The Rapids:
US EPA's Trash Free Waters Monthly Update
June 2021

https://www.epa.gov/trash-free-waters

Introduction

Hello all,

We hope you are enjoying the start of summer!

The Commission for Environmental Cooperation (CEC) recently published a toolkit for community engagement titled **"Reducing Marine Litter Through Local Action."** The purpose of this toolkit is to help North American urban, suburban and rural communities located inland or in coastal areas to mobilize and coordinate efforts to reduce and prevent improperly disposed trash from becoming marine litter. An accompanying resource is the **"Last Stop: The Ocean" Campaign Toolkit and website**, which uses creative illustration to emphasize the interconnectedness of our waterways, river systems, and shared watersheds. Both resources are offered in English, French, and Spanish.

In addition, the full Keep America Beautiful 2020 National Litter Study I referenced last month has now been published and can be read **here.**

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 Program Lead

EPA Announcements

New Gulf of Mexico Division TFW RFA
EPA's Gulf of Mexico Division issued the Healthy and Resilient Gulf of Mexico 2021 Request for Applications (RFA) on June 1. One of the funding opportunities under this RFA is titled "Trash Free Waters – Preventing More, Picking Up Less." This TFW RFA seeks projects in the five Gulf States, or within several upstream cities, focused on preventing trash from reaching our waterways. Learn more about this RFA in the Funding Opportunities section below, and **here.**

Release of the Trash Stormwater Permit Compendium

The Trash Stormwater Permit Compendium is the latest in a series of Compendia developed by EPA as technical resources for stormwater permit writers. The primary purpose of the Trash Stormwater Permit Compendium is to provide stormwater permit writers with examples and information they can use to develop effective trash-related provisions for MS4 permits. The Trash Stormwater Permit Compendium is also a useful tool for stormwater management planners, watershed planners, and others interested in how to incorporate effective trash control measures into their planning documents. Access this resource **here.**

Signing of the U.S.-Mexico Environmental Program: Border 2025 Framework Document

The EPA, in partnership with Mexico's Ministry of the Environment and Natural Resources recently signed the U.S.-Mexico Environmental Program: Border 2025 that advances the two countries commitments to protect the environment and public health along the U.S.-Mexico border. The report highlights the importance of addressing trash pollution through sustainable materials management and improved waste management. Read the report **here.**

Tampa Bay Estuary Installs Trash Capture Devices

The Tampa Bay Estuary Program was awarded almost $500,000 via an EPA Gulf of Mexico Division Trash Free Waters grant last year to expand the use of marine debris technologies and data collection efforts to inform trash management and prevention policies. On May 4th, Osprey Initiative, Inc. deployed a Litter Gitter in Clam Bayou. The Tampa Bay Estuary will be deploying an additional 11 marine debris collectors in three counties within the Tampa Bay watershed. Read more about the effort **here.**

New TFW Article Published on Trash in the Mississippi

The Trash Free Waters Program recently released a new in-depth article titled "Plastic Pollution in the Mississippi River – Regional Cooperation for a Transboundary Problem." This article examines the issue of plastic pollution in the Mississippi River Basin and describes how an exciting new regional effort, The Mississippi River Plastic Pollution Initiative, is addressing the problem. Read the article **here.**

EPA Region 7 Healthy Environments Challenge Video

EPA Region 7's Healthy Environments Challenge, launched last month in an effort to educate students about the impacts of trash in the environment and what they can do to help prevent it, now features a fun video explaining how to get involved in the initiative. Watch the video clip **here.**

Trash Free Waters Earth Day Tweet

On April 22nd, EPA reminded everyone to do their part on Earth Day (and every other day!) by refraining from littering, using reusable items, and repairing broken items instead of buying new ones. An additional illustration encouraged people to participate in a local trash cleanup. View the tweet **here** and **here.**

Chesapeake Plastic Pollution Action Team Publications

The Chesapeake Bay Program's Plastic Pollution Action Team (PPAT) in coordination with EPA Region 3 and Tetra Tech developed a series of tools to help address plastic pollution in the Chesapeake Bay. These tools include 1) a uniform size classification and unit terminology document to enhance consistency among research in the Chesapeake Bay; 2) a preliminary conceptual ecological risk assessment for microplastics on striped bass, and 3)

microplastics science and monitoring strategy. These tools are publicly available on the PPAT website **here.**

Funding Opportunities

Microfiber Innovation Challenge
Conservation X Labs has launched a Microfiber Innovation Challenge, offering $650,000 in grants to teams creating alternative, non-microfiber-shedding fabrics or improving textile manufacturing to prevent microfiber shedding. Applications close June 25. Read more about this funding opportunity **here.**

DOI Single-Use Plastic Recycling Funding Opportunity Announcement
The U.S. Department of Energy (DOE) is investing up to $14.5 million in research and development to cut waste and reduce the energy used to recycle single-use plastics like plastic bags, wraps, and films. Through this funding opportunity, DOE will support a range of projects to develop economically viable solutions for converting plastic films to more valuable materials and design new plastics that are more recyclable and biodegradable. Concept paper submissions are due by June 28. Read more **here.**

Save our Seas Foundation Small Grants
The Save our Seas Foundation (SOSF) Small Grant is designed for short (12- to 18-month) and small (grants average US$5,000) projects dedicated to early-career scientists (within five years of a degree is awarded). Aimed at original and innovative start-up projects, the grant presents early-career scientists, conservationists, or educators with an opportunity to prove themselves. Projects must be related to marine chondrichthyan species (sharks, rays, skates, sawfishes, and chimaeras). Applications are due by June 30. Read more about the opportunity **here.**

Stay Stoked Student Awards
The application period for the Algalita Wayfinder Society's Stay Stoked Awards is now open for ages 11-20 who are working to solve plastic pollution and related social justice issues. This award is open to those looking for financial support for their personal education and development, school efforts, community projects, internships, networking events, etc. connected to addressing the plastic crisis. A total of $15,000 will be awarded through the program. Applications are open until July 14. Read more about the opportunity **here.**

EPA Gulf of Mexico Division Trash Free Waters RFA
EPA's Gulf of Mexico Division issued the Healthy and Resilient Gulf of Mexico 2021 Request for Applications (RFA) on June 1. The RFA consists of four separate funding opportunities, one of which is titled "Trash Free Waters – Preventing More, Picking Up Less." This TFW RFA seeks projects focused on preventing trash from reaching our waterways and must take place within 25 miles of the coastal zone of one of the five Gulf States, or within several upstream, inland metropolitan statistical areas (MSA). Approximately $4,000,000 is expected to be made available for 8 to 16 projects. Applications are due by August 6. Learn more about the funding opportunity and eligible project types and locations **here.**

Tom Ford Plastic Innovation Prize

Tom Ford and 52HZ are offering $1.2 million to the innovators who create the best replacement for thin-film plastic; one that can be used in everything from polybags (the fashion industry's packaging of choice) to single-use, resealable sandwich and storage bags. This opportunity is a two-year competition, followed by three years of support for competition finalists, designed to incentivize the development and adoption of these alternatives to thin-film plastic. The submission window closes on October 24. Read more **here.**

Other opportunities…

Call for Nominations for the Marine Debris Foundation Board of Directors
NOAA is pleased to announce a solicitation of nominations for the Marine Debris Foundation Board of Directors. The Save Our Seas 2.0 Act of 2020 established the Marine Debris Foundation as a charitable and nonprofit organization to support NOAA and other relevant agencies in their marine debris activities. NOAA is searching for twelve people to serve as Directors representing assessment, prevention, reduction, and removal of marine debris; post-consumer materials management or a circular economy; policy; and fundraising and nonprofit management. Nominations must be received by June 30. Learn more about the foundation **here.**

The Benioff Ocean Initiative Call for Ideas
The Benioff Ocean Initiative believes that by combining everyone's awareness of where the ocean is sick with the willingness of the marine science community to help, we can make a difference. Ideas are welcome from anyone, anywhere in the world. Find out more about the 3-step process to submit your problem **here.**

Save the Dates/Calendar

June 8-10th: Capitol Hill Ocean Week
Capitol Hill Ocean Week (CHOW), hosted by the National Marine Sanctuary Foundation, convenes policymakers, scientists, managers, business leaders, conservationists, educators, students, and members of the public to engage in dialogue and debate on significant issues that impact our ocean and Great Lakes and to propose innovative policies and partnerships to address these issues. This year's focus is on diversity, equity, inclusion, and justice and the event will be completely virtual. Learn more about this opportunity **here.**

June 8-10th: Ellen MacArthur Foundation Summit
The Ellen MacArthur Foundation Summit, a three-day summit on building a circular economy, will bring together corporate executives, policymakers, and experts in climate, food, and biodiversity. This free online event explores how we collaborate to connect government and industry to tackle our biggest global challenges while creating resilience and wellbeing. Register for the summit **here.**

June 8th (9AM EDT): Rising to the Global Challenge of Ocean Plastic Pollution
In honor of World Oceans Day, please join USAID and the Ocean Conservancy for a virtual program bringing together policymakers, leading experts, and local problem solvers to discuss ways to ensure that the growing international efforts to combat ocean plastic

pollution crisis are effective and beneficial. This event will feature speakers from the University of Georgia, Coca-Cola Foundation Philippines, Inclusive Waste Recycling Consortium (iWrc), and Ministry of National Development Planning (Indonesia). Register **here.**

June 8th (9AM EDT): Environmental Degradation Trends of Plastic Debris in Seawater
This webinar is part of a monthly webinar series produced by Ocean Plastic Webinars. The event will feature speaker Rob Mathers, a professor of chemistry at Pennsylvania State University and expert in using green chemistry to synthesize renewable monomers. Join the live stream webinar on the Ocean Plastic Webinars YouTube channel **here.**

June 8th (3PM EDT): EPA Programs for Stormwater Funding and Financing
This webinar is first in the EPA Water Finance Center's Stormwater Funding and Financing Approaches Webinar Series. The event will highlight opportunities for funding and financing stormwater infrastructure through existing EPA programs and include presentations by representatives from EPA's Water Infrastructure Finance and Innovation Act (WIFIA) program, Georgia Environmental Protection Department's Nonpoint Source Program, and EPA's Clean Water State Revolving Fund (CWSRF) and Sewer Overflow and Stormwater Reuse Municipal Grants program. Register for the webinar **here.**

June 8th (4PM EDT): Clean Break – Saying Goodbye to Single-Use Plastic
Celebrate World Oceans Day with a special livestream hosted by UPSTREAM.
What is the impact single-use plastics are having on the ocean ecosystem? And how can we shift from single-use packaging products to reusable solutions to reverse the damage already done? UPSTREAM CEO Matt Prindiville will dive into these questions and more with a panel of reuse entrepreneurs. View the list of speakers and register for the special event **here.**

June 8th (8PM EDT): Virtual Finale of the Scripps-Rady Ocean Plastic Pollution Challenge
This is the culmination of a unique accelerator program that has spanned six months with participants around the globe. During this virtual event, five teams of professionals and students will pitch innovative solutions to curb the flow of plastic into the ocean, with a focus on marine conservation and marine cultural preservation areas along California's coast. The winning team will be announced! Register for the webinar **here.**

June 9th (10AM EDT): Business Opportunities from Waste Fishing Gear
The webinar will introduce the lessons learnt from the Blue Circular Economy (funded by the Northern Periphery & Arctic (NPA) Programme) to date followed by a SpeedNET stakeholder networking session aimed at increasing networking and collaboration between stakeholders with an interest waste fishing gear. Register for the event by contacting rcarruthers@uca.ac.uk with your name, job title, and organization.

June 9th (2PM EDT): A Look at the Future of Sustainable Flooring
In this webinar hosted by Dow, Scott Cassel, PSI Founder & CEO, will speak on a panel of sustainability and flooring industry experts about sustainable flooring trends in the next decade. Attendees will learn how new technologies pair with ecological know-how to help the flooring industry create more sustainable, recyclable materials and products that meet consumer demands and local standards. Register **here.**

June 15th (8:30AM- 11:30AM EDT): Marine Litter - Prevention, Progress, and Monitoring
This online seminar, presented by the British Plastics Federation and PlasticsEurope, examines the latest developments regarding marine litter. The event will offer an overview of recent research and initiatives, including Operation Clean Sweep, the Plastic Leak Project, the Alliance to End Plastic Waste, the Plastic Bank, WasteAid, and more. Register **here.**

June 15-17th: Circularity 21 – Accelerating the Circular Economy
Circularity 21, the largest online circular economy event, offers an engaging and informative program, expo, and networking opportunities. Conference tracks include Business Innovation & Strategy, Next-Gen Products & Packaging, Rethinking Supply Chains, People & Policy, Bio-Based Solutions, and Stakeholders & Storytelling. Register **here.**

June 17th (1PM EDT): The Spectrum of Approaches to U.S. Packaging EPR- From Reimbursement to Full Responsibility
This webinar is co-organized by the Northeast Waste Management Officials' Association (NEWMOA), the Product Stewardship Institute (PSI), and the Northeast Recycling Council (NERC). This webinar will summarize the spectrum of extended producer responsibility (EPR) models in use around the country, from "Full EPR" systems run by producers to "Municipal Reimbursement" systems with more municipal control, and many hybrid structures. Then, experts from New York, Vermont, and Maryland will share insights into why each state has taken a distinct approach to EPR. Register **here.**

June 17th (2:30PM EDT): A Healthy River and Healthy Communities through Citizen Science and Community Partnerships
Fifth in the California Trash Monitoring Webinar Series, this webinar will feature presenter Rob Hutsel. President and CEO of the San Diego River Park Foundation. The Healthy River, Healthy Communities Program is the San Diego River Park Foundation's signature stewardship program which utilizes an ongoing effort to survey 20+ miles of the River to inform program collaboration, advocacy, and action. View how to participate in the webinar **here.**

June 23rd (3PM EDT): Salvaging Solutions - Taking an Inventory of the Issue
Join for the fourth webinar in the NOAA Marine Debris Program's series, Salvaging Solutions to Abandoned and Derelict Vessels Webinar: Taking an Inventory of the Issue, which will focus on efforts to inventory and track abandoned and derelict vessels. Join the webinar via Adobe Connect **here.**

June 24th (8:30AM EDT): Waste-Free Rivers Webinar
This webinar will offer\the latest information on the effects of marine litter, prediction models for river litter, and practical "hands-on" innovative solutions based on some inspiring examples. This event will be hosted by KIMO, or the Kommunernes International Miljøorganisation (Local Authorities International Environmental Organisation), whose mission is to prevent pollution and to protect, preserve and enhance the seas and coastal waters of the North-East Atlantic and Baltic regions. Register for the webinar **here.**

June 24th (9:30PM EDT): No Time to Waste - Closed Loop Solutions Webinar
This webinar is the first in a series offered through a partnership between Social Marketing @ Griffith, Plastic Oceans Australasia, Green Technology Centre, Hongik University, and the Australia-Korea Foundation. The series focuses on encouraging people to combat climate change through reduced carbon emission and plastic waste. The discussion will

showcase approaches that have successfully reduced carbon emission featuring collaborations between policy-makers, corporations, and other organizations. Learn more and register for the event **here.**

June 28-30th: Waste Expo
Waste Expo, hosted by Waste360, is the leading solid waste and recycling event in North America. 2021 Conference Tracks include Operations, Fleet & Safety, Recycling & Landfill, and Business Insights & Policy. The conference will take place at the Las Vegas Convention Center. To view the conference program overview and list of exhibitors, click **here.**

June 30th (8AM EDT): Assessing the Impacts of Plastics
This webinar is brought to you via a series put on by The Marine Alliance for Science and Technology for Scotland (MASTS) and European Marine Biological Resource Centre (EMBRC). The event will feature speaker Tamara Galloway of the University of Exeter and provide an overview of the university's research into the ecotoxicology of microplastics, their entry into the marine food web and the biological impacts this can lead to. The future of plastics and the role of the Circular Economy will also be discussed. Register **here.**

Save the dates for future months…

July 14-17th: National Marine Educators Association Virtual Conference
The National Marine Educators Association (NMEA) is hosting their annual conference under the theme "Your Connection to Water," focusing on our personal connection to water. A variety of topics including conservation, ocean literacy, and traditional knowledge will likely be discussed. View the conference schedule and register **here.**

July 15th (2:30PM EDT): Big Data for Trash Monitoring Programs Big or Small
This webinar, the sixth in the California Trash Monitoring Webinar Series, will feature presenter Win Cowger, Ph.D. student and NSF graduate research fellow at the University of California Riverside. This presentation will discuss leveraging big data tools (e.g., open data, trash taxonomy, AI, machine learning, web applications, etc.) to turn data into information leading to action. View how to participate in the webinar **here.**

July 20-22nd: Mid-Atlantic Marine Debris Regional Summit
Each of the three virtual half-day sessions will inspire collaboration and empower partners to work on solutions to marine debris. Attendees will represent state and federal agencies, NGOs, academia, and other groups tackling marine debris in the five Mid-Atlantic coastal states (New York, New Jersey, Delaware, Maryland, and Virginia) and Washington, DC. The public also is encouraged to participate. Agenda and registration details will be available soon **here.**

July 28th (3PM EDT): Salvaging Solutions - Oil and Hazmat Issue
Join for the fifth webinar in the NOAA Marine Debris Program's series, Salvaging Solutions to Abandoned and Derelict Vessels Webinar: Oil and Hazmat Issues. Join the webinar via Adobe Connect **here.**

August 19th (2:30PM EDT): California Coastal Cleanup Day – History, Data, Action, and Community Engagement

This webinar, the seventh in the California Trash Monitoring Webinar Series, will feature presenter Eben Schwartz, Marine Debris Program Coordinator at the California Coastal Commission. This presentation will discuss how cleanups can offer a way for volunteers to respond to the threat of trash in our environment. View how to participate in the webinar **here.**

August 25th (3PM EDT): Salvaging Solutions - Coordination Success Stories and Lessons Learned
Join for the sixth webinar in the NOAA Marine Debris Program's series, Salvaging Solutions to Abandoned and Derelict Vessels Webinar: Coordination Success Stories and Lessons Learned. Join the webinar via Adobe Connect **here.**

September 6-9th: Estuaries and Coastal Seas in the Anthropocene Conference
This virtual conference will offer a stimulating learning and interactive experience to deepen understanding of a variety of issues facing our coastal ecosystems. The event will feature two special sessions on the impact of pollution and plastics on estuaries and the ocean. Read more and register for the conference **here.**

September 22nd (3PM EDT): Salvaging Solutions – ADV Info Hub Reflections
Join for the seventh webinar in the NOAA Marine Debris Program's series, Salvaging Solutions to Abandoned and Derelict Vessels Webinar: ADV Info Hub Reflections. Join the webinar via Adobe Connect **here.**

September 20-23rd: Global OCEANS 2021
Join global thought leaders and innovators in the areas of marine technology, engineering, science, research, and education to hear from industry experts and engineers regarding the latest research and innovations, discuss current environmental issues and policies affecting the field, and collaboratively work together to move the fields of marine technology and engineering forward. The event will feature a special technical session called "Ocean Clean Up: Micro to Macro." View the program agenda and register for the conference **here.**

Recent Legislation

ZERO WASTE Act
The 'Zeroing Excess, Reducing Organic Waste, and Sustaining Technical Expertise Act (ZERO WASTE Act)" was reintroduced in March and is currently with the House Committee on Energy and Commerce. The bill would authorize hundreds of millions of dollars in grant funding for zero-waste projects such as organics recycling infrastructure, e-scrap recycling, source reduction programs, and disposal diversion projects. At least 75% of this grant funding would be required to go towards projects that serve/are located in environmental justice communities. Read a draft version of the bill **here.**

Border Water Quality Restoration and Protection Act of 2021
The Border Water Quality Restoration and Protection Act of 2021 was introduced in the House in March and was just referred to the Subcommittee on Water, Oceans, and Wildlife. This bill calls for water quality restoration of the Tijuana River and the New River. Read the full bill text **here.**

BLUE GLOBE Act
The BLUE Globe Act, otherwise known as the "Bolstering Long-term Understanding and Exploration of the Great Lakes, Oceans, Bays, and Estuaries Act," was shared with the Senate in January of this year and is currently with the Committee on Commerce, Science, and Transportation. The purpose of this Act is to (1) promote and support the monitoring, understanding, and exploration of the Great Lakes, oceans, bays, estuaries, and coasts; and (2) conduct data collection and analysis related to these areas so as to facilitate science and operational decision-making. Read the bill **here.**

The Microplastics Breakdown

MICROPLASTICS SOURCES, FATE AND TRANSPORT

Microplastics in Indoor Air
Quik, JTK, Waaijers-van der Loop, S for the Dutch National Institute for Public Health and the Environment (RIVM)
This report compiles available literature on microplastics (MP) in indoor air on behalf of the country's Ministry of Infrastructure and Water Management (IeW). The goal of the report was to better understand the sources that release microplastics into indoor air and describe their concentration and fate with the goal of enabling IeW to take any necessary action. The authors observed that several potential other MP sources have been described in the literature, such as from construction, e.g. sanding of polymer containing paints, from wear of household plastic items, and 3D-printing using polymer-based filaments but the data on release rates is too limited to accurately estimate these emissions to indoor air. As a general matter, they found that the concentrations appear to be low. On average, there were between 1.6 and 9.3 microplastic particles per cubic meter. The particles measured were more than 11 µm in diameter, which are larger than the ultrafine particles normally measured to assess air quality. The authors noted that it is possible that much smaller microplastics are present in homes but it is currently difficult to measure the smaller types of microplastic particles in air. They recommended further research to identify smaller microplastic particles and their sources. Read the full abstract **here.**

Perfluoroalkylated Substances (PFAS) Associated with Microplastics in a Lake Environment
John W. Scott, Kathryn G. Gunderson, Lee A. Green, Richard R. Rediske, and Alan D. Steinman
The authors conducted experiments that examined the interactions of PFAS and microplastics in the field and in a controlled environment. In the field setting, the authors measured the abundance of PFAS on different polymer types of MPs (2mm-5mm) that were deployed in Lake Muskegon in Michigan for periods of 1 month and 3 months. A controlled experiment was then conducted. The adsorption of PFAS was found to be much greater on the field-incubated plastic than what was observed in the laboratory with plastic and water alone. Based on these results, the authors suggest that adsorption of PFAS by MPs is greatly enhanced by the presence of inorganic and/or organic matter associated with the materials

in the environment and could present an environmental hazard for aquatic biota. However, the authors pointed out that because of several factors the degree of PFAS associated with actual MPs in the environment may differ from those found in this study. The authors also hypothesized that since smaller MPs would have greater surface area per volume ratios per particle that could potentially provide more active sites of PFASs adsorption; the MPs in this study, they observe were much larger than most MPs found in the environment. Additionally, over time biofilms can change in composition, which in turn can affect their adsorptive properties. They suspected that these factors would increase PFASs adsorption, thereby making the results from this study biased low, and conservative. The authors found that their results support the need to consider the biological and chemical materials associated with plastic materials in the environment. Read the full abstract **here.**

Urban Stormwater Runoff: A Major Pathway for Anthropogenic Particles, Black Rubbery Fragments, and Other Types of Microplastics to Urban Receiving Waters
Larissa M. Werbowski, Alicia N. Gilbreath, Keenan Munno, Xia Zhu, Jelena Grbic, Tina Wu, Rebecca Sutton, Margaret D. Sedlak, Ashok D. Deshpande, and Chelsea M. Rochman
This study quantified and characterized urban stormwater runoff from 12 watersheds surrounding San Francisco Bay for anthropogenic debris, including microplastics (MPs). Samples were collected during wet weather events. Anthropogenic microparticles, including microplastics, were found in each of the samples in concentrations higher than those in wastewater treatment plant effluent. The authors concluded that these results suggest that urban stormwater runoff is a major source of anthropogenic debris, including MPs, to aquatic habitats. Additionally, about 85% of all particles across all samples were identified as fibers and black rubbery fragments (potentially tire and road wear particles). The authors also sampled stormwater from the inlet and outlet of a rain garden during three storm events to measure how effectively rain gardens capture microplastics and prevent it from contaminating aquatic ecosystems. The rain garden was found to have successfully removed 96% of anthropogenic debris and 100% of black rubbery fragments, suggesting rain gardens should be further explored as a mitigation strategy for MP pollution. The authors concluded that best management practices for managing legacy contaminants in stormwater, specifically rain gardens, may provide valuable co-benefits as a mitigation strategy specific to reducing MPs in stormwater runoff and deserve to be further explored. Read the full abstract **here.**

MICROPLASTICS IN ECOSYSTEMS

Interactions between microplastics and soil fauna: A critical review
Quanlong Wang, Catharine A. Adams, Fayuan Wang, Yuhuan Sun and Shuwu Zhang
This article examined the potential impacts on soil fauna (e.g., earthworms, nematodes) posed by exposure to microplastics. This review of the literature found that MPs can cause negative impacts on the growth, reproduction, lifespan, and survival of soil fauna via a wide range of mechanisms, including ingestion and bioaccumulation, histopathological damage, oxidative stress, DNA damage, genotoxicity, reproductive toxicity, neurotoxicity, metabolic disorders, and gut microbiota dysbiosis. MPs were also found to interact with other contaminants to produce combined toxicity to soil fauna. Soil fauna were found to be able to contribute to the formation and breakdown of MPs, alter the migration of MPs in soil, and even transfer accumulated MPs to higher trophic levels. The authors recommend further research given the large knowledge gap regarding the interaction of soil fauna and MPs. Read the full abstract **here.**

Effects of microplastics on the functional traits of aquatic benthic organisms: A global-scale meta-analysis

M.Berlinoa, M.C.Mangano, C.De Vittorb,G.Sarà

The authors conducted a meta-analysis focused on the effects of microplastics (MPs) on the functional traits (behavioral, physiological, and morphological characteristics) of aquatic benthic organisms. Based on their analysis of 41 scientific papers, the authors found that MPs had a moderate negative effect on the examined functional traits of benthic organisms. Some traits, such as those linked to behavior and feeding, seemed to be unaffected by microplastics. In contrast, traits related to the capacity of organisms to assimilate energy are affected. Traits associated with population-level effects appear to be negatively affected by microplastics. The authors concluded that their results highlight the possibility that the direct impact of MPs on organismal performance may have indirect repercussions at higher levels in the ecological hierarchy and represent a risk for the stability and functioning of the ecosystem. Another significant conclusion of their analysis was that responses to MPs appear to be species-specific and may depend on the ability of any single species to tolerate stressful habitat conditions: a certain level of an environmental factor may negatively affect the response of a species while not affecting another. Read the full abstract **here.**

Plastic Ingestion by Arctic Fauna: A review

France Collard, Amalie Ask

This review attempted to summarize providing existing data and knowledge gaps regarding plastic ingestion by Arctic fauna: invertebrates, marine mammals, sea birds, terrestrial mammals, and fish. Based on their review, the authors concluded that research on plastic pollution in Arctic terrestrial mammals, birds, and invertebrates, as well as in Arctic abiotic terrestrial compartments in general, is still in its infancy. They point out that, similar to research, in other regions, research efforts in the Arctic have mainly focused on marine or aquatic pollution. Among other knowledge gaps, the authors concluded that their review results highlighted the need for more data on fauna from the Russian and European Arctic and for experimental studies on impacts of plastic ingestion on Arctic species. They asserted that many processes will lead to an increase of plastic levels in the Arctic and consequently, to an increase of this threat for Arctic species: a decrease in sea ice volume, melting of glaciers, an increase in maritime activities, development of tourism, a continuous release through wastewater outlets, a slower degradation rate of plastic material in cold environments and hydrodynamic patterns make the Arctic an accumulation zone for plastics in the next decades. Read the full abstract **here.**

EXPOSURE AND HEALTH IMPACTS TO HUMANS AND ANIMALS

Polystyrene microplastics-induced ROS overproduction disrupts the skeletal muscle regeneration by converting myoblasts into adipocytes

Wang Shengchen, Liu Jing, YaoYujie, WangYue, Xu Shiwen

This study investigated the effect of two sizes of polystyrene microplastics (PS-MPs, 1–10 μm, and 50–100 μm) on the growth of anterior tibial (TA) muscle and repair after injury in mice. The authors followed the procedures of the Animal Care and Use Committee of Northeast Agricultural University in conducting this research. Thirty 6-week-old male mice were randomly divided into 3 groups (10 per group): a control group and two experimental groups who ingested a mixture of water and MPs. Their results indicated that exposure to the levels of MPs in this study did not affect the growth of skeletal muscle, but significantly damaged the repair of muscle fibers after injury. Additionally, the researchers also found

that greater effects on the repair process were associated with smaller particle sizes. Read the full abstract **here.**

Migration of (non-) intentionally added substances and microplastics from microwavable plastic food containers
Ying-Jie He, Yan Qin, Tie-Li Zhang, Yan-Yan Zhu, Zhao-Jie Wang, Zhong-Shun Zhou, Tian-Zhen Xie, Xiao-Dong Luo
This study explored whether microwaveable plastic food containers pose potential health risks, as a result of the migration of chemicals into foods. Fifteen microwavable plastic food container products were purchased from online retailers (www.amazon.cn, www.taobao.com, and www.JD.com). These containers were colorless-transparent or white-translucent and did not have printed images on them. The containers were made of polypropene (PP), Styrene-acrylonitrile resin (SAN), or Tritan. Five food simulants were employed in the experiments: 1) distilled water or 10% ethanol solution; 3% acetic acid solution; 50% ethanol solution, and 95% ethanol solution. Each container was cut into same-sized rectangular pieces and then immersed in 10 mL of each food simulant. Food simulants without added pieces of plastic were used as the blank control using the same procedure to eliminate impurities introduced by utensils. Microplastics were detected with high values of over one million particles/L in some containers single test. The migration behaviors of microplastics in different containers were diverse, and according to the authors, revealing their potential risk to health, which should be assessed in the future. Read the full abstract **here.**

RISK FRAMEWORK

Microplastic Pollution in California: A Precautionary Framework and Scientific Guidance to Assess and Address Risk to The Marine Environment
Susanne Brander, Eunha Hoh, Kenneth Unice, Anna-Marie Cook, Rusty Holleman, Chelsea Rochman, Julie Thayer
This document sets forth a framework for assessing and addressing microplastic pollution in California's marine environment that was developed by a working group of experts convened by the California Ocean Science Trust (OST) on behalf of the Ocean Protection Council. The working group recommended applying a precautionary approach to the management of microplastic pollution because the execution of a state-specific quantitative risk assessment is hindered by a lack of data. Therefore, they recommended that efforts to characterize microplastics risk in the short-term focus on their physical characteristics (i.e. particulate approach), as opposed to chemical (i.e. toxicant approach). The precautionary framework in this document consists of instructions and recommendations for completing three phases in any future microplastic risk assessment. It also identifies the three highest priority research questions to inform research and mitigation and apply the precautionary framework. The working group concluded that addressing these questions will allow decision-makers to prioritize sources for reduction activities immediately, instead of waiting to act when the necessary effects data and relevant risk frameworks become available. Read the full abstract **here.**

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

US EPA - Trash Free Waters | nandi.romell@epa.gov | https://www.epa.gov/trash-free-waters