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

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

Introduction

Hello all,

I hope everyone is having a fun summer! The United Nation's International Resource Panel published a report last month titled "Policy Options to Eliminate Additional Marine Plastic Litter by 2050 under the G20 Osaka Blue Ocean Vision." This document was commissioned by the G20 and explores both upstream and downstream policy interventions for reducing marine plastic litter. I encourage you to read the factsheet or download the full report **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

California Trash Monitoring Methods and Assessments Playbook
The California Trash Monitoring Methods and Assessments Playbook, originally released earlier this year, now includes an updated review of the EPA's litter assessment tool – the Escaped Trash Assessment Protocol (ETAP). This playbook was made possible by the California Ocean Protection Council (OPC), Southern California Coastal Water Research Project (SCCWRP) and the San Francisco Estuary Institute (SFEI). This resource serves as a library of trash monitoring methods comparing levels of precision, accuracy, cross-comparability of results, and ability to answer different management questions. A thorough review of ETAP is included in the analysis and can be read **here.**

Managing Urban Litter StoryMap
The Urban Waters Learning Network recently published an interactive storymap titled "Managing Urban Litter." This resource provides viewers with examples of successful litter management projects from across the nation. A number of the case studies highlighted are TFW-funded efforts. Click through the storymap **here.**

G20 Environment Ministers' Meeting
EPA Administrator Michael Regan attended the G20 Environment Ministers' Meeting in Italy last month. Following the meeting, the G20 environment ministers issued a communiqué

calling for stronger actions to tackle sources of marine plastic litter and welcomed the recent G20 report sharing the latest best practices to control marine plastic. Read the full news release **here.**

"Can It 'Yall" Challenge in Mobile Bay
A 2020 Gulf of Mexico Division TFW Grant awardee, the City of Mobile, recently launched the "Can It 'Yall" Cleanup Challenge in partnership with Mobile Baykeeper. This campaign is being used to increase awareness about the issue of litter in Three Mile Creek and encourages local organizations and businesses to do their part by cleaning up hotspot locations within the watershed. Grant funding is being used to advertise the campaign and provide supplies and prizes for the volunteers. More information and photos can be found **here.**

EPA Region 3 Microplastics Research
An article in the *Bay Journal* highlighted the work that EPA Region 3, in coordination with the Chesapeake Bay Program's Plastic Pollution Action Team (PPAT) is doing to lay the necessary groundwork needed to begin to address the rising concerns of microplastics in the Chesapeake Bay watershed. The article describes their newly released ecological risk assessment for striped bass and other reports on the topic of microplastics that the team produced. Trash Free Waters coordinator and co-chair of the PPAT, Kelly Sommers, is interviewed in the article, which can be found **here.**

EPA Issues Report on Health of Salish Sea
The U.S. Environmental Protection Agency and Environment and Climate Change Canada released their joint "The Health of the Salish Sea Report" last month, analyzing 10 indicators of the health of the Salish Sea **here.** One of these indicators, "Toxics in the Food Web," identifies plastics and microplastics as an emerging threat due to their prevalence, persistence, and ability to transport and release other pollutants and calls for further research to understand impacts. Read the news release **here.**

Funding Opportunities

Global SF-Nestlé Waste Reduction Pilot
Nestlé and Global SF are looking for a startup partner who can build and pilot a consumer-friendly grocery store-based refill system to help reduce Nestlé's carbon footprint and the amount of food and/or beverage packaging that ends up in landfills. Each winning startup will receive $10K to implement their pilot and proof of concept in San Francisco this summer. Applications are due by midnight on August 3. Read more about this opportunity **here.**

EPA Small Business Innovation Research (SBIR) Grants
EPA's 2021-2022 SBIR Phase I solicitation calls for small businesses to apply for funding for projects which showcase the development and commercialization of an innovative technology related to Sustainable Materials Management (i.e. tech that helps consumers prevent food waste in the acquisition, preparation, and storage of food, improve the U.S. recycling system, and/or low impact reusable and recyclable material alternatives to low value plastic items that escape management) or Clean and Safe Water (i.e. tech to process microplastics samples and/or remove microplastics from wastewater or stormwater). Phase I applications are being accepted until August 3. More information about the SBIR program solicitation, application process, and award can be found **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.**

GLRI Nonpoint Source Runoff & Nutrient Reduction Projects
The Great Lakes Restoration Initiative recently released a $9 million funding opportunity for projects which address stormwater runoff pollution from land into water bodies. Applications must be submitted via Grants.gov by August 20. Read more about eligibility and the application process **here.**

Great Lakes FY2022 B-WET Program
NOAA's Office of National Marine Sanctuaries is seeking proposals under the Great Lakes Bay Watershed Education and Training (B-WET) program. The Great Lakes B-WET program is an environmental education program that supports locally relevant, authentic experiential learning in the K-12 environment. Funded projects provide Meaningful Watershed Educational Experiences (MWEEs) for students, related professional development for teachers, and help to support regional education and environmental priorities in the Great Lakes. Applications must be submitted prior to September 9. Learn more about the opportunity on Grants.gov **here.**

NOAA FY2022 Marine Debris Removal Grants
The NOAA Marine Debris Program supports the development and implementation of locally-driven, marine debris assessment, removal and prevention projects that benefit coastal habitat, waterways, and marine and Great Lake resources. Marine debris removal activities targeting derelict fishing gear and other medium- and large-scale debris will be given priority. Projects should also foster awareness of the sources and effects of marine debris, contribute to the understanding of marine debris composition, distribution and impacts, and work to prevent marine debris reaccumulation. Funding of up to $5 million total is expected to be available. This funding opportunity requires a Letter of Intent to be submitted via email (to grants.marinedebris@noaa.gov) no later than September 24. Learn more about the opportunity on Grants.gov **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.**

Save the Dates/Calendar

August 5th (2:30PM EDT): 2021 North Texas Community Cleanup Challenge

This informational webinar will be hosted by the North Central Texas Council of Governments and will provide attendees with details about the 2021 North Texas Community Cleanup Challenge, an initiative of the Stormwater Public Education Task Force. This challenge will encourage communities to pick up as much litter as they can between the months of September and October 2021. Topics to be covered include challenge logistics, expectations for litter collection, and more. Register for the event **here.**

August 6th (10AM EDT): Solid Waste Management in El Salvador and Ecuador
This bilingual (English and Spanish) webinar hosted by Waste Wise gives a brief overview of municipal solid waste management situation, key challenges and prospects in El Salvador and Ecuador. Invited speakers include three experts with years of international experience in sustainable cities, waste management, circular economy. Register for the webinar **here.**

August 10th (12PM EDT): Adaptive Processing– Meeting Tomorrow's Needs Today
This webinar is being hosted as part of Plastic News' Ask An Expert Livestream Series. The event will feature a guest speaker Rick Pollard, Innovation Engineering Director at iMFLUX. Discussion will touch on iMFLUX's autonomous approach to the injection molding process for post-consumer recycled materials. Register for the event **here.**

August 10th (2PM EDT): Creating an Economy That's Better for People and the Planet
This webinar is being hosted by the Center for Biological Diversity, Break Free From Plastic, and the U.S. Solidarity Economy Network. The solidarity economy is a growing global movement committed to building an economy grounded in the values of solidarity, sustainability, participatory democracy, and equity. Emily Kawano, founder and co-coordinator of the U.S. Solidarity Economy Network, will present an overview of the solidarity economy before facilitating interactive breakout rooms where participants can discuss examples such as composting cooperatives, sharing systems and community gardens. An optional 30-minutes will be provided at the end for formal Q&A and a small group visioning session. Register **here.**

August 17th (4PM EDT): Working towards a global plastic pollution treaty - Process and possibilities
This webinar will discuss why 130+ countries have declared support for a global agreement to combat marine litter and microplastics and what this treaty could look like. Speaker Dr. Trisia Farrelly of Massey University is an environmental anthropologist, co-founder of the New Zealand Product Stewardship Council and the Aotearoa Plastic Pollution Alliance and has been a member of UNEA's Expert Group and the United Nations Environment Programme's Scientific Advisory Committee on Marine Litter and Microplastics since 2017. Register for the event **here.**

August 18th (11AM EDT): Recycling Revisited – Glass
This webinar is offered as part of the Southeast Recycling Development Council's (SERDC) "Recycling Revisited" webinar series. The event will focus on glass specifically, and discuss how this major recycled commodity has adapted in recent years. Register **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 20th (2PM EDT): Extended Producer Responsibility (EPR) Coffee Hour

Join Beyond Plastics, Conservation Law Foundation, National Stewardship Action Council, UPSTREAM, and Break Free From Plastic US for a free informal "coffee hour" conversation to talk about the latest EPR proposals and what to look for to make sure the goals are achieved. Register for the event **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.**

Save the dates for future months…

September 1st (11AM EDT): Recycling Revisited – Metal
This webinar is offered as part of the Southeast Recycling Development Council's (SERDC) "Recycling Revisited" webinar series. The event will focus on metal specifically, and discuss how this major recycled commodity has adapted in recent years. Register **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 11th: International Coastal Cleanup Day
Where safe, small cleanups can happen, volunteers are tracking their impact, collecting important data on the amount and types of trash collected and submitting it all through Ocean Conservancy's app, Clean Swell. The ICC began over 30 years ago and has grown to engage volunteers throughout the U.S. and more than 100 countries. Check out "8 Steps to Safely Conduct a Solo or Small Cleanup" on the Ocean Conservancy website **here.**

September 13-15th: StormCon and Water Pro Conferences
StormCon is the stormwater and surface water quality's premier conference and exhibition hosted by Endeavor Business Media, LLC. WaterPro is the annual conference of the National Rural Water Association and is designed to bring together water and wastewater utility systems for sessions in operations, management, boardsmanship and governance. These conferences will be hosted as two parallel, in-person events at the Wisconsin Center in Milwaukee, Wisconsin. They offer different programs, however a joint exhibit hall will provide attendees with the opportunity to network with vendors and service providers from both events. Register for StormCon **here**, and the WaterPro 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.**

October 1st (2PM EDT): Extended Producer Responsibility (EPR) Coffee Hour
Join Beyond Plastics, Conservation Law Foundation, National Stewardship Action Council, UPSTREAM, and Break Free From Plastic US for a free informal "coffee hour" conversation to talk about the latest EPR proposals and what to look for to make sure the goals are achieved. Register for the event **here.**

October 6th (11AM EDT): Recycling Revisited – Other Recyclables and Emerging Markets
This webinar is offered as part of the Southeast Recycling Development Council's (SERDC) "Recycling Revisited" webinar series. The event will focus on recyclables other than plastics, glass, paper, and metal, and discuss emerging markets. Register **here.**

October 13-14th: Future of Plastics Forum
This virtual conference will assess how business can tackle plastics pollution and find solutions that drive sustainable plastics use. We will bring together key industry players from across the value chain to discuss current expectations and drivers as well as practical and realistic solutions that are innovative and scalable. This event will bring together 200+ key actors from across the globe, including speakers from organizations such as Unilever, Coca-Cola Europacific Partners, The Body Shop, and The Consumer Goods Forum. View the full agenda and register **here.**

October 27th (3PM EDT): Salvaging Solutions – Vessel Disposal
Join for the eighth webinar in the NOAA Marine Debris Program's series, Salvaging Solutions to Abandoned and Derelict Vessels Webinar: Vessel Disposal. Join the webinar via Adobe Connect **here.**

October 28-30th: Conservation Marketing Conference
The ConsMark 2021 conference theme is "Changing Behavior in a Changing Climate." This virtual event will feature presentations on a wide range of environmental topics from traditional ecological knowledge to marine pollution and plastics. Register for the conference **here.**

In case you missed it…

North Carolina Coastal Microplastics Forum
The NC Coastal Microplastics Forum was held on July 15th and was hosted by the NC Coastal Federation. Forum discussion included information around the different types of microplastics pollution, the sources and pathways of these contaminants into our waterways, the risks they pose to both the natural environment and human health, as well as current federal and state policies aimed to govern microplastics pollution and what you can do to help. Access a recording of the forum as well as presentation and resource materials **here.**

EPA Watershed Academy's "Addressing and Managing Plastic Pollution" Webcast
On April 21st, the EPA Watershed Academy hosted a webcast titled "Addressing and Managing Plastic Pollution." This event featured guest speakers: Winnie Lau, Senior Manager at Pew Charitable Trusts; Judith Enck, President of Beyond Plastics; Nancy Wallace of NOAA's Marine Debris Program; and Romell Nandi, EPA Trash Free Waters team lead. The webcast recording and accompanying materials are available **here.**

Recent Legislation

INVEST in America Act
Text from the RECYCLE Act, originally introduced in March of this year, has now been incorporated into The INVEST in America Act (Investing in a New Vision for the Environment and Surface Transportation in America Act). In doing so, the updated INVEST in America infrastructure bill now includes provisions on improving the U.S. recycling system through increased public participation and reduced contamination in residential recycling programs. Read the full bill **here.**

COMPOST Act
The Cultivating Organic Matter through the Promotion of Sustainable Techniques Act, or COMPOST Act, was introduced July 16th and referred to the House Committee on Agriculture. The bill would designate composting as a conservation practice and provide $200 million a year through 2031 in grants and loan guarantees for composting infrastructure projects. Read the full bill **here.**

A resolution designating July 2021 as "Plastic Pollution Action Month"
Senator Jeff Merkley submitted a resolution to designate July 2021 as Plastic Pollution Action Month on July 15. This resolution "encourages all individuals in the U.S. to protect, conserve, maintain, and rebuild the environment by responsibly participating in activities to reduce plastic pollution in July 2021 and year-round." Read the resolution text **here.**

The Microplastics Breakdown

MICROPLASTIC EFFECTS ON AQUATIC ORGANISMS

Combined exposure to microplastics and zinc produces sex-specific responses in the water flea Daphnia magna
Yoseop Lee, Deok-Seo Yoon, Young Hwan Lee, Jin Il Kwak, Youn-Joo An, Jae-Seong Lee, Jun Chul Park
This study explored the additive or possible synergistic effects of microplastics (MPs) and zinc. Neonate, adult female and male daphnia magna (D. magna) water fleas were exposed to varying concentrations of zinc and MPs, specifically, red fluorescent carboxylate-modified polystyrene microbeads. Chronic and acute effects were observed, with males being more sensitive than females, including sex-specific alterations in behavior. Additionally, the authors found that microplastics may act as vectors for metals in the aquatic environment in D. magna. They concluded that the synergistic toxicity zinc and microplastics and could contribute to greater understanding of sex-specific effects of microplastics in aquatic organisms. Read the full abstract **here.**

REMOVAL OF MICROPLASTICS FROM WASTEWATER

The Potential Role of Membrane Technology in the Removal of Microplastics from Wastewater

Adewale Adewuyi, Abisola Joan Campbell and Olalere G. Adeyem
This article focused on the effectiveness of using membranes to remove microplastics from water. The authors noted that membrane technology is currently receiving attention for its removal capabilities. They identified some of its beneficial characteristics in terms of its use for microplastics, including its capacity to treat both municipal and industrial wastewater and its cost effectiveness and with maximum removal and recovery capacity. The authors also pointed out that membrane technology is not only effective in the removal/treatment of water contaminated with microplastics, the technology also has the potential to replace energy intensive conventional technologies as a result of their simplicity, low energy consumption, good stability and operational flexibility. However, they acknowledged that there is a challenge with polymer sourced membranes fouling and affecting chemical stability. Although there modifications can be made to address these issues, they asserted, these changes are expensive which makes the cost of treatment high. Therefore, they concluded that there is need to focus on developing cheap and affordable means of reducing fouling in polymer sourced membranes or better pretreatment methods for handling wastewater samples before passing them through membranes. Read the full abstract **here.**

MICROPLASTICS FATE AND TRANSPORT

Environmental occurrence, fate, impact, and potential solution of tire microplastics: Similarities and differences with tire wear particles
Zhuanxi Luo, Xinyi Zhou, Yu Su, Haiming Wang, Ruilian Yu, Shufeng Zhou, Elvis Genbo Xu, Baoshan Xing
The goals of this review were to: (1) summarize the properties, abundance, and sources of tire microplastic particles (TMPs) in the environment; (2) analyze the environmental fates and behaviors of TMPs; (3) evaluate the potential impacts of on terrestrial and aquatic organisms, as well as human; and (4) discuss the potential solutions to mitigate the TMP pollution. To that end, it set forth a wide-ranging discussion covering many aspects of TMPs (including tire wear particles) as a category of microplastic pollution, including a discussion of some of the product characteristics which make it a challenging pollutant source when assessing the occurrence, fate and impacts. For example, the authors pointed out that the composition of winter tires differs from that of all-season and summer tires; the quality and quantity of tires used in different counties and regions are different. They noted that global tire consumption increased during the 2010 to 2019 timeframe. Based on their review of the literature, the authors concluded that potential solutions to control and mitigate TMPs pollution are recommended in three main areas: source reduction, transporting route interception, and end-of-pipe treatment. Read the full abstract **here.**

Microplastics as an emerging source of particulate air pollution: A critical review
Srinidhi Sridharana, Manish Kumar, Lal Singh, Nanthi S.Bolan, Mahua Saha
The authors selected peer-reviewed journal articles, books, and reports obtained mainly through Google Scholar. In this review, they identified the impacts of microplastics (MPs) pollution in the air on urban air quality and atmospheric transport to pristine habitats as a serious emerging concern. However, they also pointed out that the extent and the significance of impacts of airborne particulate matter (PM) MPs on human health are not clearly understood. Furthermore, they asserted that the influence of airborne MPs on indoor and outdoor air quality remains unknown. The authors also highlighted the human health impacts of airborne PM-MPs with a special focus on the occupational safety of industry workers, as well as MPs possible influence on Air Quality Index (AQI), and accumulation in the canopy/arboreal, above-canopy and atmospheric (aerial) habitats. The article identified the data limitations and knowledge gaps regarding the atmospheric transport and contribution of particulate plastics to overall urban air quality. One of their main conclusions was that the distribution of global aerial MPs needs to be

mapped to mitigate the levels and to understand the extent of pollution especially in remote ecosystems resulting from the transboundary transport of airborne MPs. They also recommended that aerial/terrestrial plastic waste generation needs to be curtailed and research on sustainable plastic waste management needs to be undertaken. Read the full abstract **here.**

Microbial colonizers of microplastics in an Arctic freshwater lake
Miguel González-Pleitera, David Velázqueza María Cristina Casero, Bjorn Tytgat Elie Verleyen, Francisco Leganésa, Roberto Rosald Antonio Quesada, Francisca Fernández-Piñasa
The authors conducted a study focused on characterizing the plastisphere (bacteria, eukaryotes and fungi) of three kinds of microplastics (MPs): one biodegradable (PHB) and two non-biodegradables (HDPE and LDPE), in an Arctic freshwater lake. These three types of MPs were placed in a freshwater lake for 11 days at a depth of 20 cm. The plastisphere found on the MPs were compared to microbial communities in the surrounding water and the microbial mats on rocks at the bottom of the lake. In general, a slightly higher richness in the microbial mats of the rocks in the sediment was found as compared to the microbial richness in biofilms of MPs. Additionally, a higher richness was found on MPs as compared to that of the surrounding lake water. The results also indicated that bacteria attached to plastics harbored antibiotic resistant genes (ARGs), sulI and ermB, and that those attached to HDPE showed the highest abundance of both ARGs. The authors concluded that the study results highlight the importance of proper waste management and clean-up protocols to protect the environmental health of pristine environments such as polar regions in a context of global dissemination of MPs which may co-transport microorganisms, some of them including ARGs. Read the full abstract **here.**

HUMAN EXPOSURE TO MICROPLASTICS

Microplastics contamination in food and beverages: Direct exposure to humans
Mengke Jin, Xue Wang, Tao Ren, Jian Wang, Jiajia Shan
The goal of this review was to survey the current knowledge on human exposure to microplastics via daily intake of food and beverages. The authors reviewed 108 publications found in Web of Science up to 2021 concerning abundances, sources, and analytical methods of microplastics (MPs) in food sources including fish, salt, drinking water, beverages, package food, and other food. They reported that the review results indicated that microplastics have been widely detected in food webs directly exposing humans. The concentration of MPs in different types of food were found across a wide range of concentrations; the abundance of MPs in food was found to depend on the level of MP pollution of the local environment and the detection methods. The authors concluded that their initial results confirmed the characterization of MPs as an emerging risk in food chain. They noted that recent studies have found MPs in human stool samples, which indicates that humans are exposed to MPs through food and beverages. Furthermore, they pointed out that although these studies show that human body can digest and eliminate these particles, the toxic effects of MPs on tissues and organs during the circulation and accumulation in the body cannot be ignored. Read the full abstract **here.**

Microparticles and microplastics released from daily use of plastic feeding and water bottles and plastic injectors: potential risks to infants and children in China
Ke Song, Runrun Ding, Caiyun Sun, Lunguang Yao and Weicheng Zhang
According to the authors, the daily use of plastic baby and water bottles occur widely in China, and they could be sources for the release of microplastics (MPs), which could threaten the health of infants and children during daily usage. Researchers investigated the use of polycarbonate (PC) and polypropylene (PP) for making water bottles (WBs) and polyphenylene sulfone resins (PPSU) for making feeding bottles (FBs). The bottles were purchased from Taobao, a Chinese

online shopping retail platform, and were different brands, prices, neck diameters and polymer types. All of the bottles were found to have released microparticles and nano-sized particles. Microplastics were released in amounts ranging from 53 to 393 particles/mL during 100 opening and closing cycles. Thick-necked bottles were found to have released more microparticles than thin-necked bottles. The brands and types of bottles (plastic vs. glass) were found to influence microparticle release, and the authors determined that this indicated that high-quality plastic and glass bottles release fewer microparticles. The authors also examined plastic injectors which are also used extensively in daily life in managing various health conditions, e.g., for insulin injections into diabetic patients. The authors found that intravenous injection increases the chance of direct contact between microplastics and the body. They concluded that their overall results indicated that the health risks of micro- and nanosized particles to humans, especially babies and children, and the environment should be considered seriously. Read the full abstract **here.**

Paradigms to assess the human health risks of nano- and microplastics
Seta Noventa, Matthew S. P. Boyles, Andreas Seifert, et al.
The authors developed a risk assessment framework tailored to the characteristics of nano and microplastics (NMPs) pollution, which would enable an assessment of current and future human health risks from NMPs. The goal was to assist in addressing the scarcity of information regarding the potential human health risks associated with NMP exposure, which is currently a limitation to establishing whether extensive regulatory actions are required for safeguarding public health and wellbeing worldwide in combination with food safety and ecosystem integrity. The framework consists of four paradigms in addition to the traditional risk assessment methodology: 1) techniques in NMP analysis, 2) gaps in empirical data, 3) theoretical and modelling approaches, and 4) stakeholder engagement. Within this framework, the authors proposed how the knowledge gained so far via research could assist in carrying out the steps of the assessment process, and in defining priorities for further research. Read the full abstract **here.**

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