

The Rapids

US EPA's Trash Free Waters Monthly Update

May 2024

epa.gov/trash-free-waters

Introduction

Hello all,

The fourth negotiating session to develop an internationally legally binding instrument on plastic pollution was held in Ottawa, Canada, from April 23-29, 2024. The [recordings of the first four negotiating sessions](#) are available in addition to the [provisional agendas, rules and a revised draft text of the treaty](#).

In anticipation of the negotiations, Greenpeace conducted a global survey earlier this year to understand public support for reducing plastic pollution. In a new [report](#), Greenpeace presents its findings that 90 percent of those surveyed believed in the importance of creating a strong Global Plastics Treaty at the negotiating session. In addition to the survey results, the Greenpeace report offered recommendations for governments negotiating the treaty.

Finally, a recent [study](#) authored by representatives from thirteen research institutions around the world and commissioned by Break Free From Plastic, the Department of Energy National Renewable Energy Laboratory, the Possibility Lab, and the McPike Zima Charitable Foundation revealed some of the major brands responsible for plastic pollution across six continents. Data collected through 1576 audit events found that 50 percent of the items were unbranded while the rest belonged to approximately 56 companies. Also, data shows a clear linear relationship between the companies' annual production of plastic and their branded plastic pollution, with food and beverage companies being disproportionately represented.

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

References to any non-federal entity, its products, services or enterprises does not imply an endorsement by the US government or the EPA and is provided for informational purposes only. The EPA and its employees do not endorse any commercial products, services or enterprises. The EPA is also not responsible for information on external websites and linking to external websites does not imply or express an endorsement of any non-federal entity, product or service on external websites.

EPA Announcements

[Biden-Harris Administration Finalizes First-Ever National Drinking Water Standard to Protect 100M People from PFAS Pollution](#)

The Biden-Harris Administration recently issued the first national and legally-enforceable drinking water standard to protect communities from per- and polyfluoroalkyl substances (PFAS). In addition to this rule, the EPA announced almost \$1 billion in new funding through the Bipartisan Infrastructure Law to help states and territories implement PFAS testing and treatment at public water systems.

Funding Opportunities

[Oceanic Society Global Ocean Cleanup Grants](#)

As part of the second annual Global Ocean Cleanup and plastic pollution awareness campaign organized in partnership with [Sea Turtle Week](#), [Oceanic Society](#) will be making small grants (\$1,500) to at least six organizations in locations worldwide to organize, lead and document a community-based coastal or ocean cleanups on June 15 June 16, 2024 for World Sea Turtle Day. Locations may include beaches, marine areas, rivers, estuaries or other waterways in coastal areas of the world. Selected projects will also be tasked with creatively using the collected waste to create a unique art piece or sculpture. Those creations will be separately judged and three additional cash prizes will be awarded for first place, runner up and audience choice. Full Terms of Reference for participation can be found [here](#). **Applications are due by May 6, 2024.**

[The EPA Regional Pollution Prevention Recognition Program](#)

The EPA's Regional Pollution Prevention Recognition Program aims to recognize accomplishments and best practices of companies that have implemented pollution prevention projects or process improvements at their facilities. The program is accepting applications from nonprofit, for-profit and Tribal companies located in the [EPA Regions](#) 4, 5, 8, 9 and 10 to be recognized for their efforts. Projects must meet the goals of the EPA's Pollution Prevention program. **Applications are due on May 24, 2024.**

[Community Support for Marine Debris Removal](#)

The EPA Region 10 is accepting applications from eligible entities to improve the understanding of toxics and their effects on water quality in the Columbia River Basin. Eligible activities must assist in either monitoring to evaluate trends or promoting citizen engagement or knowledge. State governments, Tribal governments, regional water pollution control agencies and entities, local government entities, nongovernmental entities and soil and water conservation districts are eligible to apply. The EPA expects to distribute up to \$15,000,000 under this opportunity, with individual awards of up to \$3,000,000. **Applications are due on May 17, 2024.**

[Nationwide Fishing Trap Removal, Assessment, and Prevention Program](#)

The Virginia Institute of Marine Science Center for Coastal Resources Management and the National Oceanic and Atmospheric Administration's Marine Debris Program are accepting proposals for projects to remove derelict fishing traps. The program focuses on trap removal in four areas: standardization of data collection and monitoring, reduction of economic and ecological impacts, prevention and mitigation of harmful effects, and comprehensive data sharing and analysis. The program expects to award between 6 and 15 projects with grants of \$50,000 to \$150,000 each. **Proposals are due on May 30, 2024, at 11:59 pm ET.**

[The EPA Region 2 Source Reduction in Communities Grants](#)

The EPA Region 2 is accepting applications for grants that support research, investigation, experiments, multi-media service-learning approaches, studies, demonstrations, outreach, education and training using source reduction approaches. The EPA is especially interested in projects that include hands-on or innovative pollution prevention tools. Eligible applicants include local governments, educational institutions, nonprofit organizations and Tribes in New York, New Jersey, Puerto Rico, U.S. Virgin Islands and Guam. This funding opportunity will award up to a total of \$242,000 to one or two grantees. **Applications are due by June 18, 2024, at 11:59 PM ET.**

Upcoming Events

[Reducing PFAS in Products: Progress and Challenges](#)

May 8, 2024 (2 pm ET), virtual

The EPA Office of Chemical Safety and Pollution Prevention is hosting the third webinar in its "Pollution Prevention in Action" webinar series. Jennie Romer, the EPA's Deputy Assistant Administrator for Pollution Prevention, will discuss the EPA's PFAS Strategic Roadmap and a new online tool that highlights how standards and ecolabels address PFAS. Additional speakers include Mike Schade from Toxic-Free Future; Saskia van Bergen from Washington State Department of Ecology; Ning Ai, PhD, from University of Illinois, Chicago; Jenna Larkin from the EPA Office of Chemical Safety and Pollution Prevention; and Zach Schafer from the EPA Office of Water.

[Reuse and Refill in Practice: Learnings from India and the UK](#)

May 15, 2024 (7 am ET), virtual

Hosted by Be Waste Wise, this webinar will discuss lessons learned from active refill businesses and the potential for this circular business model for a wide range of sectors, including retail, home goods and hospitality. The webinar will feature panelists Catherine Conway and Lokesh Sambhwani, leaders of popular refill brands in the UK and India, and will be moderated by Emma Burlow, the founder of Lighthouse Sustainability.

[The EPA Mid-Atlantic Region 2024 Virtual Summit – Empowering Communities for Environmental Equity](#)

May 16, 2024 (10 am-4 pm ET), virtual

The EPA Mid-Atlantic Region is hosting its 3rd annual environmental summit. This year's summit is centered around the theme: "Empowering Communities for Environmental Equity." The summit will feature a plenary with White House Senior Advisor Tom Perez and the U.S. EPA Deputy Administrator Janet McCabe, as well as breakout sessions on a variety of topics. The event is free and open to the public, and will convene mid-Atlantic region community members, non-profits, Tribes, advocacy groups, industry, academia, and state and local governments.

[Reducing Global Consumption—What Matters More: Government, People or Businesses?](#)

May 20, 2024 (7 am ET), virtual

This Be Water Wise webinar will include a panel discussion on whether government, businesses or the public can make the biggest impact on reducing global resource consumption. The webinar will explore policies, opportunities and best practices for changing consumption patterns to support decarbonization. Panelists will include Sally-Anne Kasner, Director of Circular-Vision; Niki Wallace, Founder of Net Zero Lab; Zoë Lenkiewicz, Waste Management Specialist; and Adam Read, Chief Sustainability & External Affairs Officer at Suez UK.

[Circularity 24](#)

May 22 – 24, 2024, Chicago, IL

Hosted by GreenBiz, Circularity 24 is the leading convening of visionaries and practitioners building the circular economy. Form valuable connections with the growing circularity community that will empower you to move beyond incremental action, catalyze systems change and accelerate the transition to a circular economy. [Register](#) today using the discount code C24WASAP to receive 10% off your All-Access Pass.

Save the date for future months...

[Clean the \(Chesapeake\) Bay Day](#)

June 1, 2024 (9:00 a.m. to noon), multiple locations across Virginia

The Virginia Office of the Chesapeake Bay Foundation is pleased to announce that registration for the 35th annual Clean the Bay Day is now live. Every year Virginians all over the state join together to clean litter that jeopardizes the health of the bay. This three-hour annual event has had a massive cumulative impact. Since the event began in 1989, this Virginia tradition has engaged more than 165,500 volunteers who have removed approximately 7.18 million pounds of debris from more than 8,250 miles of shoreline. This year's event will take place on Saturday, June 1st, from 9:00 a.m. to noon, at locations throughout the state. To participate in Clean the Bay Day, register [here](#). Please direct any questions to Ctbd@cbf.org.

[Woven: Building a Roadmap to Reduce Microfiber Pollution](#)

June 17-18, 2024, Los Angeles, CA

The 5 Gyres Institute is hosting a symposium for cross-industry collaboration to develop a collective vision for reducing microfiber pollution. Goals for the symposium include unpacking the existing science and research; discussing advances in technology; weaving together ongoing efforts around the world; sharing best practices across industry; identifying challenges within existing frameworks, industries and society; creating a community of like-minded leaders across the textiles sector; and, ultimately, drafting a framework to reduce microfiber pollution.

[MICRO 2024: Plastic Pollution from Macro to Nano](#)

September 23-27, 2024, Lanzarote, Spain

The fifth annual International Conference MICRO is happening this September on the island of Lanzarote, Spain. MICRO 2024 aims to celebrate the growing community of researchers and policymakers concerned about plastic pollution, with a core focus on microplastics. The conference is accepting abstracts through May 20, and registration is open until June 20.

[National Zero Waste Virtual Conference](#)

October 2-3, 2024, virtual

Zero Waste USA is hosting its annual virtual conference in October. The first day will focus on Zero Waste Businesses and Institutions, while Day 2 will focus on Zero Waste Communities. The detailed program is not

available yet, but early registration is discounted through June 30.

In case you missed it...

[Petrochemicals, Plastics, and Health](#)

Collaborative for Health and the Environment and Alaska Community Action on Toxics co-hosted this webinar on plastics and their impacts on human health. Dr. Tracey Woodruff, PhD, MPH, and Dr. Laura Monclús Anglada, PhD, MDV, discussed chemicals in plastics, their impacts on human health, and how the global plastics treaty can help address this urgent issue.

[Chemicals in Plastics: Human Health Costs](#)

The Endocrine Disrupting Chemicals Strategies Partnership hosted a webinar on the human health costs of chemicals in plastics. This webinar explored global studies that have documented how exposure to endocrine disrupting chemicals through plastic materials has contributed to infertility and non-communicable diseases—with estimated annual human health costs of \$250 billion per year related to plastics. Dr. Leonardo Trasande discussed research on birth outcomes using data from the U.S. National Institutes of Health Environmental Influences on Child Health Outcomes program.

[Plastics & Climate: Exploring What We Know, Impacts on Vulnerable Communities, and How to Solve the Problem](#)

The EPA Trash Free Waters Program hosted a webinar to discuss the relationship between plastics and climate change. During this webinar, expert panelists provided information on the effects of plastic consumption and production on climate change and answered audience questions about this serious problem. Panelists included Alice Zhu, PhD Candidate & Vanier Scholar at the University of Toronto + Co-Founder of Plastics & Climate Project; Dr. John Doherty, Science and Policy Analyst at Environmental Law Institute; and Margaret Spring, Chief Conservation and Science Officer at Monterey Bay Aquarium.

[A Journey Toward Plastic-Free Parks](#)

To kick off its 2024 Plastic-Free Parks TrashBlitz, 5 Gyres hosted a webinar on the history and progress of reducing single-use plastics in parks and solutions and recommendations for keeping parks plastic-free. Speakers included: Frankie Orona, Executive Director of Society of Native Nations; Paulita Bennett-Martin, Senior Federal Policy Lead at 5 Gyres Institute; Mecia Serofino, Fiscal Operations & Compliance Manager at Yosemite Climbing Association; Shawn Norton, Sustainability Coordinator at the U.S. Department of Interior National Park Service; and Kim McIntyre, Executive Director of the Aquarium Conservation Partnership. *Webinar passcode: e7+MBp4^*

[People vs. Plastic: How the United Nations Plastics Treaty Must Protect Our Health](#)

Plastic Pollution Coalition and EARTHDAY.ORG co-hosted a webinar focused on the impacts of plastics on human health and the implications for UN Plastics Treaty negotiations. Panelists included Aidan Charron, Director of End Plastic Initiatives at EARTHDAY.ORG; Dr. Jamala Djinn, Policy Advisor at Break Free From Plastic; and Ruth Stringer, Science and Policy Coordinator at Healthcare Without Harm. The conversation was moderated by Renee Sharp, Director of Plastics and Petrochemical Advocacy for the Natural Resources Defense Council.

[The End of Plastic Pollution: How Business Can Operationalize Circularity](#)

Hosted by GreenBiz, this webinar discussed the practical implications of the fourth session of the Intergovernmental Negotiating Committee to develop a legally binding instrument on plastic pollution; how recycling, reuse and regeneration scenarios impact the ways companies can comply with packaging regulation, operate profitably and reduce waste; and the business opportunity to end plastic pollution and drive systemic change. Speakers included Stephen Jamieson, Global Head of Circular Economy Solutions at SAP; Sarah Perreard, co-CEO & Stakeholder Engagement Lead for Earth Action; and Yoni Shiran, Partner at SYSTEMIQ.

The Microplastics Breakdown

MICROPLASTICS FATE AND TRANSPORT

Stormwater Runoff Microplastics: Polymer types, Particle Size, and Factors Controlling Loading Rates

This study investigated the presence of microplastics in stormwater runoff in central New Jersey. Samples were taken during nine different rainfall events from November 2021 to September 2022, at eight stormwater outfalls in urban and suburban areas and one bioretention basin outlet. The article explained that the sampling sites were selected based on their accessibility. Runoff from these areas entered stormwater pipelines hydraulically connected to the Raritan River that flows to the Raritan Hudson estuary. Microplastic loadings were found to have moderate correlations with both rainfall accumulation and intensity. Antecedent dry days were found to have no correlation with microplastic abundance, which the authors described as being likely the result of the short dry periods between sampling events. The authors asserted that their study results provided data for risk assessment and mitigation strategies and surrounding land use. **Read the full abstract here:**

<https://www.sciencedirect.com/science/article/pii/S0048969724026317?via%3Dihub>

Where The Rubber Meets the Road: Emerging Environmental Impacts of Tire Wear Particles and Their Chemical Cocktails

Paul M. Mayer, Kelly D. Moran, Ezra L. Miller, Susanne M. Brander, Stacey Harper, Manuel Garcia-Jaramillo, Victor Carrasco-Navarro, Kay T. Ho, Robert M. Burgess, Leah M. Thornton Hampton, Elise F. Granek, Margaret McCauley, Jenifer K. McIntyre, Edward P. Kolodziej, Ximin Hu, Antony J. Williams, Barbara A. Beckingham, Miranda E. Jackson, Rhea D. Sanders-Smith, Chloe L. Fender, Miguel Mendez

In this review, the authors examined the life cycle of tires across production, emissions, recycling, and disposal. Tires were considered as pollutant sources across three levels: tires in their whole state, as particulates, and as a mixture of chemical cocktails. The production and use of tires generates multiple heavy metals, radioactive compounds, and nutrients that can be toxic alone or as chemical cocktails. Particles and chemicals from tires can be transported by air, water and terrestrial pathways. The authors synthesized recent research and data about the environmental and human health risks associated with the production, use and disposal of tires. For example, tires were found to pose risks to environmental and human health across the entire life cycle. The authors discuss gaps in the existing knowledge about fate and transport, the toxicology of tire particles and chemical leachates, the potential management and remediation approaches for addressing exposure risks across the life cycle of tires. Information gaps in the understanding of tires as a pollutant were described, such as in the knowledge about fate and transport and the toxicology of tire particles and leachates. Further research is needed to characterize the gamut of effects from tire pollution and to identify effective methods of remediation and risk management across environmental, socioeconomic and political boundaries. The article also included key questions that would need to be answered to improve the knowledge and the ability to manage and remediate tire pollution. Mitigating the risks associated with tire pollution was found to be challenging given the volume of tires in use and produced as waste. Source control, such as reducing the need for tires, recycling or reuse, was determined to be easier than remediating particles or chemicals that are released to the environment. The authors asserted that pollution from tires must be examined holistically across production, emissions, recycling and disposal to develop effective management and remediation. **Read the full abstract here:**

<https://www.sciencedirect.com/science/article/pii/S0048969724012920?via%3Dihub#s0145>

Unravelling the Microplastic Contamination: A Comprehensive Analysis of Microplastics in Indoor House Dust

Mansoor Ahmad Bhat

This study investigated the presence of microplastics in the indoor environment; the researcher observed that while environmental concerns in aquatic ecosystems have been widely explored, less work has been done in indoor environments, where humans spend most of their lives. Samples of house dust were collected from ten homes in Eskisehir, Turkey in March 2022. One hundred eighteen particles were identified as microplastics. The study found 22 different types of microplastics in the samples, with most of them including low-density polyethylene, polyethylene, polypropylene, polyamide, polyvinyl chloride, high-density polyethylene and polystyrene. A diverse range of forms of microplastics were found, including fibres, fragments, foams, pellets and films. The author noted that fibres were the most prevalent type of microplastic, which was attributed to textile products like clothes, carpets, sofas and curtains in these indoor environments. The plastic particles were different colours, including black, red, blue, yellow, white and brown. Differences in microplastic sizes were identified across different households, with the average size range was 178.87–3713.99 μm . The author concluded that microplastics in indoor environments raise concerns about potential human exposure and underscore the need for further research into their health implications. The absence of standardized collection and analysis techniques for indoor microplastics was identified as a challenge when comparing research results from different studies. The need for further examination of other indoor environments aside from residential dwellings as well as the origins and routes by which microplastics infiltrate interior areas was highlighted. The author also pointed out that a better understanding of indoor microplastics will assist in the evaluation of

microplastics' cumulative impacts on ecosystems and human health by revealing their relationship to outside sources and environmental processes. **Read the full abstract here:**

<https://journals.sagepub.com/doi/full/10.1177/1420326X241248054>

AQUATIC LIFE EXPOSURE TO MICROPLASTICS AND POTENTIAL EFFECTS

Warming Temperatures Exacerbate Effects of Microplastics in a Widespread Zooplankton Species

Natasha Klasios, Abigail Birch, Aurelio Morales Murillo, Michelle Tseng

The researchers investigated the effects of environmentally microplastic exposure on the survival, reproduction, and growth of the water flea, *Daphnia pulex*, at three different temperatures. As described, this study used microplastics with physicochemical characteristics often detected in nature, and the organisms were exposed to concentrations close to values reported in inland waters and 1-2 orders of magnitude higher. The three temperatures studied were intended to simulate cool/springtime, current, and warming scenarios. The highest concentration of microplastics was found to have impacted the survival and total offspring at temperatures of 20 °C and 24 °C, but not at 12 °C. No effect was observed on the organism's first reproduction or on the average growth rate at any temperature. Notably, the researchers found that warmer temperatures exacerbated microplastic toxicity, although only for concentrations of microplastics not currently observed in nature. However, the authors observed that these concentrations are possible in pollution hotspots, through pulses pollution events or future worsening environmental contamination. They asserted that their study results demonstrated the need for further investigation of climate change related co-stressors such as warming temperatures in microplastic and pollution ecology, through environmentally realistic exposure scenarios. **Read the full abstract here:** https://www.sciencedirect.com/science/article/pii/S0269749124006328?dgcid=rss_sd_all

HUMAN EXPOSURE TO MICROPLASTICS AND POTENTIAL HEALTH EFFECTS

Are Microplastics Linked to Obesity? Is There a Correlation between Obesity and the Environmental Pollution Produced by Microplastics? Here are the Findings.

Silvia María Aldana Salazar

This article explored the hypothesis that microplastics may play a role in the global obesity epidemic. It was observed that polyethylene terephthalate (PET) includes certain terephthalates which function as endocrine disruptors. The author cited research finding that when microplastics of <20 µm in size are inhaled or ingested, they can penetrate membranes, accumulate in tissues, and elicit cytotoxic responses, which means they can penetrate cells and cause them to die. The article also points out that microplastics have been associated with various metabolic disorders, including diabetes and obesity and have been classified as obesogenic.[1] While acknowledging that obesity is a complex issue with multiple contributing factors, the article highlighted the association between exposure to obesogens and this condition. Research on mice has demonstrated microplastics induce changes in energy balance and lipid metabolism. The article concluded with a discussion of plastic pollution mitigation, for example research into methods of degrading plastics via the use of microorganisms and new enzymes. **Read the full abstract here:** <https://tecscience.tec.mx/en/science-communication/microplastics-and-obesity/>

[1] A compound earns the label “obesogenic” when it contributes to obesity and weight-related issues. This typically occurs due to factors such as an increase in the number of adipocytes, specialized cells within adipose tissue tasked with fat storage, which can consequently disrupt metabolism.

Microplastics and Nanoplastics: Exploring Neurotoxicity, Blood-Brain Barrier Permeation, and Cell Death

Kevin Morris, Joe F. Bolanos, Walencia O. Pereira

The authors of this poster observed that microplastics are small enough to cross biological barriers, including the blood-brain barrier, and interact with neural cells, leading to neurotoxicity. They emphasized the importance of understanding the underlying mechanisms in honing in on the impacts of these particles on neurological health. An improved understanding of these mechanisms, the authors pointed out, is critical to develop effective mitigation strategies for micro- and nanoplastic-induced neurotoxicity. The generation of reactive oxygen species[2] was identified as a key mechanism of nanoplastic-induced neurotoxicity. Nanoplastics can induce oxidative stress in neural cells, leading to damage to proteins, lipids and DNA. This oxidative damage can disrupt cellular function and contribute to neuronal cell death. Nanoplastics can also disrupt intracellular calcium signaling, leading to excessive calcium influx and activation of cell death pathways. This disruption in calcium homeostasis can lead to neuronal cell death and neurodegenerative diseases. Research on the epidemiology of micro- and nanoplastic exposure and neurotoxicity is still in its early stages. Animal studies have shown that

exposure to nanoplastics can lead to neurobehavioral changes, neuroinflammation and neuronal cell death. However, human epidemiological studies are needed to correlate nanoplastic exposure levels with neurological disorders incidence. The impact of micro- and nanoplastics on neurological health is a complex and multifaceted issue. While the exact mechanisms underlying micro- and nanoplastic-induced neurotoxicity are still being elucidated, current evidence suggests that they can have detrimental effects on neural cells and the BBB. **Read the full abstract here:** https://www.researchgate.net/profile/Kevin-Morris-18/publication/379696188_Microplastics_and_Nanoplastics_Exploring_Neurotoxicity_Blood-Brain_Barrier_Permeation_and_Cell_Death/links/661629f066ba7e2359b95370/Microplastics-and-Nanoplastics-Exploring-Neurotoxicity-Blood-Brain-Barrier-Permeation-and-Cell-Death.pdf

[2] Reactive oxygen species are molecules capable of independent existence, containing at least one oxygen atom and one or more unpaired electrons. This group includes oxygen free radicals, e.g., superoxide anion radical, hydroxyl radical, hydroperoxyl radical, singlet oxygen, as well as free nitrogen radicals. Under physiological conditions, small quantities of ROS are formed during cell processes, such as aerobic respiration or inflammatory processes, mainly in hepatocytes and macrophages. Reactive oxygen species are primarily signaling molecules. In addition, they induce cell differentiation and apoptosis, thus contributing to the natural ageing process. [https://pubmed.ncbi.nlm.nih.gov/32352946/#:~:text=Reactive%20oxygen%20species%20\(ROS\)%20are,well%20as%20free%20nitrogen%20radicals.](https://pubmed.ncbi.nlm.nih.gov/32352946/#:~:text=Reactive%20oxygen%20species%20(ROS)%20are,well%20as%20free%20nitrogen%20radicals.)

MICROPLASTICS POLLUTION REMEDIATION

Microfiber Pollution and its Microbial Mitigation: A Review on Current Trends and Future Prospects

Alok Prasad Das, Kasturi Dutta, Rousan Khatun, Ipsita Dipamitra Behera, Shikha Singh, Sunanda Mishra

This literature review explored and evaluated microfiber waste management through biological and chemical approaches. Certain microorganism properties provide the opportunity for microbial remediation process of microfiber pollutants in several environmental conditions. For example, aerobic and anaerobic bacteria act on microfibers to fulfill their nutrient consumption and energy production. Microbial remediation of microfiber pollution through biodegradation was found to be an attractive, affordable and sustainable approach to address microfiber pollution. The mechanism of biodegradation of microfiber was described. According to the authors, the first phase of the process begins with the colonization of microorganisms on the microfiber surface through biofilm formation. Once microorganisms attach on the surface, they release various enzymes which in turn degrades the microfiber into smaller fragments. The rate of degradation microfibers depended on the concentration of pollutants present in the source and the amount of catalysts available. One effective method identified was bioremediation, which was found to be affected by microfiber characteristics, such as electrodynamic ability, porous, ultrafine linear density and persistence of [organic pollutants](#) on the water surface. The authors asserted that the reduction in exposure to macrofibres will be the most effective in the long term if a more strategic approach is taken that includes addressing the basic questions/issues about how we create, use and dispose of clothes and other textiles in an eco-friendly way. **Read the full abstract here:** <https://www.sciencedirect.com/science/article/pii/S1876107023004339>





U.S. EPA Office of Water | 1200 Pennsylvania Ave NW, Washington, DC 20460

[Unsubscribe](#) ansley.groff@erg.com

[Update Profile](#) | [Constant Contact Data Notice](#)

Sent by nandi.romell@epa.gov powered by



Try email marketing for free today!