprofits, and global leaders to explore sustainable solutions for today’s most pressing challenges. More details to come.

The Gulf of Mexico Conference 2022

April 25-28th

The Gulf of Mexico Conference (GoMCon) combines the annual Gulf of Mexico Alliance (GOMA) All Hands Meeting, the annual Gulf of Mexico Oil Spill and Ecosystems Science (GoMOSES) Conference, and the triannual State of the Gulf Summit. This conference seeks to promote the integration of science and management into decision-making. GoMCon will feature a wide variety of session themes including citizen science and education, water quality and quantity, and emerging issues including marine debris.

Virtual Salish Sea Ecosystem Conference 2022

April 26-27th

The theme of this year's Salish Sea Ecosystem Conference is "Honoring our Ancestors: Visions for Future Generations and the Salish Sea." The conference typically attracts about 1,500 participants and has become the premier scientific research and policy gathering in the Pacific Northwest. Conference presentations and discussions will serve as a platform to build shared policies, practices and procedures necessary to guide future actions for protecting and restoring the Salish Sea and its watersheds.

WasteExpo

May 9-12th, Las Vegas, NV

Whether you are from the private sector, a small, medium or large public sector waste management company, organics management, or food waste management company, or a manufacturer or supplier from the U.S. or abroad, count on WasteExpo to bring the entire industry together under one roof. 2022 conference tracks include: Operations, Fleet & Safety, Recycling & Landfill, Business Insights & Policy, and Tech & Innovation.

Circularity 22

May 17-19th, Atlanta, GA

As the leading convening of professionals building the circular economy, Circularity 22 offers thought-provoking keynotes, informative breakouts, a solutions-oriented expo and engaging networking opportunities. The goal of this conference is to encourage moving beyond individual action to catalyze systems change and accelerate the circular economy. Tracks include next-gen products and packaging, bio-based solutions, policy and infrastructure, and more.

Re|Focus Sustainability & Recycling Summit

May 23-25th, Cincinnati, OH

Hosted by the Plastics Industry Association, the Refocus Sustainability and Recycling Summit addresses the real-world challenges you face as your company pushes recycled content and sustainable manufacturing from goals and promises to action.

Plastic Waste Free World North America Conference and Expo

June 8-9th, Atlanta, GA

The Plastic Waste Free World Conference & Expo is an international conference and exhibition for companies looking for new technologies, materials, and solutions to help realize their plastic waste targets and source the latest innovations driving the new circular economy. The event typically attracts major manufacturers, brand owners, retailers, materials experts, circular economy experts, government organizations, NGOs, the recycling industry, and the plastics sector to engage in discussions that will help reduce waste plastic in the environment. Conference tracks include: 1) Eliminating Waste Plastics, 2) Retail and Consumer Goods Packaging, and 3) Fashion and Textiles.

UN Ocean Conference 2022

June 27th to July 1st, Lisbon, Portugal

The Ocean Conference, co-hosted by the Governments of Kenya and Portugal, will mobilize action around science-based innovative solutions aimed at starting a new chapter of global ocean action. Solutions for a

sustainably managed ocean involve green technology and innovative uses of marine resources. They also include addressing the threats to health, ecology, economy and governance of the ocean - acidification, marine litter and pollution, illegal, unreported and unregulated fishing, and the loss of habitats and biodiversity.

In case you missed it...

[Outreach and Education for Trash Free Waters – What Makes a Successful Campaign?](#)

The Trash Free Waters Program's January 20th webinar drew 230 attendees from local, state, and federal government offices, NGOs, universities, and businesses. The webinar featured three expert speakers who discussed lessons learned and best practices for outreach campaigns aimed at preventing aquatic trash. The speakers provided the audience with practical information on how to craft an effective anti-littering or source reduction outreach campaign and discussed common barriers to achieving desired behavior changes and strategies for overcoming these barriers.

[Reckoning with the U.S. Role in Global Ocean Plastic Waste – Beyond Plastics Briefing](#)

On December 1st, the National Academies of Science, Engineering and Medicine released a breathtaking report titled Reckoning with the U.S. Role in Global Ocean Plastic Waste which could shape the debate over plastics in the U.S. for years to come. Watch the recording of Beyond Plastics' February 16th virtual briefing on the report featuring NASEM members, Margaret Spring and Dr. Rashid Sumaila and moderated by Beyond Plastics president, Judith Enck.

[Scientists' Declaration on the Need for Governance of Plastics: A scientific perspective on a new global plastics treaty](#)

This Environmental Investigation Agency webinar formally launched the [Scientists' Declaration on the Need for Governance of Plastics Throughout their Lifecycles](#) and requested more scientific experts, research institutes and rightful holders of traditional knowledge to sign the declaration, which will remain open indefinitely. The event presented perspectives from four international experts who have contributed to empirical and applied research as part of the multidisciplinary field of plastic pollution and who helped develop the declaration.

[Driving Innovation to Advance Plastics Circularity](#)

The transition to a circular economy requires a host of new solutions to address gaps in the plastics value chain. The Alliance to End Plastic Waste has identified six priority areas, or gaps, that stand in the way of circularity. This webcast sought to discuss practical solutions to bridge these gaps and how collaboration, innovation and investment can help to power the transition.

The Microplastics Breakdown

MICROPLASTIC QUANTIFICATION

[Quantification of Microplastics in Sediments from Narragansett Bay, Rhode Island USA Using A Novel Isolation and Extraction Method](#)

Michaela A. Cashman, Troy Langknecht, Dounia El Khatib, Robert M. Burgess, Thomas B. Boving, Sandra Robinson, Kay T. Ho

In this study, a hybridized method was developed for the extraction of microplastics (45–1000 µm) from sediments using sodium bromide solution for density separation. Method development was tested using spiked microplastics as internal standards. The method was then used to extract microplastics from sediments in Narragansett Bay, Rhode Island, USA. Suspect microplastics were analyzed with Raman spectroscopy. Microplastic abundance ranged from 40 particles/100 g sediment to 4.6 million particles/100 g sediment (wet weight). Cellulose acetate fibers were the most abundant microplastic. These results are some of the first data for microplastics in Rhode Island sediments.

HEALTH IMPACTS OF MICROPLASTIC EXPOSURE

The Emerging Risk of Microplastics and Nanoplastics on the Microstructure and Function of Reproductive Organs in Mammals: A Systematic Review of Preclinical Evidence

Rodolfo C. Marcelino, Ronan M. Cardoso, Elisa L.B.C. Domingues, Reggiani V. Gonçalves, Graziela D.A. Lima, Rômulo D. Novaes

After conducting a literature search and evaluating the results, the authors reviewed 12 full-text studies focused on the reproductive impacts of nanoplastic and microplastic (MP) exposure. According to the authors, these studies identified a broad spectrum of microstructural changes in the male reproductive system in mice and rats, including testicular atrophy, inflammation of the seminal vesicle, and various effects on sperm quality. Effects on the female reproductive system in mice and rats were also found, including dilatation in of the fallopian tubes and ovarian cysts. The authors evaluated the methodologies used in these studies and concluded that each study had certain flaws (e.g., not including descriptions of how the animals were selected and assigned to treatment groups). However, the authors stated that the missing elements did not indicate flaws in the experimental protocols, they only point out limitations in the research report.

HUMAN EXPOSURE TO MICROPLASTICS

Extraction, Identification, and Environmental Risk Assessment of Microplastics in Commercial Toothpaste

Chidhambaram T. Madhumitha, Natchimuthu Karmegam, Muniyandi Biruntha, Alagarsamy Arun, Abdulaziz A. Al Kheraif, Woong Kim, Ponnuchamy Kumar

In this study microplastics from ten different commercially available toothpaste brands were purchased in supermarkets in India; three samples from each brand were extracted by vacuum filtration and characterized with microscopic and Fourier-transform infrared spectroscopic analyses. The authors reported that 50% of the toothpaste samples were found to have more than 50% MP particle abundance, which indicated to them that the MP particles were added by the manufacturers. The smallest size of MPs that was recorded in the study was 3.5 µm with the largest size exceeding 400 µm. The largest numbers of MPs found in the samples were 167,508 and 193 respectively and were classified into three size ranges in the study results: <100 µm, 100–400 µm, and >400 µm. Four major polymer types were identified: cellophane, polypropylene, polyvinyl chloride, and polyamide. The authors noted that their study results were the first time that PP, PVC and PA were identified in a study of MPs in toothpaste. They suggested that their findings could be used as baseline data for the contribution of toothpaste to the addition of MPs in the environment and associated impacts.

FATE AND TRANSPORT OF MICROPLASTICS

Microplastics in Latin America and the Caribbean: A review on Current Status and Perspectives

Carolina Orona-Návar, Raul García-Morales, Frank J. Loge, Jürgen Mahlknecht, Iris Aguilar-Hernández, Nancy Ornelas-Soto

This literature review focused on publications pertaining to: (1) the occurrence and distribution of MPs in the environment and (2) the environmental impact of MPs. According to the authors there was a high degree of variability in the MP concentrations found in surface waters in the Latin America and Caribbean (LAC) region. Fibers and fragments were found to be the predominant types of MPs found in LAC, which

suggested to them that secondary MPs are an important source of pollution in the region. Results from the few studies in LAC where the types of MPs were identified indicated that polypropylene and polyethylene are frequently detected in coastal areas. MPs in freshwater systems in LAC have not yet been well investigated, which the authors explained could be due to (a) the fact that MPs were initially identified and studied in the marine environment and have therefore benefited from decade-long efforts to mitigate marine pollution, especially plastic litter and (b) higher visibility of their presence and effects (e.g. occurrence of fragmented plastic litter on beaches) playing a role in public perception and funding opportunities. Additionally, the article pointed out that sampling campaigns in freshwater environments may require access to remote locations and more expensive equipment, while studies on the marine environment can be carried out by the shoreline. The authors observed that existing studies analyzing MPs sources have been carried out in developed countries with very contrasting socioeconomic and geographical context compared to LAC, so it is still unknown if LAC differs in (a) main sources, (b) amount of MPs that enter the environment via wastewater, (c) secondary MPs generated by improper waste management, (d) if economic disparities within the region affect the degree of MP exposure experienced by its citizens and wildlife.

The Role of Mesopelagic Fishes as Microplastics Vectors Across the Deep-Sea Layers from the Southwestern Tropical Atlantic

Anne K.S. Justino, Guilherme V.B. Ferreira, Natascha Schmidt, Leandro N. Eduardo, Vincent Fauvelle, Véronique Lenoble, Richard Sempéré, Christos Panagiotopoulos, Michael M. Mincarone, Thierry Frédou, Flávia Lucena-Frédou

The authors described this study as the first-time data on MP contamination in mesopelagic fish (which inhabit the intermediate depths of the sea, approximately 650–3,300 feet below the surface) from the Southwestern Tropical Atlantic (SWTA) off of the Brazilian coast. Fish from four mesopelagic species were collected for this study: Sladen's hatchetfish; the diaphanous hatchetfish; the short-headed lantern fish; and Tåning's lanternfish. A total of 213 MP particles were recovered from the 170 analyzed specimens; 67% of the four species analyzed had MPs in their digestive tract. Fibres were the common MP shape for all species (64%), and polyamide, polyethylene, and polyethylene terephthalate (PET) were the most common polymers identified. The number of MPs found differed between species with Sladen's hatchetfish having the most MPs. No relationship between the MPs ingested by fish species and the biological parameters (standard length and the total weight) was identified. The mean size of ingested MPs also varied according to the species. The authors also found an association between the number of MPs and the depth strata where the fish were sampled. They described their results suggested that when migrating to the upper layers, these species interact with MPs and, when returning, they probably act as vectors of MPs to the deeper ocean layers. Their finding that the smallest number of particles were in species inhabiting the deepest layers is supported by previous hypotheses that the deeper layers are less contaminated.

Microplastics Contamination of Groundwater: Current Evidence and Future Perspectives. A Review

Stefano Viaroli, Michele Lancia, Viviana Re

This article included a critical analysis of MPs in groundwater and a review of existing studies on MPs in groundwater systems. The characterization of both the groundwater dynamics and the heterogeneity of MPs is suggested, and the article proposed a new framework/conceptual model named "Hydrogeoplastic Model." This model is described as an amendment of the classic conceptual model involving MPs dynamics and their fate in the subsoil. It is not limited to groundwater, but also encompasses surface waters, soils, the anthroposphere (land use, landfills, seepage of septic tanks and WWTP effluents) and the atmosphere. The authors observed that characterization and quantification of MPs in groundwater is challenging, and existing water sampling techniques are mainly related to surface waters. They pointed out that study results are not comparable due to the lack of common analytical procedure and to the absence

of hydrogeological information which can deeply affect the groundwater dynamics. Of the literature they found, only five articles provided experimental data about the presence of plastic fragments together with a description of the hydrogeological framework. Based on their review, the authors suggested that future studies supporting the characterization of the subsoil are necessary to comprehensively assess the occurrence of MPs in groundwater and they also highlighted the need for more coordinated action among researchers working in the field.

Microplastics Contamination Associated with Land-Application of Biosolids – A Perspective

Goldy De Bhowmick, Ajit K. Sarmah

This article sought to provide insight into the current status of the application of biosolids containing MPs to soils and identify its potential risks to human and ecological health whilst also providing solutions to mitigate them. Authors pointed out that soil texture and characteristics like roughness, bio-filtration, the level of organics, saturation, and hydrodynamic condition affect MPs' migration and mobility along with the MPs size and aggregation state. Other determinative factors in the fate and MP behavior in soil were temperature, soil variable condition, soil type, and water status. The authors recommend that more studies should focus on the MP mobility and transportation fate particularly under complex soil matrices. This article included a discussion of case studies focused on biosolid application to agricultural land, which indicated there were impacts on plant performances and microbial activities. The article also listed a set of mitigation actions to reduce the contamination of soils by MPs: (a) legislative action focused on sewage application to agricultural farmland; (b) in-depth studies on MPs fate and transport; (c) introduction of more critical assessment of MPs contamination; (d) penalty on dumping mulched plastic items; (e) design environmental taxes; (f) raising awareness of MPs contamination through education and social media coverage; (g) life cycle assessment of plastic products and (h) identifying alternatives to plastics.

MICROPLASTICS AND WASTEWATER

Alteration in Microbial Community and Antibiotic Resistance Genes Mediated By Microplastics During Wastewater Ultraviolet Disinfection

Zeyuan Yang, Peng Liua, HaoyuWei, Huang Li, Jian long Li, Xinran Qiu, Rui Ding, Xuetao Guo

This study was based on the idea that MPs could serve as vectors to colonize microorganisms and antibiotic resistance genes (ARGs) in the context of wastewater treatment. The authors examined the effects of different concentrations and sizes of polystyrene microplastics (PSMPs) on the distribution and removal of microbial communities and ARGs under ultraviolet disinfection of urban sewage. Manufactured PSMPs particles were exposed to wastewater and were observed under two conditions, UV disinfection and without UV disinfection. Microbial communities and ARGs in the absence of MPs were also observed. Results showed the presence of MPs affected the species, abundance and functions of microorganisms in wastewater treatment; specifically, the genetic information processing and metabolism were altered by the presence of PSMPs. The UV disinfection efficiency of microorganisms and ARGs were found to be affected by PSMPs since they provided colonization sites and increased the water turbidity. The findings indicated that PSMPs altered the distribution and removal of microbial communities and ARGs in ultraviolet disinfection of wastewater. The authors recommended that increased removal of MPs to improve the sterilization effect of ultraviolet rays and reduce the environmental risks of resistant bacteria and resistant genes.

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



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