Tired of Tires? We Should Be: Addressing Tire Microplastics and the Need for International Review

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I. INTRODUCTION

The Plasticene Epoch,[1] a new era where plastics have become so prevalent, so widespread in ecosystems around the world, that scientists use them as key indicators to identify a new beginning of human history.[2] This history is getting worse, with more plastic produced in the last ten years than during the last century.[3] Roughly 90% of trash in the ocean is plastic, despite accounting for only 10% of the total waste generated worldwide.[4] In 2019, 368 million tons of plastic were produced, half of which were single-use products, and less than 14% of those were recycled.[5] The rest were sent to landfills or otherwise improperly disposed of, often resulting in microplastic.[6]

II. MICROPLASTICS

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[1] Kristen Goodhue, *Do We Live in the Plasticene? 12 Words to Know for the Age of Plastics*, SMITHSONIAN ENV'T RSCH. CTR. (Jan. 15, 2020), https://pmc.ncbi.nlm.nih.gov/articles/PMC7068600/pdf/ijerph-17-01212.pdf [https://perma.cc/KL2G-33K8].

[2] Claudia Campanale et al., *A Detailed Review Study on Potential Effects of Microplastics and Additives of Concern on Human Health*, INT'L. J. ENV'T RSCH. PUB. HEALTH, Feb. 13, 2020, at 1, 2, https://pmc.ncbi.nlm.nih.gov/articles/PMC7068600/pdf/ijerph-17-01212.pdf [https://perma.cc/ZMR5-3DT3].

[3] *Plastic Waste Overview*, BASEL CONVENTION, https://www.basel.int/Implementation/MarinePlasticLitterandMicroplastics/Overview/tabid/6068/Default.aspx [https://perma.cc/29W2-A97U] (last visited Mar. 4, 2025).

[4] *Id.*

[5] Kerestin E. Goodman et al., *Effects of Polystyrene Microplastics on Human Kidney and Liver Cell Morphology, Cellular Proliferation, and Metabolism*, 7 ACS OMEGA, 34136, 34136 (2022).

[6] *Id.*

A. Microplastics and Why They Matter

Microplastics are typically defined as any solid, water insoluble, polymer-based particles less than five mm long[7] and are primarily derived from two sources: microbeads and plastic degradation.[8] Microbeads are manufactured solid plastic particles less than one millimeter in length used in a variety of products such as exfoliation and toothpastes.[9] Plastic degradation refers to any plastic product that degrades and breaks into smaller pieces over time, eventually becoming microplastic.[10] While many countries,[11] and even companies themselves,[12] have created rules to limit the production of microbeads, very little has been done until recently to regulate microplastics from plastic degradation.[13]

1. The New Reality: A Microplastic World

This regulation gap poses a problem, as microplastics have, in one way or another, contaminated nearly every environmental system and life form on earth.[14] Once microplastics enter the environment, they are nearly impossible to remove due to their small size.[15] Microplastics can be transported through wind, dust, water, snow, and atmospheric fallout.[16] They have been detected in the

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[7] Ida Jarlskog, *Concentrations of Tire Wear Microplastics and Other Traffic-Derived Non-Exhaust Particles in the Road Environment,* ENV'T INT'L, Nov. 3, 2022, at 1, 2, https://www.diva-portal.org/smash/get/diva2:1715211/FULLTEXT01.pdf [https://perma.cc/W827-CPNM]; *What Are Microplastics?*, NAT'L OCEAN SERV., https://oceanservice.noaa.gov/facts/microplastics.html [https://perma.cc/7B2M-BNMP] (June 16, 2024).

[8] *Id.*

[9] *Id.*

[10] Nicholas J. Schroeck, *Microplastic Pollution in the Great Lakes: State, Federal, and Common Law Solutions*, 93 UNIV. DET. MERCY L. REV. 273, 273–74 (2016).

[11] *E.g.*, Microbead-Free Waters Act of 2015, Pub. L. No. 114-114, 129 Stat. 3129 (2015); Chelsea M. Rochman et al., *Scientific Evidence Supports a Ban on Microbeads*, 49 ENV'T SCI. & TECH. 10759, 10760 (2015).

[12] Rochman et al., *supra* note 11, at 10760.

[13] Rachel M. Sorensen et al., *Past, Present, and Possible Future Policies on Plastic Use in the United States, Particularly Microplastics and Nanoplastics: A Review*, 19 INTEGRATED ENV'T ASSESSMENT MGMT. 474, 477, 485 (2022); Rana Zeeshan Habib et al., *Trends of Microplastic Abundance in Personal Care Products in the United Arab Emirates Over the Period of 3 Years (2018–2020)*, 29 ENV'T SCI. POLLUTION RSCH. 89614, 89616 (2022); *see Plastic Global Law & Policy*, CTR. FOR INT'L ENV'T L., https://www.ciel.org/issue/plastic-global-law-policy/ [https://perma.cc/URL5-MANL] (last visited Mar. 4, 2025).

[14] *See* Khaled Ziani et al., *Microplastics: A Real Global Threat for Environment and Food Safety: A State of the Art Review*, NUTRIENTS, Jan. 25, 2023, at 1, 2, https://pmc.ncbi.nlm.nih.gov/articles/PMC9920460/pdf/nutrients-15-00617.pdf [https://perma.cc/E5WR-Y5TL].

[15] Schroeck, *supra* note 10, at 274—75.

[16] Goodman et al., *supra* note 5, at 34136; *see* Campanale et al., *supra* note 2, at 1.

snow in Antarctica,[17] the deepest trenches in the ocean,[18] and caves untouched by man for decades.[19] Humans live with microplastics in their blood[20] and are even born already infested.[21] Microplastics have infiltrated our world, and they are toxic to life.[22]

2. Negative Health Impact on Living Creatures

Humans are ingesting toxic microplastics through the air we breathe, the water we drink, and the food we eat.[23] These particles are so miniscule that they can pass directly through the lungs and into the bloodstream, and they are even capable of crossing the blood-brain barrier.[24] While the negative health impacts on humans are still being studied, microplastics may contribute to "oxidative stress, inflammation, impaired immune function, alteration in cellular and energy metabolism, inhibition in cell proliferation, tissue degeneration, abnormal organ development and dysfunction, alteration in biochemical parameters and even cause genotoxicity and carcinogenicity."[25] This lies on top of research showing a myriad of adverse effects on humans, such as significant damage to kidney and liver cells.[26]

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[17] Alex R. Aves et al., *First Evidence of Microplastics in Antarctic Snow*, 16 CRYOSPHERE 2127, 2127 (2022).

[18] MICHAEL S. BANK, MICROPLASTIC IN THE ENVIRONMENT: PATTERN AND PROCESS 2 (Michael S. Bank ed., 2022).

[19] Elizabeth A. Hasenmueller et al., *Cave Sediment Sequesters Anthropogenic Microparticles (Including Microplastics and Modified Cellulose) in Subsurface Environments*, SCI. TOTAL ENV'T, June 9, 2023, at 1, 2, https://pdf.sciencedirectassets.com [https://perma.cc/8H2J-W762] (citation URL altered).

[20] Heather A. Leslie et al., *Discovery and Quantification of Plastic Particle Pollution in Human Blood*, ENV'T INT'L., Mar. 24, 2022, at 1, https://pdf.sciencedirectassets.com [https://perma.cc/96RT-92WJ] (citation URL altered).

[21] Antonio Ragusa et al., *Plasticenta: First Evidence of Microplastics in Human Placenta*, ENV'T INT'L, Dec. 2, 2020, at 1, https://pdf.sciencedirectassets.com [https://perma.cc/G5Z3-3FQB] (noting the placentas of unborn babies had microplastics) (citation URL altered).

[22] *E.g.*, Pieter J. Kole et al., *Wear and Tear of Tyres: A Stealthy Source of Microplastics in the Environment,* INT'L. J. ENV'T. RSCH. PUB. HEALTH, Oct. 20, 2017, at 22, https://www.semanticscholar.org/reader/5d03295f0cb0033fc8c93b70d08b8603dbd625b1 [https://perma.cc/M6XN-UPV5].

[23] Nurshad Ali et al., *The Potential Impacts of Micro-and-Nano Plastics on Various Organ Systems in Humans*, EBIOMEDICINE, Jan. 2024, at 1, 2, https://pmc.ncbi.nlm.nih.gov/articles/PMC10749881/pdf/main.pdf [https://perma.cc/F9Q2-226G].

[24] Euronews Green, *Toxic Tyre Dust: This Source of Microplastic Pollution Could Be the Worst of All*, EURONEWS, https://www.euronews.com/green/2023/10/02/toxic-tyre-dust-this-source-of-microplastic-pollution-could-be-the-worst-of-all [https://perma.cc/FKU2-MKFM] (May 10, 2023, 8:36 AM).

[25] Nurshad Ali et al., *supra* note 23, at 13.

[26] Goodman et al., *supra* note 5, at 34150.

Fish, birds, mammals, and invertebrates have all been found to be polluted with microplastic.[27] Microplastics can hinder an animal's ability to digest food while causing inflammation, oxidative stress, and disruption of endocrine functions.[28] These issues are likely just the tip of the iceberg, as the full effect of microplastics on animals is not yet fully understood.[29] Microplastic-infested animals can also be eaten by predators and humans, continuing their spread into living creatures.[30]

B. Microplastics From Tires: A Big Deal

While there have been agreements and laws to combat plastic waste and the resulting microplastics,[31] there is one source that has escaped regulatory attention until recently: tires. While cars have long been recognized as a source of pollution, the focus has been on tailpipe and exhaust emissions. Luckily, the world is finally starting to focus on tire emissions, because it turns out tires are shedding tons and tons of microplastics when they hit the road.[32] While there are a multitude of factors in play, such as vehicle characteristics, tires shed approximately 10% of their mass during their lifetime.[33] The heavier the car, the more particles are shed from the tires, with electric vehicles and large SUVs leading as two of the worst offenders.[34] If you took all the tires manufactured in the world every year and stacked them on their sides, the pile would be high enough to reach the moon.[35] That is approximately two billion microplastic-producing tires being manufactured *every year.*[36]

1. What's in a Tire and Why Are They So Toxic

It takes a lot of natural and synthetic rubber to make that many tires, and when rubber polymers break down, they become microplastic.[37] However, tires are not just made of rubber polymers. More than 400 chemical compounds go into making a tire, and many of those chemicals are toxic or carcinogenic .[38] A chemical called 6PPD (famous for its derivative 6PPD-q causing the coho

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[27] Aamir Khan et al., *Microplastics in Animal Nutrition: Occurrence, Spread, and Hazard in Animals*, J. AGRIC. & FOOD RSCH., June 10, 2024, at 1, https://pdf.sciencedirectassets.com [https://perma.cc/JLV9-DKRG] (citation URL altered).

[28] *Id.*

[29] *Id.*

[30] *See id.*

[31] *E.g.*, Commission Regulation 2023/2055, 2023 O.J. (L 238) 67 (EU).

[32] Kole et al., *supra* note 22, at 2.

[33] Barouch Giechaskiel et al., *Contribution of Road Vehicle Tyre Wear to Microplastics and Ambient Air Pollution*, SUSTAINABILITY, Jan. 7, 2024, at 4, https://diva-portal.org/smash/get/diva2:1836576/FULLTEXT01.pdf [https://perma.cc/SH69-ZUAP].

[34] Kole et al., *supra* note 22, at 23.

[35] Euronews Green, *supra* note 24.

[36] *Id.*

[37] S*ee* Jarlskog, *supra* note 7, at 1–2.

[38] Kole et al., *supra* note 22, at 22.

salmons' near extinction)[39] is added to prevent cracking.[40] Zinc and sulfur are added to improve elasticity.[41] Throw in some polyaromatic hydrocarbons,[42] heavy metals like copper and lead,[43] chemicals such as polychlorinated biphenyls,[44] and isoprene (known to cause tumors in rats and mice),[45] and tire microplastics become the perfect toxic cocktail for humans and wildlife.[46]

2. Aquatic Environments Are Being Hit Especially Hard

Every time a vehicle with tires travels along the road, it sheds microplastics that are then washed into streams and rivers, eventually reaching the ocean.[47] Of all the plastic in the ocean, 5-10% is estimated to be microplastics just from tires.[48] Put another way, tires produce 78% of microplastics in the ocean, devastating oceanic life.[49] These tiny toxic tire particles have also wreaked havoc on freshwater lifeforms, from green algae and water fleas to frogs and turtles.[50] So what is being done to address microplastic pollution?

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[39] Kyoshiro Hiki et al., *Acute Toxicity of a Tire Rubber-Derived Chemical, 6PPD Quinone, to Freshwater Fish and Crustacean Species,* 8 ENV'T SCI. TECH. LETTERS 779, 779 (2021).

[40] *Evaluating Bioactivity of Tire Preservative, 6PPD, and its Degradant, 6PPD-quinone, in High Throughput Assays*, EPA, https://www.epa.gov/chemical-research/evaluating-bioactivity-tire-preservative-6ppd [https://perma.cc/UQ42-AJ62].

[41] Kole et al., *supra* note 22, at 2.

[42] Natacha Tullis & Selene Álvarez Peña, *To Fight Microplastic Pollution, EU Needs Strong Tyre Emissions Legislation*, PEW (Nov. 6, 2023), https://www.pewtrusts.org/en/research-and-analysis/articles/2023/11/06/to-fight-microplastic-pollution-eu-needs-strong-tyre-emissions-legislation [https://perma.cc/3L6C-K89E].

[43] Euronews Green, *supra* note 24.

[44] Cassandra Johannessen et al., *Composition and Transformation Chemistry of Tire-Wear Derived Organic Chemicals and Implications for Air Pollution*, ATMOSPHERIC POLLUTION RSCH., Aug. 16, 2022, at 5, https://pdf.sciencedirectassets.com [https://perma.cc/PZN4-UFRW] (citation URL altered).

[45] Maurizio Gualtieri et al., *Toxicity of Tire Debris Extracts on Human Lung Cell Line A549*, 19 TOXICOLOGY VITRO 1001, 1006 (2005).

[46] Brittany Cunningham et al., *Toxicity of Micro and Nano Tire Particles and Leachate for Model Freshwater Organisms*, J. HAZARDOUS MATERIALS, Jan. 20, 2022, at 1, https://pdf.sciencedirectassets [https://perma.cc/B5Y4-MXHV] (citation URL altered); *see* Virginia Gewin, *Tracking Tire Plastics—and Chemicals—From Road to Plate*, CIVIL EATS (July 16, 2024), https://civileats.com/2024/07/16/tracking-tire-plastics-and-chemicals-from-road-to-plate/ [https://perma.cc/6TQ4-ZDUC].

[47] Kole et al., *supra* note 22, at 17–18.

[48] *Id.* at 1.

[49] Euronews Green, *supra* note 24; Marco Capolupo et al., *Chemical Composition and Ecotoxicity of Plastic and Car Tire Rubber Leachates to Aquatic Organisms*, WATER RSCH., Nov. 6, 2019, at 1, https://pdf.sciencedirectassets.com [https://perma.cc/F846-RUYP] (citation URL altered).

[50] *See* Kole et al., *supra* note 22, at 22; Shuo Gao et al., *Nanoplastic Pollution Changes the Intestinal Microbiome but not the Morphology or Behavior of a Freshwater Turtle,* SCI. TOTAL ENV'T, May 13, 2024, at 8, 9, https://pdf.sciencedirectassets.com [https://perma.cc/T73L-NRVD] (citation URL altered).

III. CURRENT GLOBAL EFFORTS TO COMBAT PLASTIC POLLUTION AND WHY THEY FALL SHORT

A. The European Union: A Good Start

The European Union ("EU") is getting tired of the problems posed by plastic pollution.[51] It is no wonder, considering that approximately 176,000 tons of microplastics are unintentionally introduced into EU ecosystems every year.[52] The primary sources of microplastics in the EU are from paint, tires, pellets (i.e., small pieces of plastic from industrial manufacturing), and textiles.[53] To begin monitoring the problem, the EU has instructed its twenty-seven Member States to keep track of their plastic waste.[54]

The primary example of how the EU has committed to combatting overall plastic pollution is the Zero Pollution Action Plan adopted in 2021 (part of the European Green Deal) which requires a 30% reduction in microplastic pollution by 2030.[55] The EU has made numerous other efforts to limit microplastic pollution, including a recent measure proposed in November 2023 to reduce the number of pellets spilled into the environment by up to 74%.[56]

1. Groundbreaking Tire Pollution Legislation: EU's Euro 7

While pellets are the third largest source of microplastic pollution in Europe, tires are the second.[57] Roughly 450,000 metric tons of tire particles are released into the EU environment annually.[58] Research has shown that tire microplastics will be responsible for up to 90% of all particles emitted by vehicles in Europe by 2050.[59] Yet, up until 2023, no country in Europe, nor in the world for that matter, had legislation to set limits on tire particle emissions.[60]

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[51] *See e.g.*, Marine Strauss & Julia Payne, *EU Commission Proposes Measures to Curb Microplastic Pollution from Pellets*, REUTERS (October 18, 2023, 7:17 AM), https://www.reuters.com/world/europe/eu-commission-proposes-measures-curb-microplastic-pollution-pellets-2023-10-16.

[52] *Id.*

[53] *Id.*

[54] Commission Regulation 2150/2002, art. 1, 2002 O.J. (L 332) 1, 2 (EC).

[55] *Proposal for a Regulation of The European Parliament and of the Council on Preventing Plastic Pellet Losses to Reduce Microplastic Pollution*, at 2, COM (2023) 645 final (Oct. 16, 2023) (noting that while the title states "proposal" the Zero Pollution Action Plan addressing microplastics was explicitly adopted in the document).

[56] Strauss & Payne, *supra* note 51.

[57] Selene Álvarez Peña, *With Microplastic Pollution Skyrocketing, The EU Takes Needed Action*, PEW (Feb. 8, 2023), https://www.pewtrusts.org/en/research-and-analysis/articles/2023/02/08/with-microplastic-pollution-skyrocketing-the-eu-takes-needed-action; Tullis & Álvarez Peña, *supra* note 42.

[58] Tullis & Álvarez Peña, *supra* note 42.

[59] Commission Regulation 2024/1257, ¶ 20, 2024 O.J. (L EN) 1, 4 (EC) [*hereinafter* Euro 7].

[60] Tullis & Álvarez Peña, *supra* note 42.

Enter Euro 7. In November 2023, the EU proposed potentially groundbreaking legislation that established vehicle emission standards, including limits on particle emissions from tires.[61] Euro 7 was one of the few legislative proposals available to help achieve the 2030 objective set by the Zero Pollution Action Plan,[62] and was officially adopted on April 24, 2024.[63] The regulation provides a comprehensive plan to address tire microplastics, including setting tire abrasion tracking methods and limits,[64] and detailing manufacturer responsibilities.[65]

2. EU Decides to Collaborate with The United Nations Economic Commission for Europe (UNECE) on Tire Regulations

To tackle tire emissions, the EU's original plan was to create a report detailing the best methods for tracking and curbing tire emissions by 2024.[66] However, in October 2023, the EU decided to align their tire testing methods with the United Nations Economic Commission for Europe's ("UNECE") *Task Force on Tyres' Abrasion* ("*TFTA*"), which was developing its own methods for testing and limiting microplastic emissions.[67]

B. The United Nations Economic Commission for Europe

UNECE was established by the United Nations ("U.N.") in 1947 with a mandate to assist in reconstructing Europe post-World War II.[68] Today, UNECE is comprised of 56 Member States accounting for 20% of the world's population and 35% of the land on Earth.[69] The modern-day goal of UNECE is to promote economic cooperation and integration amongst its members.[70] To that end, UNECE has developed 226 legally binding international treaties and protocols, with 210 of those regarding transport and 16 in environmental policy.[71]

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[61] European Parliament Press Release, Euro 7: Deal on New EU Rules to Reduce Road Transport Emissions (Dec. 18, 2023).

[62] Tullis & Álvarez Peña, *supra* note 42.

[63] Euro 7, *supra* note 59.

[64] Euro 7, *supra* note 59, ¶ 20.

[65] Euro 7, *supra* note 59, at art. 4–9.

[66] *Proposal for a Regulation of the European Parliament and of the Council on Type-Approval of Motor Vehicles and Engines and of Systems, Components and Separate Technical Units Intended for Such Vehicles, with Respect to Their Emissions and Battery Durability (Euro 7) and Repealing Regulations (EC) No 715/2007 and (EC) No 595/2009*, ¶ 12, at 18, COM (2022) 586 final (Nov. 10, 2022).

[67] European Parliament Press Release, Euro 7: MEPs Back New Rules to Reduce Road Transport Emissions (Oct. 12, 2023).

[68] UNECE Econ. Coop. Trade Div., The Case of the United Nations Economic Commission for Europe (UNECE), 11, (2016), https://www.oecd.org/content/dam/oecd/en/publications/reports/2016/11/the-case-of-the-united-nations-economic-commission-for-europe_618f83a3/452e1c80-en.pdf [https://perma.cc/F6TK-NP9G] [hereinafter UNECE Report].

[69] *Id.* at 18.

[70] *Id.* at 13.

[71] *Id.* at 29.

1. A UNECE Working Party: The Task Force on Tyres' Abrasion (TFTA)

There are many subsidiary groups under the UNECE working to create these treaties and protocols, and the most junior groups are called task forces."[72] Task forces report to working parties, which report to a Sectoral Committee, which reports to the executive body of UNECE, called EXCOM.[73] Despite the task force being the lowest in the UNECE hierarchy, much of the research and work to create a treaty or protocol is done at that level.[74]

For tire microplastics, the task force is the *Task Force on Tyres' Abrasion* ("*TFTA*").[75] The *TFTA* reports to two different working parties who in turn report to another working party, the long-established *World Forum for the Harmonization of Vehicle Regulations* ("*WP29*").[76] Currently, the *TFTA* is trying to: (1) develop a standardized way to measure tire microplastic output, and (2) set limits for tire microplastic emissions.[77] Once completed, both would be included as part of *WP29's* 1958 Agreement regulations, either as new or amended regulations.[78]

2. WP29 And The 1958 Agreement: A Working Party Trying to Create Uniform Vehicle Standards

The *WP29* was created over 50 years ago and attempts to establish globally standardized regulations on vehicles.[79] The *WP29* utilizes three U.N. agreements (adopted in 1958, 1997, and 1998 respectively) to provide Member States with a legal framework to establish new regulations.[80] The 1958 Agreement will be exclusively focused given its relation to tires. The purpose of the 1958 Agreement is to establish uniform standards for vehicles and their components, with a focus on safety, energy efficiency, and the environment.[81] The 1958 Agreement currently has 59 contracting Parties, excluding the United

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[72] *See ITC Structure*, UNECE, https://unece.org/transport/inland-transport-committee/itc-structure [https://perma.cc/M9CX-F72T] (last visited Mar. 5, 2025) (noting the organizational chart on the site does not show Task Forces but does show the Working Parties GRPBP and GRPE, which the TFTA reports to as a subsidiary. GRPBP and GRPE can be found under WP.29 in green).

[73] *See* UNECE Report, *supra* note 68, at 20–21, 23.

[74] *See id.* at 23 (noting "[m]ost UNECE IRC activities take place in Working Parties, Task Forces or Teams of Specialists that report to one of the UNECE substantive Committees.").

[75] *See generally* UNECE, Terms of Reference of the Task force on Tyres' *A*brasion (TF TA), Informal document GRBP-75-39-rev1 (Feb. 8–11, 2021), https://unece.org/sites/default/files/2022-02/GRBP-75-39e-Rev.1.pdf [https://perma.cc/9RMG-9CWF].

[76] *Id.* § A(2–4).

[77] *Id.* § B(3).

[78] *See id.* § A(5).

[79] *World Forum for Harmonization of Vehicle Regulations (WP.29)*, UNECE, https://unece.org/transport/vehicle-regulations/world-forum-harmonization-vehicle-regulations-wp29 [https://perma.cc/7WE3-KW39] (last visited Mar. 5, 2025).

[80] *WP.29 – Introduction*, UNECE, https://unece.org/wp29-introduction [https://perma.cc/N4C6-MVVE] (last visited Mar. 5, 2025).

[81] *FAQ*, UNECE, https://unece.org/transport/vehicle-regulations/faq (last visited Mar. 5, 2025).

States, [82] and recommends 172 regulations that focus on the technical requirements, approval of tire types, and conformity of tires.[83]

3. The Problem: WP29 Members Can Cherry Pick Regulations

The problem is, none of the contracting parties to the *WP29* are required to apply any of the regulations.[84] To combat tire microplastic pollution effectively, there needs to be an internationally standardized method for tracking tire microplastic output and setting tire emission limits, implemented by as many countries as possible. While the EU will implement the *TFTA* methods through Euro 7 if they are completed and adopted by the *WP29* in the next five years,[85] the *TFTA*'s proposed regulations may or may not be enforced by the remaining contracting parties to the 1958 Agreement, and there are only forty-nine parties regardless. Other international organizations should be brought in, specifically the Basel Convention.

C. The Basel Convention: The Gold Standard

1. Why It Came About: An Attempt to Keep Industrialized Nations from Dumping Hazardous Waste on Developing Countries

The world produces thirteen tons of hazardous waste every second, which adds up to 400 million tons of hazardous waste every year.[86] Until the 1980s, with no regulations to impede them, industrialized countries shipped most of their toxic waste to poorer, developing countries.[87] In an attempt to stop this practice of illicitly dumping hazardous wastes, the international community convened in Basel, Switzerland in 1989 and established The Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal ("Basel Convention").[88]

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[82] *Contracting Parties to the UNECE 1958 & 1998 Agreements*, JASIC, https://www.jasic.org/e/07_wp29/3_agreements.htm [https://perma.cc/S9WQ-AMXT] (last visited Mar. 20, 2025).

[83] *See generally id; see Addenda to the 1958 Agreement (Regulations 161-180)*, UNECE, https://unece.org/transport/standards/transport/vehicle-regulations-wp29/addenda-1958-agreement-regulations-161-180 [https://perma.cc/656A-BQA8].

[84] Agreement Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts Which Can Be Fitted and/or Be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations art. 1(3–6), Mar. 20, 1958, 335 U.N.T.S. 211 (entered into force Jun 20, 1959).

[85] Euro 7, *supra* note 59, ¶ 20.

[86] *Tons of Hazardous Waste Thrown Out*, THE WORLD COUNTS, https://www.theworldcounts.com/challenges/planet-earth/waste/hazardous-waste-statistics [https://perma.cc/C5LX-E6X5] (last visited Mar. 8, 2025); Charles W. Schmidt, *Trading Trash: Why the U.S. Won't Sign on to the Basel Convention*, 107 ENV'T HEALTH PERSP. 410, 411 (Aug. 1, 1999).

[87] JAN ALBERS, RESPONSIBILITY AND LIABILITY IN THE CONTEXT OF TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTES BY SEA: EXISTING RULES AND THE 1999 LIABILITY PROTOCOL TO THE BASEL CONVENTION 20 (Jurgen Basedow et al. eds., 2015).

[88] Schmidt, *supra* note 86, at 411.

With 191 Member States, including 188 U.N. Member States, the Basel Convention is one of the most comprehensive international agreements regulating the transport of hazardous waste.[89] The ultimate goal of the Basel Convention was to strictly regulate the movement of hazardous waste across international boundaries and ensure that hazardous waste was handled in an environmentally responsible way.[90] To achieve this goal, exporting countries were required to give prior notification and receive informed consent for waste shipments to recipient countries,[91] while the Member States implemented environmentally sound management of hazardous wastes[92] and placed restrictions on shipments of hazardous waste to countries that had not ratified the Basel Convention.[93]

2. How Basel Manages Plastic Waste: 2019 Plastic Waste Partnership (PWP)

The Basel Convention has been committed to tackling plastic waste in recent years. In May 2019, the parties to the Basel Convention adopted the *Plastic Waste Partnership* ("*PWP*") with the goals of: (1) preventing, or at least minimizing, plastic waste; and (2) creating or amending existing national, regional, and international policies on plastic waste.[94] As of 2023, the *PWP* has sixty members including France, Japan, and Germany,[95] countries that play host to Michelin,[96] Bridgestone,[97] and Continental[98] respectively. These companies comprise three of the four largest tire producing companies in the

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[89] Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, BASEL CONVENTION, https://www.basel.int/Countries/StatusofRatifications/PartiesSignatories/tabid/4499/Default.aspx [https://perma.cc/GF4P-7TRP] (last visited Jan. 27, 2025); Schmidt, *supra* note 86, at 411.

[90] Schmidt, *supra* note 86, at 411.

[91] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal art. 4(1), *entered into force* May 5, 1992, 1673 U.N.T.S. 57 [hereinafter Basel Convention Regulations]; ALBERS, *supra* note 87, at 99-100.

[92] Basel Convention Regulations, *supra* note 91, at art. 4(2)(a–d); ALBERS, *supra* note 87, at 98.

[93] Basel Convention Regulations, *supra* note 91, at art. 4(5); ALBERS, *supra* note 87, at 97.

[94] Conference of the Parties to the Basel Convention, *Terms of Reference for the Basel Convention Partnership on Plastic Waste and Workplan for the Working Group of the Partnership on Plastic Waste for the Biennium 2020–2021*, at 2, UNEP/CHW.14/INF/16/Rev.1 (June 11, 2019) [hereinafter *PWP Terms*].

[95] *Membership*, BASEL CONVENTION, https://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/Membership/tabid/8098/Default.aspx [https://perma.cc/LTF7-TKKF] (last visited Jan. 25, 2025) (noting the membership list is only available as a downloadable PDF and can be found as a link on the website).

[96] *The MICHELIN Company*, MICHELIN, https://guide.michelin.com/en/about-the-michelin-company#:~:text=The%20Michelin%20Group%20is%20a,production%20facilities%20around%20the%20world [https://perma.cc/52W8-M2N9] (last visited Jan. 25, 2025).

[97] Matt Banks, *Where are Bridgestone Tyres Made?*, AUTOHERO (Sept. 6, 2022), https://www.autohero.com.au/blog/where-are-bridgestone-tyres-made/ [https://perma.cc/VYP7-7GV3].

[98] *History: Constantly Moving Forward,* CONTINENTAL, https://www.continental-tires.com/ca/en/history/#:~:text=Continental%20has%20a%20history%20of,re%20ready%20to%20support%20them (last visited Jan. 25, 2025).

world.[99] An additional 121 countries and more than 200 industries, academia, and non-governmental organizations also send representatives to the *PWP*.[100]

Beyond the broad goals of plastic waste prevention and minimization, the *PWP* is tasked with undertaking projects to collect information, improve the environmentally sound management of transboundary plastic waste, and promote relevant research and development.[101] When tackling a new plastic waste issue, the *PWP* creates a project group which operates off of the same pre-established work plan.[102] This work plan has four main "topics" under which project groups are developed, and the priority of initiating project groups is based on the relevance to the topics.[103] The topics themselves each contain a list of specific activities that need to be undertaken to address plastic waste issues.[104] The more activities the project group's issue falls under, the higher the priority.[105]

3. Basel Guidelines That Handle Tire Waste

In 2000, the Basel Convention released guidelines specifically for tires called the *Basel Convention Revised Technical Guidelines for the Environmentally Sound Management of Used and Waste Pneumatic Tyres,* detailing the characteristics of tires and proper methods for their disposal.[106] Seven years later, the Basel Convention updated their tire guidelines through *Decision VIII/17*, adding additional information regarding proper tire disposal methods and known tire issues.[107] In 2022*,* the parties to the Basel Convention issued *Decision BC-15/15*, which plans to update the guidelines a third time, but so far nothing has been officially implemented.[108]

4. The Problem with Existing Basel Tire Guidelines: They Are Out of Date and Conflicting

While the Basel Convention is actively updating their tire guidelines, these efforts fall short as the planned updates apply only to used and waste tires and

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[99] *The Largest Tire Manufacturers in the World (New)*, CARLOGOS.ORG (June 26, 2023), https://www.carlogos.org/reviews/largest-tire-manufacturers.html [https://perma.cc/7EFB-RSJ6].

[100] *Membership*, *supra* note 95.

[101] *PWP Terms*, *supra* note 94, at 2.

[102] *Id*. at 3, 8–9.

[103] *Id*.; *see* discussion *infra* Section IV.B.2.

[104] *Id*. at 8—9; *see* discussion *infra* Section IV.B.3.

[105] *See id*. at 3, 8–9.

[106] Conference of the Parties to the Basel Convention, *Basel Convention Revised Technical Guidelines for the Environmentally Sound Management of Used and Waste Pneumatic Tyres*, at 6, (Oct. 31, 2011) [hereinafter *Basel Tyre Guidelines*].

[107] *Id*.

[108] Conference of the Parties to the Basel Convention, *BC-15/15: Further Consideration of Plastic Waste*, (June 17, 2022).

fail to address tires in active use.[109] A draft of the newly revised guidelines released in June 2024 correctly notes the problem of microplastics from tires in use[110] but then focuses almost exclusively on *used and waste* tires for negative environmental effects.[111] The draft guidelines then entertain options for Basel Convention management of used and waste tires and fail to discuss how to prevent microplastic emission from tires in use.[112] While the current guidelines are overdue for a much-needed update regarding microplastic emission from tires in use, they are also simply that, guidelines. They can offer much-needed advice on how to manage tire microplastics, but they are not enforceable regulations.

5. A Basel Achilles Heel: Enforcement and a Lack of Repercussions

On a positive note, the majority of the top thirty tire producers that control the bulk of the world's tire supply are situated in countries with strong environmental laws that have ratified and enforced the Basel Convention.[113] Unfortunately, the Basel Convention has no way to enforce regulations against countries that do not follow them. There are no explicit financial penalties or consequences for countries that don't comply with Basel Convention guidelines.[114] The *Basel Protocol on Liability and Compensation* outlines a comprehensive liability regime,[115] but has been pending since 1999 and has not been implemented.[116] Because of this issue, the Basel Convention relies on countries establishing individual enforcement mechanisms to comply with the treaty.[117]

This has resulted in spotty enforcement, with some countries and regional blocs following strict guidelines, while others fail to properly follow Convention regulations altogether.[118] The Basel Convention offers a great opportunity to

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[109] *See generally Basel Tyre Guidelines*, *supra* note 106 (noting the guidelines never address how to deal with microplastic from tires in use).

[110] Open-Ended Working Group of the Basel Convention, *Technical Guidelines for the Environmentally Sound Management of Used and Waste Pneumatic Tyres*, § 1(B)(5), at 16, UNEP/CHW/OEWG.14/INF/11/Rev.1 (July 15, 2024) [hereinafter *Basel Unofficial Tyre Guidelines*] (noting this version is still in progress).

[111] *See generally id.* (noting the document does not implement any regulations for microplastics from tires in use).

[112] *See generally id.*

[113] *See The Largest Tire Manufacturers in the World (New)*, *supra* note 99.

[114] ALBERS, *supra* note 87, at 64.

[115] *Basel Protocol on Liability and Compensation*, BASEL CONVENTION, https://www.basel.int/TheConvention/Overview/LiabilityProtocol/tabid/2399/Default.aspx (last visited Jan. 27, 2025).

[116] ALBERS, *supra* note 87, at 295.

[117] Basel Convention Regulations, *supra* note 91, at art. 4(4).

[118] *Practical Experiences with the Basel Convention: Challenges, Good Practice and Ways to Improve Transboundary Movements of E-Waste in Low and Middle Income Countries*, PREVENT WASTE ALL. SOLVING E-WASTE PROBLEM 1, 11—12 (2022), https://prevent-waste.net/wp-content/uploads/2023/05/PREVENT-StEP_Practical_Experiences_Basel-Convention_discussion-paper-2022.pdf [https://perma.cc/Q2RM-P9EN].

expand the implementation of the *TFTA*'s standardized method of testing tire microplastic output across a maximum number of countries, but enforcement issues, specifically on tire microplastics emission limits, remain a concern.

D. The United States: Tackling the Microplastic Issue on Its Own

1. The U.S. Has Not Ratified the Basel Convention: Is it Serious About Microplastic Pollution?

Despite being a major tire-producing country, the United States is not a party to the *WP29's* 1958 Agreement and, while it did sign the Basel Convention in 1990, it has not ratified it,[119] and probably never will.[120] Among the reasons the United States did not ratify the Basel Convention is that the Convention does not clearly define what constitutes hazardous waste, and the United States does not have sufficient domestic statutory authority to implement all the provisions of the Convention.[121] That does not mean the United States is not concerned about microplastic pollution or is unwilling to address the current crisis.

2. Overall U.S. Efforts to Combat Microplastics

The U.S. states and the federal government already have begun the fight against microplastics domestically. In 2015, Congress passed the *Microbead-Free Waters Act* prohibiting microbeads from cosmetics.[122] Fifteen states have also independently passed or introduced legislation banning the use of microbeads.[123] California in particular has been very proactive in trying to counteract the damage caused by tire microplastics. A recent example: The California Environmental Protection Agency successfully required tire manufacturers to find an alternative to the chemical 6PPD in tires by 2024, as it was killing salmon, and testing is being done on seven new potential chemical replacements for tires.[124]

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[119] *Basel Convention on Hazardous Wastes*, U.S. DEP'T STATE, https://www.state.gov/key-topics-office-of-environmental-quality-and-transboundary-issues/basel-convention-on-hazardous-wastes/ [https://perma.cc/9XT8-JYN3] (last visited Jan. 27, 2025).

[120] *Id* ("The United States, however, has not ratified the Convention because it does not have sufficient domestic statutory authority to implement all of its provisions.").

[121] *See* Schmidt*, supra* note 86, at 411.

[122] Microbead-Free Waters Act of 2015, Pub. L. No. 114-114, 129 Stat. 3129 (2015).

[123] *Microbeads Fact Sheet*, NAT'L CAUCUS OF ENV'T LEGISLATORS, https://www.ncelenviro.org/resources/microbeads-fact-sheet-2/ [https://perma.cc/5KVZ-HQF5] (last visited Oct. 19, 2023).

[124] Euronews Green, *supra* note 24; *The California Department of Toxic Substances Control Approves Preliminary Alternatives Analysis for Tires Containing the Antiozonant 6PPD,* GRADIENT (Sept. 3, 2024), https://gradientcorp.com/ca-dtsc-approves-preliminary-alternatives-analysis-tires-containing-antiozonant-6ppd/ [https://perma.cc/L2WM-88AR].

3. The Clean Air Act (CAA): Keeping Track of Microplastics

Clearly, the United States has some awareness of the microplastic issue, and the legal framework for tracking tire microplastics is already in place with the *Clean Air Act ("CAA").* Two of the main purposes of the *CAA* are to prevent air pollution and manage pollution sources, and the *CAA* recognizes that new sources of emission will need to be reviewed and regulated.[125] Every three years, any person who can demonstrate improved techniques for managing emissions can present them to the *CAA*, and if those techniques are authorized by the *CAA*, they can be used.[126] These techniques are also subject to review by the public.[127]

a. National Ambient Air Quality Standards ("NAAQS")

To further address air pollution, the Environmental Protection Agency ("EPA") sets *National Ambient Air Quality Standards ("NAAQS")* through the *CAA*. Currently, *NAAQS* applies to six common air pollutants: ground-level ozone, carbon monoxide, lead, sulfur dioxide, nitrogen dioxide, and particulate matter.[128] Tire microplastics fall under particulate matter as they are solid particles that are often less than 10 micrometers in length.[129] The EPA sets two types of standards for *NAAQS* based on health: primary and secondary. National primary ambient air quality standards are set to protect public health, while secondary ambient air quality standards are set to protect public welfare, including the environment.[130] Both attempt to combat adverse effects from pollutants.[131]

Every five years, the *CAA* reviews the *NAAQS* list and uses the latest scientific findings on pollutants to revise and update sources that qualify as air pollutants.[132] To qualify for the list, an air pollutant source must be considered potentially harmful to public health or welfare.[133] Updating the *NAAQS* air pollution source list starts with the *CAA* issuing a public call for scientific evidence and policy issues for consideration.[134] After completing multiple steps, the *CAA* eventually consults with appropriate government and private groups

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[125] 42 U.S.C. § 7430.

[126] *Id.*

[127] *Id.*

[128] *Criteria Air Pollutants*, EPA (Jan. 8, 2025), https://www.epa.gov/criteria-air-pollutants [https://perma.cc/KZ6R-DDHW].

[129] *Particulate Matter (PM) Basics*, EPA (Apr. 6, 2025), https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#PM [https://perma.cc/G5GZ-KLS7]; *Microplastics Research*, EPA (Apr. 6, 2025), https://www.epa.gov/water-research/microplastics-research#:~:text=EPA%20researchers%20define%20microplastics%2C%20or,is%20about%2080%2C000%20nanometers%20wide [https://perma.cc/J47F-XFGQ].

[130] 42 U.S.C. § 7409(b).

[131] *Id.*

[132] *Id.* § 7409(d)(1).

[133] *Id.* § 7409(a)(1)(A).

[134] *Id.* § 7409(d)(1).

and then issues information on air pollution control techniques to the States.[135] New or updated standards can be implemented at any time.[136] Once the *CAA* has created a new air quality standard, states have a maximum of three years to provide the *CAA* with a plan to implement and enforce that standard.[137]

b. Problem: Tires Pollute 2,000 Times More Than Tailpipes, But Are Not Regulated

In an attempt to reduce emissions as much as possible, the *CAA* has identified motor vehicles as a primary source of air pollution[138] and has established motor vehicle emission regulations, focusing primarily on engines and fuel.[139] The problem is, recent studies show that tires produce about 2,000 times more particle pollution by mass than tailpipes,[140] with the particulates retaining the toxicity elements of microplastic.[141] Nevertheless, while the *CAA* says its intention is to regulate *all* air pollutants from vehicles and identifies particulate matter in general as a pollutant, the *CAA* has ignored tire microplastics and currently has no regulations to deal with them. The *CAA* briefly reviewed "tire debris" as a particulate matter emission during a one-time study in 1977, but no further action was ever taken to address tire emissions.[142]

IV. SOLUTIONS TO REDRESS EXISTING SHORTFALLS IN COMBATING TIRE MICROPLASTIC POLLUTION

A. Adopt Consistent International Tire Testing Methods and Emission Limits

With tire microplastic emissions on the rise,[143] contaminating environments and people worldwide, the *TFTA* methods must be fully embraced globally to combat tire microplastic pollution. The *TFTA* methods establishing standardized tire microplastic tracking and tire emission limits are the only ones of their kind. Organizations and researchers around the world have stated the need for accurate tracking of microplastic and prevention methods[144] and the

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[135] 42 U.S.C. § 7408(b)(1).

[136] 42 U.S.C. § 7409(d)(1).

[137] 42 U.S.C. § 7410(a)(1).

[138] 42 U.S.C. § 7401(a)(2).

[139] 42 U.S.C. § 7521.

[140] Olivia Lai, *Tyre Pollution Nearly 2,000 Times Worse Than Car Exhaust Emissions: Study*, EARTH.ORG, https://earth.org/tyre-pollution/ (last visited Sept. 26, 2024); Jim Robbins, *Tire Toxicity Faces Fresh Scrutiny After Salmon Die-Offs*, CBS NEWS (Apr. 23, 2024, 5:00 AM), https://www.cbsnews.com/news/toxic-tires-6ppdq-auto-pollution-fish-kills/#:~:text=Tests%20by%20Emissions%20Analytics%20have,particles%2C%20even%20smaller%20than%20PM2 [https://perma.cc/T8JL-R3FC].

[141] *See e.g.*, Gewin, *supra* note 46; Cunningham et al., *supra* note 46, at 1.

[142] 42 U.S.C. § 7548.

[143] Sarah LaBrecque, *Rising Microplastics in Seas Puts Pressure on Tyre Industry*, REUTERS (July 17, 2023, 5:23 AM), https://www.reuters.com/sustainability/land-use-biodiversity/rising-microplastics-seas-puts-pressure-tyre-industry-2023-07-17/ [https://perma.cc/6Y8N-JZWA].

[144] *E.g.*, Kole et al., *supra* note 22, at 24–25.

TFTA has answered the call. Truly committing to the fight against microplastic will require not just research, but also the regulatory willpower of as many countries as possible. Today, the goal is pushing for existing *TFTA* methods to become a global standard, removing the possibility of them languishing in obscurity under UNECE.

B. Nominate the Basel Convention to Take the Lead in Standardizing Guidelines and Enforcing Compliance

1. TFTA's Standardized Methods Align Well with Basel Convention Goals

Implementation of *TFTA*'s standardized methods of measuring tire microplastic output and setting tire emission limits would align well with the goals of the Basel Convention. The Basel Convention focuses heavily on the prevention and minimization of hazardous waste, applies to transboundary movement of hazardous waste, and recognized microplastic as hazardous waste in 2020 with the creation of the *PWP*.[145] Microplastics from tires are considered transboundary as they are transported across borders through a variety of mediums.[146] Implementing the *TFTA* methods would also provide much needed clarity on tire microplastic quantities and how the parties involved in creating and managing tire waste should handle them, which the Basel Convention has identified as critical steps for managing hazardous waste.[147]

2. Basel's Plastic Waste Partnership Should Adopt TFTA's Methods

The *TFTA* methods should be adopted by the *PWP* of the Basel Convention. The *PWP* works to analyze regional policies, such as the *TFTA* methods, and potentially implement them if they prevent and minimize plastic waste.[148] In order to undertake a project, the *PWP* must show that the project will either provide needed information, improve management, or promote research and development of plastic waste issues.[149] Adopting the *TFTA* methods satisfies all three of these goals. Tracking tire microplastic output provides the needed information to create relevant solutions (as otherwise there is no accurate information to build from) and both tracking and setting emission limits will improve the management of tire microplastic waste. If the *PWP* were to adopt the *TFTA* methods, they would also promote the *TFTA*'s thorough research and help more countries develop programs to stop microplastic pollution.

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[145] *PWP Terms*, *supra* note 94, at 2.

[146] *E.g.*, Goodman et al., *supra* note 5, at 34136; Campanale et al., *supra* note 2, at 1.

[147] Basel Convention Regulations, *supra* note 91, at art. 10(2).

[148] *PWP Terms*, *supra* note 94, at 2.

[149] *See id.* at 8–9.

3. How to Apply the TFTA Methods Under the PWP: Project Groups and Work Plan

The *PWP* should initiate a project group under their work plan to review and adopt the *TFTA* methods.[150] As previously noted, the *PWP* work plan is used to develop new project groups and has four "topics."[151] The priority of initiating project groups is based on the relevance to the topics.[152] A project group adopting the *TFTA* tire microplastic methods will likely take high priority as it heavily relates to three of the four topics.[153] The first topic, Policy and Regulatory Framework, works to find new ways to gather information on plastic waste sources and collect information that will help prevent plastic waste pollution.[154] The second topic, Environmentally Sound Management of Plastic Waste, works on reviewing other international initiatives combatting plastic waste and how their strategies could correct deficiencies in the *PWP*'s approach to plastic waste.[155] The third topic, Private Sector and Others Collaboration, attempts to identify plastic waste occurring from indirect unregulated sources and review approaches taken by relevant competent authorities.[156]

One might say the *TFTA* methods being "heavily related" to the *PWP* work plan topics is a gross understatement. A project group reviewing and adopting the *TFTA* methods would provide a new, and currently the only, way to gather information on tire microplastics while also aiding in their prevention. The *PWP* also has no approach to combat tire microplastics and is therefore provided with a perfect opportunity to review the methods being developed by the *TFTA*, a relevant competent international authority.

4. The PWP: Starting the Project Group

The *PWP* offers overwhelming support for creating a project group to implement the *TFTA* tire emission testing methods and tire emissions limits, so finding an ideal member to propose the project group is key. Proposals to the *PWP* may be submitted by parties to the Basel Convention, among others,[157] and Germany would be an ideal candidate. In addition to hosting one of the largest tire companies in the world,[158] Germany has heavily invested in the *PWP* as it

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[150] *See generally id.*

[151] *Id.* at 3, 8–9.

[152] *See id.*

[153] *Id.* at 8–9.

[154] *PWP Terms*, *supra* note 94, at 8.

[155] *Id.*

[156] *Id.* at 9.

[157] *First Call for Proposals*, BASEL CONVENTION, https://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/PWPpilotprojects/Firstcallforproposals/tabid/9050/Default.aspx [https://perma.cc/ZM3F-59EA] (last visited Mar. 22, 2025).

[158] *History: Constantly Moving Forward, supra* note 98.

financed the first pilot projects in 2020,[159] is a Member of the EU for Euro 7, and is a contracting party to the 1958 Agreement for the *TFTA*.[160]

5. Updating the Basel Conventions Tire Technical Guidelines

While creating a project group is an excellent start, we must not gloss over the opportunity to correct a deficiency in the *PWP*'s approach to plastic waste: the Basel Convention's Tire Technical Guidelines. They are woefully out of date. These guidelines may not offer enforceable regulations, but they can provide a starting point for countries looking to effectively combat waste. As such, the Tire Technical Guidelines must be updated to accurately describe how to manage tire microplastics.

The first and most pressing issue: they do not include tires in active use, only waste and used tires.[161] If the guidelines wish to address proper management of tire waste, they must include tire microplastics, which come from tires in active use.[162] As the guidelines waver on the toxicity and effects of tire microplastics on organic life and the environment, research continues to rapidly produce statistics showcasing the dangers of microplastics to such life.[163]

Including the *TFTA* standardized tracking methods and emission limits would also provide countries with the guidance needed to initiate their own policies. While it remains to be seen what the planned update for the guidelines from 2022 will officially be, the draft guidelines released in 2024 focused almost exclusively on used and waste tires and failed to properly address microplastic from tires currently in use.[164] Proposed amendments to Basel Convention guidelines come through the Open-Ended Working Group, one of the Basel Convention's subsidiary bodies, and any Party to the Convention can propose updates to guidelines.[165] Germany is, for reasons previously mentioned, an ideal country to propose to the Open-Ended Working Group that the guidelines should be updated.

6. Addressing the Basel Convention Enforcement Issue

It is important to note again that the Basel Convention relies on countries acting on the national level, and that enforcement of standardized testing methods and tire emission limits will likely vary from country to country.[166]

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[159] *First Call for Proposals*, *supra* note 157.

[160] *Contracting Parties to the UNECE 1958 & 1998 Agreements*, *supra* note 82.

[161] *See generally Basel Tyre Guidelines*, *supra* note 106.

[162] Kole et al., *supra* note 22, at 2.

[163] *E.g.*, Farhan R. Khan et al., *Acute and Long-Term Toxicity of Micronized Car Tire Wear Particles to Hyalella Azteca*, 213 AQUATIC TOXICOLOGY 105216, 105216 (2019); Terry B. Councell et al., *Tire-Wear Particles as a Source of Zinc to the Environment*, 38 ENV'T SCI. TECH. 4206, 4206 (2004).

[164] *See generally Basel Unofficial Tyre Guidelines*, *supra* note 110.

[165] *Development of Technical Guidelines*, BASEL CONVENTION, https://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/Overview/tabid/2374/Default.aspx [https://perma.cc/XLM4-2L3Z] (last visited Nov. 9, 2023).

[166] Basel Convention Regulations, *supra* note 91, at art. 4(4).

Despite this, even partial enforcement by a fraction of the 191 Member States to the Basel Convention would have a positive impact.

Tire emission limits will also apply to the tire companies themselves. These companies must ensure that their tires do not exceed microplastic emission limits. Thirty companies control the overwhelming majority of the world's tire supply.[167] The top four tire companies — Michelin, Bridgestone, Goodyear, and Continental — control over half of the worlds tire production and are situated in France, Japan, the United States, and Germany respectively.[168]

Each of these countries has strong environmental laws and all but the United States have ratified the Basel Convention. [169] If standardized tire microplastic emission limits were implemented under the Basel Convention, France, Japan, and Germany would likely enforce them. These countries' respective tire companies would then be required to enforce tire emission limits, and Goodyear would likely follow suit. If Goodyear fails to implement any enforced tire emissions limits embraced by the countries of the Basel Convention, they would likely be locked out of those markets. This can be seen through an EPA announcement covering the Basel Convention's restrictions on the international trade of plastic scrap in May 2019.[170] The EPA noted that U.S. companies were prohibited from trading in plastic scrap with countries that were party to the Basel Convention unless the companies followed the newly implemented requirements or there was a pre-determined agreement between the United States and a country meeting Basel criteria.[171]

C. Involve the United States, Even If It Operates Alone

The United States, as a major tire-producing country and global leader, must be considered for any plan to combat tire microplastics and should adopt the *TFTA* methods tracking tire microplastic output and setting emission limits. However, adopting these solutions will require action from within.

The *CAA* can adopt the *TFTA* methods in three ways to pursue its objectives of preventing air pollution and managing air pollution sources. The first is simply a general proposal to the *CAA* to adopt the *TFTA* methods. The second is establishing the *TFTA* methods as new air quality standards under *NAAQS*. The third is specifically updating the *CAA*'s vehicle regulations. Luckily, all are well within the realm of possibility.

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[167] *See Largest Tire Companies by Market Cap*, COMPANIESMARKETCAP.COM, https://companiesmarketcap.com/tires/largest-tire-companies-by-market-cap/ [https://perma.cc/ZF8E-27BH] (last visited November 11, 2024); *The Largest Tire Manufacturers in the World (New)*, *supra* note 99.

[168] *Statistics of the Tire Industry in 2022*, TOP TIRE R., https://toptirereview.com/statistics-of-the-tire-industry-in-2022/#Key_Tire_Industry_Stats [https://perma.cc/F8T6-8MLF] (last visited Oct. 28, 2023).

[169] U.S. DEP'T STATE, *supra* note 119.

[170] *New International Requirements for the Export and Import of Plastic Recyclables and Waste*, EPA, https://www.epa.gov/hwgenerators/new-international-requirements-export-and-import-plastic-recyclables-and-waste#fq5 [https://perma.cc/62CL-XKYP] (Aug. 26, 2024).

[171] *Id.*

1. General CAA Adoption

Generally proposing that the *CAA* adopts the *TFTA* methods can be achieved relatively simply. The *CAA* is required to address unregulated emission sources and establish methods to prevent further pollution every three years.[172] Tires are undisputedly a major source of air pollution for which no prevention measures are currently in place. While any proposal to adopt methods dealing with new air pollution sources requires a showing that the methods are an improvement, this is easily handled as there are no methods dealing with tire microplastics in the United States.[173] As such, any method implemented will be an improvement. The fact that the methods proposed are developed by the *TFTA*, a specialized international task force, should also prove persuasive. Anyone is permitted to propose the *TFTA* methods but a suggestion coming from an established group, such as the State Department's Bureau of Oceans and International Environmental and Scientific Affairs, which assists domestic efforts to combat plastic pollution problem, would be ideal.[174]

2. CAA NAAQS Adoption

Adopting the *TFTA* methods under *NAAQS* is an equally viable option. The list *NAAQS* uses to create air quality standards includes particulate matter as one of six air pollutants for which sources must be identified and standards created. [175] As tires are a source of particulate matter pollution (tire microplastics), they should be included in the NAAQS primary and secondary ambient air quality standards.

Creating new primary ambient quality standards requires research showing dangers to public health.[176] Tire microplastics not only contain zinc, which the *CAA* has designated a hazardous air pollutant,[177] but also over 400 chemicals, many of which are toxic or carcinogenic.[178] Tire microplastics have also been shown to have adverse effects on humans.[179] Creating a secondary ambient air quality standard requires documented adverse effects to public welfare and the environment. [180] This is also easily established as tire microplastics are

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[172] 42 U.S.C. § 7430.

[173] *Microplastic Regulatory Context*, INTERSTATE TECH. & REGUL. COUNCIL, https://mp-1.itrcweb.org/regulatory-context/ [https://perma.cc/KBX5-GUYJ] (last visited Apr. 6, 2025).

[174] *Plastic Pollution*, U.S. DEP'T STATE, https://www.state.gov/office-of-environmental-quality/plastic-pollution#:~:text=State%20Department%20Work%20on%20Plastic,global%20agreement%20on%20plastic%20pollution [https://perma.cc/W55J-BEGG] (last visited Feb. 14, 2025).

[175] Criteria Air Pollutants, *supra* note 128.

[176] *See* 42 U.S.C § 7409(b)(1).

[177] 40 C.F.R. § 61.01 (West 2023).

[178] Jim Robbins, *Road Hazard: Evidence Mounts on Toxic Pollution from Tires*, YALE ENV'T 360 (Sep. 19, 2023), https://e360.yale.edu/features/tire-pollution-toxic-chemicals [https://perma.cc/F5D2-DBHW].

[179] *E.g.*, Goodman et al., *supra* note 5, at 34150; Gualtieri et al., *supra* note 45, at 1006.

[180] *See* 42 U.S.C. § 7409(b)(2).

documented as having adverse effects on wildlife and environments worldwide.[181]

Given the sheer amount of research highlighting tire plastics' adverse effects on public health, welfare, and the environment, creating new ambient quality standards is critical to minimize future damage. The *CAA* should view tire microplastics as a primary policy problem and initiate a public call for information as soon as reasonably possible. This will start the process for updating the air quality list and eventually lead to new air quality standards for tire microplastics. As creating air quality standards will require knowledge of air pollution quantities and ideal emission limits, adopting the *TFTA*'s methods not only uses existing standards but also helps the *CAA* avoid creating their own methods from scratch. This should hopefully speed up the overall process and, given the ever-increasing amounts of tire microplastics in the air, sooner is better than later.

It should also be noted that the EPA recently announced a proposal in January 2023 to revise *NAAQS* and its particle pollution standards.[182] This was done to address new sources of pollution, among other items, but did not address tire microplastics.[183] While that proposal is now closed, updates to *NAAQS* can and will occur, and the *CAA* should move quickly to address tire microplastics while interest in updating *NAAQS* is high.

3. CAA Vehicle Regulations Adoption

Given the *CAA*'s heavy focus on vehicle emission regulations, it is rather shocking that tires have not yet been addressed. While the *CAA* has no set deadline to create vehicle-specific regulations,[184] the *CAA* will be offered a golden opportunity to address tire microplastic emissions when the *TFTA* methods are introduced. Tracking tire microplastic output and setting emission limits is necessary to achieve the purpose of the *CAA* vehicle regulations: attaining the greatest possible reduction in vehicle emissions.[185]

The CAA currently ignores tire microplastics and has instead developed regulations to cover nearly all forms of engine and fuel pollution.[186] One may argue that because the regulations all include "motor vehicles" in their description, perhaps the vehicle regulations only apply to motor emissions.[187] Yet the regulations specifically include "emission[s] of any air pollutant" from a

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[181] *E.g.*, Kole et al., *supra* note 22, at 22; Aves et al., *supra* note 17, at 2127.

[182] *EPA Proposes to Strengthen Air Quality Standards to Protect the Public from Harmful Effects of Soot*, EPA (Jan. 6, 2023), https://www.epa.gov/newsreleases/epa-proposes-strengthen-air-quality-standards-protect-public-harmful-effects-soot [https://perma.cc/H3UD-F8AW].

[183] *Id.*

[184] Strengthening American Leadership in Clean Cars and Trucks, 86 Fed. Reg. 43583, 43583–43584 (Aug. 5, 2021); *see* 42 U.S.C. § 7521(a)(1).

[185] 42 U.S.C. § 7521(a)(1); § 7521(a)(3)(A)(i).

[186] *See generally* 42 U.S.C. § 7521 (noting the *CAA* does not track microplastics as a source of vehicle pollution).

[187] *See generally id.*

vehicle.[188] If an engine, a car component, is sufficient to have specific regulations, then tires as car components should also have specific regulations. Both produce air particle pollution, and tires are by far the worse polluter in today's world.

V. CONCLUSION

Only recently have tires been recognized as an overlooked source of microplastic, and research has shown a worrying increase of adverse effects from tire microplastics on all living organisms and the environment.[189] The EU, through *Euro 7*, and the *TFTA* have taken the first steps in combatting tire microplastic emissions by working to implement the *TFTA*'s standardized testing method for tracking tire microplastic output and setting tire emission limits. However, more countries and organizations must be involved to maximize tire microplastic prevention and reduction.

Implementing the *TFTA*'s methods under the Basel Convention offers the best opportunity to include as many countries as possible in the fight against tire microplastics. Beyond the Basel Convention's 191 member countries, the *Basel Convention Plastic Waste Partnership* showcases the Convention's recent dedication to combatting plastic while also offering an ideal system to implement standardized tracking for tire microplastics and tire emissions limits.[190] Updating the *Basel Convention's Tire Technical Guidelines* to include the *TFTA* methods will also assist all countries in preventing tire microplastics. While enforcement of the Basel Convention can be sporadic, the current distribution of tire producing countries suggests enforcement will be done comprehensively and, if not, partial enforcement is far better than none. Germany is the ideal candidate to promote both the adoption of the *TFTA* methods and an update to the tire guidelines as it hosts one of the largest tire companies in the world,[191] has heavily invested in the *PWP*,[192] is a Member of the EU for Euro 7, and is a contracting party to the 1958 Agreement for the *TFTA*.[193]

Bringing the United States in line with the *TFTA*, Euro 7, and hopefully the Basel Convention is necessary to maximize the prevention and reduction of tire microplastics. This is especially true given the United States' status as a leading tire producer[194] with a large, car-enthused population. While the United States has recently recognized the dangers of microplastics and taken some steps to prevent it, U.S. regulations have so far failed to address non-intentionally produced microplastics, with no regulations on tire microplastics currently available. However, through the *CAA*, the United States has multiple clear paths to adopt the *TFTA* standard tire testing methods and emission limits,

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[188] *Id.* § 7521(a)(1).

[189] Goodman et al., *supra* note 5, at 34150; Khan et al., *supra* note 27, at 1; Kole et al., *supra* note 22, at 22.

[190] *PWP Terms*, *supra* note 94, at 2.

[191] *History: Constantly Moving Forward, supra* note 98.

[192] *First Call for Proposals*, *supra* note 157.

[193] *Contracting Parties to the UNECE 1958 & 1998 Agreements*, *supra* note 82.

[194] *See* TOP TIRE R., *supra* note 168.

thereby closing legal gaps and starting a truly global solution to tire microplastic pollution.