COMMENTS SUBMITTED TO

U.S. ENVIRONMENTAL PROTECTION AGENCY

on

Draft National Strategy to Prevent Plastic Pollution (April 2023)

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by

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INTRODUCTION

The undersigned groups and individuals submit these comments on EPA's Draft National Strategy to Prevent Plastic Pollution ("Draft Strategy").[1] Part I of these comments describes many of the harms caused by plastics—to climate change, human health, and biodiversity; Part II describes the strengths and shortcomings in the Draft Strategy; and Part III outlines additional measures EPA must include in its final strategy in order to truly address the array of harms and cumulative impacts caused by plastics during manufacture, use, disposal or recycling, as well as during the production of the petrochemical feedstocks that are the building blocks of virtually all plastics (collectively, the "life-cycle"). We urge EPA not to delay in modifying, finalizing and implementing a plastics strategy that addresses the plastics problem at its roots—in a holistic, rather than piecemeal fashion—by acknowledging that:

- plastics cannot be made, used, or disposed of without harming the planet and all its inhabitants, and
- recycling plastics by any means (including gasification and pyrolysis, which are forms of incineration) expose fenceline communities, workers, and consumers to repeated cycles of toxicity.

The final strategy must focus on:

- source reduction, including a plan to mandate elimination of non-essential single use plastics;
- meaningfully improved protection for fenceline communities, workers, and consumers from cumulative impacts linked to toxic exposures during production, use and disposal of plastics; and

[1] See Notice of Availability, Draft National Strategy to Prevent Plastic Pollution: Request for Public Comment, 88 Fed. Reg. 27,502 (May 2, 2023); EPA, *EPA's Draft National Strategy to Prevent Plastic Pollution: Part of a Series on Building a Circular Economy for All*, Off. of Res. Conservation and Recovery, EPA Doc. No. EPA 530-R-23-006 (Apr. 2023) ("Draft Strategy"), https://www.epa.gov/system/files/documents/2023-04/Draft_National_Strategy_to_Prevent_Plastic_Pollution.pdf.

- transparency and monitoring so we can better understand the problem and measure our progress in addressing it.

We applaud EPA for acknowledging that the "business-as-usual approach to managing plastic waste is unsustainable,"[2] and appreciate EPA's recognition that the United States plays a critical role in addressing the global plastics crisis since we are a leading producer of plastics and plastic feedstocks, a major generator of plastic waste, and we use far more plastic per capita than any other country.[3] However, the Draft Strategy's focus on managing plastic waste does not meaningfully address the fact that plastics contribute to climate change, and harm human health, the environment, and biodiversity, *throughout their life-cycle*.

EPA's plastics strategy will not be successful unless it includes enforceable measures designed to significantly reduce the scale of manufacture and use of plastics (recognizing that every pound of plastics that we produce is a pound of plastic waste that we have to deal with later). But the pollution-reduction proposals in the Draft Strategy involve primarily 1) *voluntary* measures, which are destined to be ineffective given the petrochemical industry's powerful incentives to continue—and, indeed, expand—global demand for plastics, and 2) wishful thinking that significant quantities of plastic can be recycled and/or reused without perpetuating cycles of toxicity that harm workers, communities, consumers, and the environment. We urge EPA to commit to developing enforceable policies and regulations that help to identify and dramatically reduce the harms caused by the cumulative impacts of plastics across their full life-cycle.[4]

We are especially concerned that EPA's Draft Strategy does not concretely address the harms that environmental justice communities—especially those on the frontlines of petrochemical manufacturing and disposal facilities, as well as Tribes and other populations that subsist on fishing and hunting—face from the cumulative impacts of the production, use,

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[2] Draft Strategy at 10.
[3] Draft Strategy at 6–7.
[4] This life-cycle includes extraction of crude oil and natural gas (and sometimes coal), refining and cracking of the fossil fuels to obtain chemical compounds (like ethane and propane), the processing into resins and pellets, and then the manufacturing of plastic into products, followed by disposal or post-consumer processing.

disposal or recycling of plastics and plastic feedstocks. The petrochemical industry creates "hot spots of cancer-causing air,"[5] that have turned many communities of color—especially in Texas and Louisiana—into sacrifice zones.[6] The presence of petrochemical facilities in these cancer hot-spots "impair[s] not just a neighborhood's health but also its economic prospects and property values, fueling a cycle of disinvestment."[7] To truly address the harms caused by plastics across their life-cycle, especially to environmental justice communities, we urge EPA to adopt a strategy that *requires* reduction and eventual phaseout of any manufacturing and use of non-essential plastics, including all non-essential single-use plastics. EPA's strategy must also deter (if not prohibit) the massive petrochemical boom that is occurring in the Gulf South and Ohio River Valley. Significant reduction in petrochemical production is the only way to meaningfully reduce the many—and cumulative—harms caused by producing and using plastic and its fossil fuel feedstocks, and the only viable strategy for ensuring that plastic production does not drive ongoing demand for oil, gas and coal, which will undermine our climate goals and commitments.

Moreover, to the extent that plastics continue to be manufactured, used and disposed of, EPA must do more to reduce the cumulative impacts on communities, workers, consumers, and ecosystems. Part III of these comments lays out a set of concrete proposals to address the cumulative impacts of plastics across their life-cycle using EPA's existing authorities (including its duties to consider and address communities' cumulative risk under the Clean Air Act and the Toxic Substances Control Act). In addition, while much is known about the harms caused by plastics across their life-cycle, there is still much that is unknown. We urge EPA to adopt strategies aimed at achieving greater transparency related to plastics, including measures that would increase understanding of the composition of different plastics (such as what chemical

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[5] Lylla Younes et al., *Poison in the Air*, ProPublica (Nov. 2, 2021), https://www.propublica.org/article/toxmap-poison-in-the-air.

[6] *Id*. ("Census tracts where the majority of residents are people of color experience about 40% more cancer-causing industrial air pollution on average than tracts where the residents are mostly white. In predominantly Black census tracts, the estimated cancer risk from toxic air pollution is more than double that of majority-white tracts.").

[7] *Id*.

additives they contain); the presence and effects of microplastics[8] in different environmental media; and the composition and toxicity of substances produced by chemical recycling. Concrete recommendations are set forth in Part III.

I. The Production, Use and Disposal (Including so-called "Recycling") of Plastics Causes Serious, Cumulative Harm.

A. Producing and Disposing of Plastics and their Fossil Fuel Feedstocks Contributes to Climate Change.

The production of petrochemicals—chemicals made primarily from oil and gas that are the building blocks of plastics—is fueling the climate crisis, threatening the gains made by the transition to clean energy sources.[9] Petrochemicals are expected to account for more than a third of the growth in oil demand by 2030 and nearly half of the growth by 2050, and are "rapidly becoming the largest driver of global oil consumption."[10]

It is estimated that 12.5 to 13.5 million metric tons of carbon dioxide equivalents ("CO2e") are emitted per year while *extracting* and *transporting* natural gas to create feedstocks for plastics in the United States,[11] though some reports indicate that greenhouse gas ("GHG") emissions during extraction are much higher.[12] In addition, GHGs are released during the

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[8] Throughout these comments, references to microplastics include nanoplastics.

[9] Rebecca Leber, *Fossil Fuel Companies are Counting on Plastics to Save Them*, Grist (March 8, 2020), https://grist.org/climate/fossil-fuel-companies-are-counting-on-plastics-to-save-them/.

[10] Int'l Energy Agency, *The Future of Petrochemicals,* at 11 (2018), https://iea.blob.core.windows.net/assets/bee4ef3a-8876-4566-98cf-7a130c013805/The_Future_of_Petrochemicals.pdf.

[11] Lisa Anne Hamilton, et al., *Plastic and Climate, The Hidden Costs of a Plastic Planet*, Ctr. for Int'l Env't Law (May 2019), https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-FINAL-2019.pdf.

[12] *See* Jim Vallette et al., *The New Coal: Plastics and Climate Change*, Beyond Plastics, at 8 (Oct. 2021), https://static1.squarespace.com/static/5eda91260bbb7e7a4bf528d8/t/616ef29221985319611a64e0/1634661022294/REPORT_The_New-Coal_Plastics_and_Climate-Change_10-21-2021.pdf (noting that the plastics industry consumes more than 1.5 billion U.S. tons of fracked gases

manufacture of petrochemicals and plastic. At least 114 million tons of CO2e are released from the 130 plastics facilities and related power plants that report their emissions to EPA,[13] though not all plastics facilities are required to report these data.[14] Moreover, the petrochemical industry seeks to dramatically expand the number of facilities in the United States. As just one example, the currently stalled, but still planned by Formosa Plastics for St. James Parish, Louisiana, mega-petrochemical complex would emit 13.6 million tons of carbon pollution each year.[15] On top of that, incineration of plastics in municipal waste incinerators contributed 16 million metric tons of CO2e in 2015, about the same emissions as 1 million cars in a year.[16] In addition, landfills are a major source of methane emissions, accounting for approximately 14.3% of these emissions in 2021 (though not all methane emissions from landfills are from plastic).[17]

The Organization for Economic Cooperation and Development ("OECD") estimates that in 2019, plastics generated 1.8 billion tons of GHG emissions – 3.4% of global emissions, with

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annually. At a leakage rate of 2.6%, this demand causes an estimated 36 million tons of CO2e during fracking each year). Methane emissions from New Mexico's oil and gas wells alone amount to approximately 1.8 million metric tons of CO2e in a year. *See also* Defend Our Health, *Hidden Hazards: The Chemical Footprint of a Plastic Bottle*, at 35 (Box 17) (May 2023)("DOH Plastic Bottle Report"), https://defendourhealth.org/wp-content/uploads/2023/05/FINAL-DOH-PlasticBottles-Report_5.20.2023.pdf.

[13] Vallette, *supra* note 12, at 6.

[14] A recent report found that manufacturing bottles out of PET plastic contributes the equivalent of 2.2 million metric tons of carbon dioxide per year and the full North American PET supply chain contributes 8.8 million metric tons of CO2e per year. DOH Plastic Bottle Report at 13, 39. The recent report *Hidden Hazards: The Chemical Footprint of a Plastic Bottle* contains information on the 2021 GHG emissions of a mere 9 facilities that manufacture a single type of plastic—polyethylene terephthalate resin, finding that 4 of the facilities emitted more than 750,000 metric tons of CO2e that year. DOH Plastic Bottle Report at 16–17, 21–22, 26, 29, 32.

[15] David J. Mitchell, *DEQ Analysis for $9.4B Formosa Facility's Permits Include 'Obsolete Data,' Lawsuit Claims*, The Advocate (Mar. 9, 2020), https://www.theadvocate.com/baton_rouge/news/communities/ascension/article_1423ab88-5d8c-11ea-8664-2f06778dbcf3.html.

[16] DOH Plastic Bottle Report at 10 (citing Ctr. for Int'l Env't L. et al., *Plastic and Climate: The Hidden Costs of a Plastic Planet* (May 2019), https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-FINAL-2019.pdf).

[17] EPA, *Basic Information about Landfill Gas*, https://www.epa.gov/lmop/basic-information-about-landfill-gas.

emissions on track to more than double to 4.3 billion tons of GHG emissions by 2060.[18] Plastics are on track to account for 15% of global GHG emissions by 2050.[19] In sum, every stage of plastics' life-cycle produces GHGs and therefore contributes to climate change. Moreover, plastics are propping up the oil and gas industry, and perpetuating the environmental and health devastation caused by this dirty industry, as the world takes giant strides toward renewable fuel sources. Allowing this industry to externalize the very real health and environmental costs of the plastics life-cycle also discourages development of cleaner alternatives. As discussed in Part II below, EPA's Draft Strategy does not directly address the impacts of plastics on climate change.

B. Producing, Using and Disposing of Plastics Is Linked to Serious Human Health Harms.

Plastics consist of polymers made from fossilized carbon (such as oil, gas, or coal), several of which are hazardous,[20] and chemical additives—including stabilizers, fillers, coloring, plasticizers, flame retardants, processing aids—many of which are known to be harmful. The polymers and chemical additives are released at every phase of the plastics life-cycle, placing people at increased risk of serious health harms.[21] Due to residential racial segregation,

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[18] OECD, *Plastic Leakage and Greenhouse Gas Emissions are Increasing*, https://www.oecd.org/environment/plastics/increased-plastic-leakage-and-greenhouse-gas-emissions.htm#:~:text=In%202019%2C%20plastics%20generated%201.8,and%20conversion%20from%20fossil%20fuels.

[19] World Econ. F., *The New Plastics Economy, Rethinking the Future of Plastics* (Jan. 2016), https://www3.weforum.org/docs/WEF_The New_Plastics_Economy.pdf.

[20] Lithner, D., Larsson, A., & Dave, G. (2011). Environmental and Health Hazard Ranking and Assessment of Plastic Polymers Based on Chemical Composition. *The Science of The Total Environment*, *409*(18), 3309–3324. https://doi.org/10.1016/j.scitotenv.2011.04.038.

[21] Valerie Denney et al., *An Introduction to Plastics & Toxic Chemicals; How Plastics Harm Human Health and the Environment and Poison the Circular Economy*, IPEN for a Toxics-Free Future, at 12–15 (Nov. 2022), https://ipen.org/sites/default/files/documents/ipen-plastics_booklet-finalspreads.pdf ("Plastics & Toxic Chemicals").

expulsive zoning laws,[22] and environmental racism in the siting of production and disposal facilities, these harms fall disproportionately on people of color.

1. Human health hazards linked to producing plastics and their feedstocks

The extraction and production of oil and gas (the feedstocks of plastics) result in releases of ozone, fine particulate matter, methane, and other toxic pollutants into soil, air, and water—including into drinking water—placing surrounding communities and workers at increased risk of serious health harms, including cancer, liver damage, immunodeficiency, neurodevelopmental harm, and asthma.[23]

Extraction using hydraulic fracturing (or fracking) raises special health concerns for surrounding communities. People living near fracking sites experience higher rates of cancer (including pediatric leukemia); adverse birth impacts (including congenital heart defects, infant mortalities and preterm delivery); cardiovascular disease; respiratory impacts (increased pediatric asthma-related hospitalizations); and dermal effects.[24] The National Institute of Environmental Health Sciences has confirmed that fracking fluids "have chemicals that could harm human health and the environment, especially if they enter drinking water supplies. Other concerns relate to chemicals that are recovered and disposed of as wastewater." The concern is not limited to fracking. Oil and gas wells also emit toxic particulate matter, nitrous oxide, ozone, and volatile organic compounds, leaving nearby communities at heightened risk of preterm.

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[22] Ana Isabel Baptista, et al., *U.S. Municipal Solid Waste Incinerators: An Industry in Decline*, Tishman Env't and Design Ctr., at 13 (May 2019), https://www.no-burn.org/wp-content/uploads/2021/03/CR_GaiaReportFinal_05.21-1.pdf.

[23] Johnston, J. E., Lim, E., & Roh, H. (2019). Impact Of Upstream Oil Extraction and Environmental Public Health: A Review of The Evidence. *The Science of The Total Environment*, *657*, 187–199. https://doi.org/10.1016/j.scitotenv.2018.11.483; Buonocore, J. J., et al. (2023). Air Pollution and Health Impacts of Oil & Gas Production in The United States. *Environ. Res.: Health*, https://doi.org/10.1088/2752-5309/acc886.

[24] Environmental Health Project, *Health Impacts of Shale Gas Development: A Collection of Research* (May 2023), https://www.environmentalhealthproject.org/_files/ugd/a9ce25_feddfe7415ba4d3b894e94821aa40aab.pdf?index=true (and references cited therein).

Delivery, asthma and heart disease.[25] Nearly 18 million people in the United States live within one mile of an active oil or gas well (including fracking sites), and they are disproportionately people of color, people living in poverty, as well as the elderly and young children.[26] Ongoing reliance on oil and gas to make plastics leaves these communities in harm's way. Oil and gas extraction is also extremely dangerous for workers; the fatality rate linked to extraction is an average of seven times higher than among U.S. workers in general,[27] with nearly 500 workers killed on the job from 2013 to 2017.[28]

Once these feedstocks arrive at the petrochemical facilities that convert them to plastics, the cycle of danger and toxicity continues.[29] Large volumes of toxic pollutants—many carcinogenic—are released by refineries, natural gas processing facilities, ethane crackers, and other plants that are part of the process of converting fossil materials into plastics. As a result, communities living near these facilities—disproportionately people of color and low-income communities—are exposed to dangerous pollutants from the air they breathe, the water they drink and recreate in, toxic dust that settles in their homes, and the food they eat (such as fish caught in local waters); many people who live near petrochemical facilities also work in those

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[25] Gonzalez, D. J. X., Francis, C. K., Shaw, G. M., Cullen, M. R., Baiocchi, M., & Burke, M. (2022). Upstream Oil and Gas Production and Ambient Air Pollution in California. *The Science of The Total Environment*, 806 (Pt 1), 150298. https://doi.org/10.1016/j.scitotenv.2021.150298.

[26] Proville, J., Roberts, K. A., Peltz, A., Watkins, L., Trask, E., & Wiersma, D. (2022). The Demographic Characteristics of Populations Living Near Oil And Gas Wells In The USA. *Population and Environment*. https://doi.org/10.1007/s11111-022-00403-2.

[27] Krystal L. Mason, et al., *Occupational Fatalities During the Oil and Gas Boom – United States, 2003-2013*, Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, (May 29, 2015), https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6420a4.htm#:~:text=Although%20the%20fatality%20rate%20in,fatality%20rates%20in%20recent%20years.

[28] Kevin Isern, *Oil and Gas Accident Statistics*, We Stand for Justice Blog, Lovell, Lovell, Isern & Farahough, L.L.P. (July 14, 2021), https://www.lovell-law.net/blog/personal-injury/oil-and-gas-accident-statistics/.

[29] Transportation of oil and gas feedstocks is also extremely dangerous – both for workers and for communities where accidents and spills occur (as has proven to be inevitable).

facilities and are exposed to these chemicals on the job as well, often bringing chemicals home with them on their shoes and clothing.

A very recent study found that air pollution linked to oil and gas production in the United States in 2016 resulted in "410,000 asthma exacerbations, 2,200 new cases of childhood asthma, and 7,500 excess deaths, with $77 billion in total health impacts."[30] Studies have shown that people living near petrochemical facilities, disproportionately people of color, have significantly higher rates of many types of cancer. For example, people living near oil refineries have a "statistically significantly increased risk of . . . cancer diagnosis across all cancer types."[31] Other studies have found a link between living near petrochemical facilities and a "significantly higher" risk of lung cancer.[32] Fenceline communities living near petrochemical facilities also face increased risk of brain and bladder cancers, as well as cancers of the blood.[33] Indeed, people living within 5 kilometers of a petrochemical facility were found to have a 30% higher risk of developing leukemia than people not living near such facilities.[34] People living near

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[30] Buonocore, J. J., Reka, S., Yang, D., Chang, C., Roy, A., Thompson, T., Lyon, D., McVay, R., Michanowicz, D., & Arunachalam, S. (2023). Air Pollution and Health Impacts of Oil & Gas Production In The United States. *Environmental Research: Health*, 1(2), 021006. https://doi.org/10.1088/2752-5309/acc886.

[31] Williams, S. B., Shan, Y., Jazzar, U., Kerr, P. S., Okereke, I., Klimberg, V. S., Tyler, D. S., Putluri, N., Lopez, D. S., Prochaska, J. D., Elferink, C., Baillargeon, J. G., Kuo, Y. F., & Mehta, H. B. (2020). Proximity to Oil Refineries and Risk of Cancer: A Population-Based Analysis. *JNCI Cancer Spectrum*, *4*(6), pkaa088, p.1. https://doi.org/10.1093/jncics/pkaa088.

[32] Lin, C. K., Hsu, Y. T., Christiani, D. C., Hung, H. Y., & Lin, R. T. (2018). Risks And Burden of Lung Cancer Incidence For Residential Petrochemical Industrial Complexes: A Meta-Analysis And Application. *Environment International*, *121*(Pt 1), 404–414. https://doi.org/10.1016/j.envint.2018.09.018 .

[33] Domingo, J. L., Marquès, M., Nadal, M., & Schuhmacher, M. (2020). Health Risks for The Population Living Near Petrochemical Industrial Complexes. 1. Cancer Risks: A Review of The Scientific Literature. *Environmental Research*, *186*, 109495. https://doi.org/10.1016/j.envres.2020.109495 .

[34] Jephcote, C., Brown, D., Verbeek, T., & Mah, A. (2020). A Systematic Review And Meta-Analysis Of Haematological Malignancies In Residents Living Near Petrochemical Facilities. *Environmental Health : A Global Access Science Source*, *19*(1), 53, p. 1 & 12.

petrochemical facilities are also at greater risk of adverse birth outcomes,[35] asthma and other respiratory illnesses.[36] Children are more susceptible to harm from these exposures than adults.[37] Given the multitude of toxic substances released during petrochemical production many people who live near where plastics are produced experience cumulative exposures to multiple toxicants, increasing their risk of harm.

Known-toxic chemicals such as ethylene oxide (EtO), 1,3-butadiene, toluene, and benzene are among the most toxic pollutants released in high volumes from plastic production.[38] Approximately one-half of all U.S. production of EtO— which is linked to breast cancer and lymphoma,[39] and "is the biggest contributor to excess industrial cancer risk from air pollutants nationwide"[40]— is used to make another chemical (ethylene glycol) for its use in production of

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https://doi.org/10.1186/s12940-020-00582-1; *see also* Whitworth, K. W., Symanski, E., & Coker, A. L. (2008). Childhood Lymphohematopoietic Cancer Incidence and Hazardous Air Pollutants in Southeast Texas, 1995-2004. *Environmental Health Perspectives*, *116*(11), 1576–1580. https://doi.org/10.1289/ehp.11593 .

[35] Huang, C. C., Pan, S. C., Chin, W. S., Chen, Y. C., Hsu, C. Y., Lin, P., & Guo, Y. L. (2021). Maternal Proximity to Petrochemical Industrial Parks and Risk of Premature Rupture of Membranes. *Environmental Research*, *194*, 110688. https://doi.org/10.1016/j.envres.2020.110688; Marquès, M., Domingo, J. L., Nadal, M., & Schuhmacher, M. (2020). Health Risks for The Population Living Near Petrochemical Industrial Complexes. 2. Adverse Health Outcomes Other Than Cancer. *The Science Of The Total Environment*, *730*, 139122. https://doi.org/10.1016/j.scitotenv.2020.139122.

[36] Wichmann, F. A., Müller, A., Busi, L. E., Cianni, N., Massolo, L., Schlink, U., Porta, A., & Sly, P. D. (2009). Increased Asthma and Respiratory Symptoms in Children Exposed to Petrochemical Pollution. *The Journal of Allergy and Clinical Immunology*, *123*(3), 632–638. https://doi.org/10.1016/j.jaci.2008.09.052.

[37] Cal. Air Resources Board, *Children and Air Pollution*, https://ww2.arb.ca.gov/resources/documents/children-and-air-pollution.

[38] Hamilton, et al., *supra* note 11, at 18–20, https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-FINAL-2019.pdf.

[39] EPA, *Evaluation of the Inhalation Carcinogenicity of Ethylene Oxide: In Support of Summary Information on the Integrated Risk Information System (IRIS)*, EPA Doc. No. *EPA/635/R-16/350Fa* (Dec. 2016), https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/1025tr.pdf.

[40] Lylla Younes et al., *supra* note 5.

polyethylene terephthalate, or PET, plastic,[41] and more than 68,000 pounds of EtO were released into the air during production of ethylene glycol for manufacture of PET.[42]

Any assessment of the dangers of living near plastic-producing, petrochemical facilities must take into account the cumulative exposures to pollutants from all routes (inhalation, ingestion and dermal) and all pathways of exposure, including from on the job, in the home, air, water, product use, and so on. This assessment must include risks from exposure to all pollutants experienced in areas with high volumes of petrochemical production, including air pollution from mobile sources such as diesel trucks, contaminated drinking water, and so on. Non-chemical stressors that increase susceptibility to harm from chemical exposures and inequitable health burdens—including greater levels of income insecurity, violence, and racial discrimination—must also be considered. As discussed in Part III below, several of the statutes EPA implements require EPA to consider and address these cumulative exposures and risks.

2. Human health hazards linked to using plastic

Toxic exposures and resulting health risks also occur due to the use of plastic products. This is because plastic is made of a mixture of chemicals, many of which are associated with a wide range of acute, chronic or multi-generational toxic effects, and many of which leach out during use.[43] Several of the building block plastic polymers (e.g., acrylonitrile-butadiene-styrene, polyvinyl chloride, and others) are themselves toxic.[44] Moreover, additional chemicals in monomer form are added to the polymers to achieve certain characteristics or functions, such as plasticizers, flame retardants, stabilizers, anti-static agents and pigments; other chemicals are present in plastics as impurities or residues from the manufacturing process.[45] Some researchers estimate that there are tens of thousands of chemicals intentionally added to plastics.[46] A recent

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[41] DOH Plastic Bottle Report at 20.
[42] DOH Plastic Bottle Report at 20.
[43] U. N. Env't Programme, *Chemicals in Plastics - A Technical Report* (2023), at 2, https://wedocs.unep.org/20.500.11822/42366.
[44] Lithner, *supra* note 20.
[45] U.N. Env't Programme, *supra* note 43, at Executive Summary xii, 4.
[46] Wiesinger, H., Wang, Z., & Hellweg, S. (2021). Deep Dive into Plastic Monomers, Additives, and Processing Aids. *Environmental Science & Technology*, 55(13), 9339–9351, pgs. 9339–40. https://doi.org/10.1021/acs.est.1c00976.

United Nations report found that "more than 13,000 chemicals are associated with plastics and plastic production …, of which over 3,200 monomers, additives, processing aids and non-intentionally added substances are of potential concern due to their hazardous properties . . . includ[ing] carcinogenicity, mutagenicity, reproductive toxicity, specific target organ toxicity, endocrine disruption, ecotoxicity, bioaccumulation potential, environmental persistence and mobility, including potential for long-range environmental transport to remote locations."[47]

While the identities of many of these additives are unknown (a problem discussed in more detail below), we know that many plastic additives are members of classes of chemicals that are linked to serious health harms, such as per- and polyfluorinated alkyl substances ("PFAS"), halogenated flame retardants, phthalates, bisphenols, alkylphenols and alkylphenol ethoxylates, polycyclic aromatic hydrocarbons, UV stabilizers, and heavy metals.[48] A recent study of 34 commonly used plastic products found that a majority of the products contained chemicals that induced toxicity in laboratory tests.[49] A similar independent study of 26 common plastic products found that nearly half of the products contained chemicals that induced immobility in exposed animals.[50]

Since most of the additives present in plastics are not bound to their base plastic fibers, they "can be released at all stages of the plastics' life-cycle," including during and following use.[51] Unfortunately, plastic consumer products made from new and recycled plastic are nearly ubiquitous, and as a result, plastic additives are present in the blood of most people.[52] For

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[47] U.N. Env't Programme, *supra* note 43, at Executive Summary xii.
[48] *Id*. at 7 (Figure 2), 12–17.
[49] Zimmermann, L., Dierkes, G., Ternes, T. A., Völker, C., & Wagner, M. (2019). Benchmarking the in Vitro Toxicity and Chemical Composition of Plastic Consumer Products. Environmental Science & Technology, 53(19), 11467–11477. https://doi.org/10.1021/acs.est.9b02293.
[50] Lithner, *supra* note 20.
[51] Zimmermann et al., *supra* note 49, at 11,467.
[52] Calafat, A. M., Ye, X., Wong, L. Y., Reidy, J. A., & Needham, L. L. (2008). Exposure Of The U.S. Population to Bisphenol A and 4-Tertiary-Octylphenol: 2003-2004. *Environmental Health Perspectives*, 116(1), 39–44. https://doi.org/10.1289/ehp.10753; Ctr. for Disease Control & Prevention, *Fourth National Report on Human Exposure to Environmental Chemicals* (Feb. 2015), https://www.cdc.gov/biomonitoring/pdf/FourthReport_UpdatedTables_Feb2015.pdf.

example, over 1,000 different intentionally added food contact chemicals are known to migrate from plastic food contact materials into food.[53] Moreover, scientists have identified 325 hazardous plastic substances listed on global inventories of materials used in the manufacture of food packaging and food contact materials.[54] Thus, hazardous chemicals that migrate from plastic food packaging into our food and onto our hands while we eat "likely contribut[e] substantially to human exposure to chemicals."[55]

Chemicals can leach out from a wide array of products, exposing children, pregnant people and others who are at greater risk from chemicals. Plastic products that are known to leach toxic chemical additives include: furniture, carpeting, and clothing (since most synthetic clothing – e.g., nylon, polyester, and – on -- and textiles are plastics);[56] as well as electronic equipment.[57] Approximately 90 % of commercially available toys are made of plastic, which is especially concerning given the special vulnerability of children to harm from chemical exposures and the fact that typical children's behaviors (putting toys in their mouth, crawling on

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[53] Geueke, B., Groh, K. J., Maffini, M. V., Martin, O. V., Boucher, J. M., Chiang, Y. T., Gwosdz, F., Jieh, P., Kassotis, C. D., Łańska, P., Myers, J. P., Odermatt, A., Parkinson, L. V., Schreier, V. N., Srebny, V., Zimmermann, L., Scheringer, M., & Muncke, J. (2022). Systematic Evidence on Migrating and Extractable Food Contact Chemicals: Most Chemicals Detected in Food Contact Materials Are Not Listed for Use. *Critical Reviews in Food Science and Nutrition*, 1–11. https://doi.org/10.1080/10408398.2022.2067828.

[54] Groh, K. J., Geueke, B., Martin, O., Maffini, M., & Muncke, J. (2021). Overview of Intentionally Used Food Contact Chemicals and Their Hazards. *Environment International*, *150*, 106225. https://doi.org/10.1016/j.envint.2020.106225 .

[55] U. N. Env't Programme, *supra* note 43, at 20.

[56] Plastics & Toxic Chemicals at 12.

[57] Zota, A. R., Singla, V., Adamkiewicz, G., Mitro, S. D., & Dodson, R. E. (2017). Reducing Chemical Exposures at Home: Opportunities for Action. *Journal of Epidemiology and Community Health*, *71*(9), 937–940. Advance online publication. https://doi.org/10.1136/jech-2016-208676; Heather M. Stapleton, *Additive Flame Retardants in Electronics: Use and Potential Health Concerns*, Duke University - Nicholas School of the Environment, https://doh.wa.gov/sites/default/files/legacy/Documents/4000//WA_Health_ElectronicsJan2019.pdf.

the floor, which may be coated in contaminated dust, and then putting their hands in their mouth) increase the likelihood that they will ingest chemicals that migrate out of the plastic.[58]

Moreover, consumer use of plastic also leads to environmental pollution. For example, plastic microfibers are released into the environment from laundry. Indeed, microplastic pollution from washing synthetic textiles has recently been identified as "the main source of primary microplastics in the ocean"—contributing approximately 35% of the global release of microplastics into the ocean.[59]

3. Human health hazards linked to disposal of plastic

The health harms linked to plastics persist during the disposal phase of the plastics life-cycle. An estimated 242 million metric tons of plastic waste is generated globally every year.[60] According to the OECD, most plastic waste generated in the United States is sent to landfills, with incineration being the next most common form of disposal, followed by recycling (with nearly an equal amount of plastic waste "mismanaged" as recycled).[61] Each of these options is linked to health harms.

First, landfilling plastics inevitably results in human and ecological exposure to toxic additives and other chemicals in the environment. Plastics may persist in landfills for thousands of years; during that time, they will leach potentially toxic substances into soil and water, and

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[58] U. N. Env't Programme, *supra* note 43, at 18-19.

[59] De Falco, F., Di Pace, E., Cocca, M., & Avella, M. (2019). The Contribution of Washing Processes of Synthetic Clothes to Microplastic Pollution. *Scientific Reports*, *9*(1), 6633. https://doi.org/10.1038/s41598-019-43023-x

[60] National Academies of Sciences, Engineering and Medicine, *Reckoning with the U.S. Role in Global Ocean Plastic Waste* (2021), https://nap.nationalacademies.org/login.php?record_id=26132 (click "Download as Guest").

[61] OECD, *Plastic Pollution is Growing Relentlessly as Waste Management and Recycling Fall Short, says OECD* (Feb. 22, 2022), https://www.oecd.org/newsroom/plastic-pollution-is-growing-relentlessly-as-waste-management-and-recycling-fall-short.htm.

emit gases into the air, endangering humans and the environment for centuries.[62] The concerns are heightened because plastics deposited in a landfill (as well as plastics that are mismanaged and simply discarded in the environment) can breakdown through a process known as photo-degradation. This process makes plastics brittle and vulnerable to physical decomposition by wind, wave action, and other environmental abrasions.[63] Over time, these processes lead to the fragmentation of plastics into tiny particles, often referred to as micro- and nano-plastics.[64] During this fragmentation, new surface areas are exposed, resulting in the slow and consistent leaching of dangerous additives.[65] In addition, persistent organic pollutants in the environment, including known or likely carcinogens like polychlorinated biphenyls,[66] polycyclic aromatic hydrocarbons,[67] and PFAS,[68] readily adhere to microplastics, which act as reservoirs for these toxic pollutants.[69] Small particles and/or fibers, including microplastics, are transported away

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[62] U.N. Env't Programme, *Plastic Planet: How Tiny Plastic Particles Are Polluting Our Soil* (Dec. 2021), https://www.unep.org/news-and-stories/story/plastic-planet-how-tiny-plastic-particles-are-polluting-our-soil#:~:text=Very%20little%20of%20the%20plastic,into%20the%20soil%20and%20water; Wojnowska-Baryła, I., Bernat, K., & Zaborowska, M. (2022). Plastic Waste Degradation In Landfill Conditions: The Problem With Microplastics, And Their Direct And Indirect Environmental Effects. *International Journal of Environmental Research And Public Health*, *19*(20), 13223. https://doi.org/10.3390/ijerph192013223.

[63] Wright, S. L., & Kelly, F. J. (2017). Plastic And Human Health: A Micro Issue?. *Environmental Science & Technology*, 51(12), 6634–6647, pg. 6634. https://doi.org/10.1021/acs.est.7b00423.

[64] Wojnowska-Baryła, I., *supra* note 62, at 1, 3.

[65] David Azoulay, et al., *Plastic & Health: The Hidden Costs of a Plastic Planet*, Center for International Environmental Law (Feb. 2019), at 2.

[66] *See* Agency for Toxic Substances & Disease Registry ("ATSDR"), *Polychlorinated Biphenyls (PCBs)* (Mar. 2011), https://wwwn.cdc.gov/TSP/substances/ToxSubstance.aspx?toxid=26.

[67] *See* ATSDR, *Polycyclic Aromatic Hydrocarbons (PAHs)* (Mar. 2011), https://wwwn.cdc.gov/TSP/substances/ToxSubstance.aspx?toxid=25.

[68] *See* ATSDR, *Per- and Polyfluoroalkyl Substances (PFAS) and Your Health: What Are the Health Effects?* (Jan. 2020), https://www.atsdr.cdc.gov/pfas/health-effects.html.

[69] Llorca, M., Schirinzi, G., Martínez, M., Barceló, D., & Farré, M. (2018). Adsorption Of Perfluoroalkyl Substances On Microplastics Under Environmental Conditions. *Environmental Pollution* (Barking, Essex : 1987), 235, 680–691. https://doi.org/10.1016/j.envpol.2017.12.075.

from landfills and into surrounding areas via air and leachate.[70] Because microplastics can leach toxic additives, and absorb environmental pollutants from the environment, they "can act as both vectors and carriers of pollutants in the environment."[71] If inhaled or ingested by humans, microplastics can accumulate and exert chemical toxicity via leaching of toxic additives and adsorbed persistent pollutants.[72] According to California State Policy Evidence Consortium ("CalSPEC"), " [a] growing body of evidence shows increasing human exposure to microplastics due to accumulation in the ecosystem."[73] A recent University of California rapid review found that exposure to microplastics is suspected to be a digestive hazard to humans, including cancer, as well as a hazard to the human reproductive system.[74]

Second, incinerating plastics is also a dangerous option because it "releases dangerous substances such as heavy metals, persistent organic pollutants, and other toxics into the air," harming communities often already overburdened by heavily polluting industries.[75] Plastic incineration can release toxic chemicals, such as chlorinated dioxins and furans (which are known carcinogens), into the environment.[76] Further, the ash produced from incineration creates a new waste disposal problem, and one that can expand the cycle of toxic exposure.[77] Not

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[70] Wojnowska-Baryła, I., *supra* note 62, at 1, 4, 9–10.
[71] Wojnowska-Baryła, I., *supra* note 62, at 1.
[72] *Id*.
[73] CalSPEC, *Microplastics Occurrence, Health Effects, and Mitigation Policies* (Jan. 2023), at Executive Summary i, https://static1.squarespace.com/static/5eda91260bbb7e7a4bf528d8/t/63ee3b95ee82156a46194aae/1676557207404/CalSPEC-Report-Microplastics-Occurrence-Health+Effects-and-Mitigation-Policies.pdf.
[74] *Id*. at Executive Summary iii.
[75] GAIA, *No Renewable Energy Incentives for Burning Plastic*, https://www.no-burn.org/no-renewable-energy-incentives-for-burning-plastic/.
[76] Elizabeth Royte, *Is Burning Plastic Waste a Good Idea?*, National Geographic (March 12, 2019), https://www.nationalgeographic.com/environment/article/should-we-burn-plastic-waste
[77] David Azoulay, et al., *supra* note 65, at 46-47.

surprisingly, eight of ten incinerators in this United States are in communities that are either poorer or have fewer white people than the rest of the country.[78]

Third, many so-called "recycling" processes, including pyrolysis and gasification, are just incineration by another name because the facilities that use these processes combust at least some of the plastic waste that is fed into them. They generate hazardous air pollutants and large quantities of hazardous waste, resulting in toxic exposures to communities near these facilities as well as hazardous waste facilities– which are disproportionately communities of color.[79] Moreover, most chemical recycling facilities in the United States are not creating new plastic, as the word "recycling" might suggest, but rather are creating chemicals or oils that will be used to make fuels.[80]

Furthermore, the pyrolysis oils and other end products of these processes are themselves toxic and thus the use of these products in fuels can place workers, communities and the general population at very high risk of cancer and other health harms.[81] The Draft Strategy acknowledges concerns about the potential health and environmental risks posed by "impurities that may be present in pyrolysis oils" generated from burning plastic.[82] While we welcome EPA's concern about impurities, this framing significantly understates the problem. As noted directly above, EPA has calculated that using fuels made from these oils is linked to

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[78] Sharon Lerner, *Waste Only: How the Plastics Industry Is Fighting to Keep Polluting the World*, The Intercept (July 20, 2019), https://theintercept.com/2019/07/20/plastics-industry-plastic-recycling/.

[79] *See* NRDC, *Recycling Lies: "Chemical Recycling" of Plastic Is Just Greenwashing Incineration* (Feb. 2022)("NRDC 2022"), https://www.nrdc.org/sites/default/files/chemical-recycling-greenwashing-incineration-ib.pdf . For the reasons in this issue brief, EPA rightly confirms that activities that convert solid waste to fuels or fuel substitutes or for energy production are not recycling. Draft Strategy at 15.

[80] NRDC 2022, *supra* note 79.

[81] Sharon Lerner, *This "Climate-Friendly" Fuel Comes With an Astronomical Cancer Risk,* ProPublica (Feb. 23, 2023), https://www.propublica.org/article/chevron-pascagoula-pollution-future-cancer-risk.

[82] Draft Strategy at 15.

extraordinarily high risks—without even considering the presence of impurities.[83] In addition, the incinerators used to create pyrolysis oils produce large volumes of hazardous waste, require a lot of energy to operate, and release toxic air pollutants into surrounding communities.[84]

Fourth, recycling plastic by mechanical means does not solve the end-of-life concerns.[85] Plastic recycling facilities produce toxic air pollution and put workers at an increased risk of chronic health effects like cancer.[86] In addition, the chopping, shredding, and washing of plastic in recycling facilities may turn a significant percentage of the waste into microplastics.[87]

Additionally, when plastic is recycled into new products, it perpetuates exposures to the toxic additives present in the plastic. For example, toxic flame retardants that had been banned

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[83] EPA, Proposed Rule, Significant New Use Rules on Certain Chemical Substances (23-2.5e), 88 Fed. Reg. 39,804 (June 20, 2023) (finding exceedingly high cancer and non-cancer risks from production of fuel from pyrolyzed plastic waste without considering the presence of any impurities in the pyrolysis oil); *see also* EPA, *TSCA Section 5 Order for a New Chemical Substance*, *Premanufacture Notice (PMN) Numbers P-21-0144-0147, P-21-0148-0150, P-21-0152-0154, P-21-155-0158, P-21-0160-0163,* EPA Doc. No. EPA-HQ-OPPT-2023-0245-0003, *in* attach. 2 (Aug. 25, 2022).

[84] NRDC, *Recycling Lies: "Chemical Recycling" of Plastic is Just Greenwashing Incineration* (Feb. 2022), https://www.nrdc.org/sites/default/files/chemical-recycling-greenwashing-incineration-ib.pdf.

[85] John Hite, *We Can't Recycle Our Way Out of the Plastic Pollution Problem*, Conservation Law Foundation (Apr. 24, 2019), https://www.clf.org/blog/cant-recycle-out-of-plastic-pollution-problem-guide/.

[86] He, Z., Li, G., Chen, J., Huang, Y., An, T., & Zhang, C. (2015). Pollution Characteristics and Health Risk Assessment of Volatile Organic Compounds Emitted from Different Plastic Solid Waste Recycling Workshops, *Environment International*, 77, 85–94. https://doi.org/10.1016/j.envint.2015.01.004; Stubbings, W. A., Nguyen, L. V., Romanak, K., Jantunen, L., Melymuk, L., Arrandale, V., Diamond, M. L., & Venier, M. (2019). Flame Retardants and Plasticizers In A Canadian Waste Electrical And Electronic Equipment (WEEE) Dismantling Facility. *The Science of The Total Environment*, *675*, 594–603. https://doi.org/10.1016/j.scitotenv.2019.04.265.

[87] James Bruggers, *Who Said Recycling Was Green? It Makes Microplastics by the Ton*, Inside Climate News (May 16, 2023), https://insideclimatenews.org/news/16052023/recycling-plastic-microplastics-waste/#:~:text=Research%20out%20of%20Scotland%20suggests,for%20the%20planet%20and%20people.

in the EU were found in the majority of toys sold in the EU that were made from recycled plastic.[88] In addition, banned flame retardants from e-waste have also been found in food contact materials as a result of recycling.[89] A recent systematic review found that "[r]ecycled and reused food contact plastics are 'vectors for spreading chemicals of concern' because they accumulate and release hundreds of dangerous toxins like styrene, benzene, bisphenol, heavy metals, formaldehyde and phthalates."[90] Therefore, improving recyclability rates – if that were feasible – would come with significant risks. Moreover, even recycled plastics are ultimately incinerated or sent to landfills, resulting in the harms described above.[91]

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In sum, plastics harm human health across their life-cycle, from extraction to disposal or recycling and reuse. However, as discussed in Part II below, EPA's Draft Strategy does not adequately address these harms.

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[88] Joseph DiGangi et al., *POPs Recycling Contaminates Children's Toys with Toxic Flame Retardants*, Int'l Pollutants Elimination Network ("IPEN")(Apr. 2017), https://ipen.org/sites/default/files/documents/toxic_toy_report_2017_update_v1_5-en.pdf.

[89] Samsonek, J., & Puype, F. (2013). Occurrence Of Brominated Flame Retardants In Black Thermo Cups And Selected Kitchen Utensils Purchased On The European Market. *Food Additives & Contaminants. Part A, Chemistry, Analysis, Control, Exposure & Risk Assessment*, 30(11), 1976–1986. https://doi.org/10.1080/19440049.2013.829246; Rani, M., Shim, W. J., Han, G. M., Jang, M., Song, Y. K., & Hong, S. H. (2014). Hexabromocyclododecane in Polystyrene Based Consumer Products: An Evidence of Unregulated Use. *Chemosphere*, *110*, 111–119. https://doi.org/10.1016/j.chemosphere.2014.02.022; Ionas, A. C., Dirtu, A. C., Anthonissen, T., Neels, H., & Covaci, A. (2014). Downsides of the Recycling Process: Harmful Organic Chemicals In Children's Toys. *Environment International*, *65*, 54–62. https://doi.org/10.1016/j.envint.2013.12.019.

[90] Tom Perkins, *Recycled And Reused Food Contact Plastics Are 'Vectors' For Toxins – Study*, The Guardian (May 27, 2023), https://www.theguardian.com/environment/2023/may/27/recycled-reused-food-plastic-toxins-study, quoting Birgit Geueke et al., *Hazardous Chemicals in Recycled and Reusable Plastic Food Packaging*, 1 Cambridge Prisms: Plastics 1 (2023), https://doi.org/10.1017/plc.2023.7.

[91] John Hite, *We Can't Recycle Our Way Out of the Plastic Pollution Problem*, Conservation L. Found. (Apr. 24, 2019), https://www.clf.org/blog/cant-recycle-out-of-plastic-pollution-problem-guide/.

C. Producing, Using and Disposing of Plastics and their Feedstocks Harms Ecosystems and Contributes to the Biodiversity Crisis

1. Biodiversity harms linked to production of plastics and their feedstocks

Extracting oil and gas to produce feedstocks for plastics threatens wildlife in a range of ways. Loud noises, human movement, and vehicle traffic from both the seismic surveys that occur during the initial stages of exploration for oil and gas, as well as during drilling and extracting operations, can disrupt animals' communication, breeding, and nesting.[92]

Drilling and extraction also introduce the risk of oil spills, which have proven to be inevitable and which pose a threat to all marine life, and can be devastating to entire marine habitats and ecosystems. As one clear example, the Deepwater Horizon explosion in the Gulf of Mexico killed between 60,900 and 173,900 sea turtles and about 1,141 dolphins, and also caused long-term harm, including death, to many other species.[93] While the Deepwater Horizon spill was particularly large, all spills expose marine species to the dangers from oil exposure, including permanent behavioral alterations, suppressed growth, reduced immunity to disease and

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[92] Erbe, C., Dent, M. L., Gannon, W. L., McCauley, R. D., Römer, H., Southall, B. L., Stansbury, A. L., Stoeger, A. S., & Thomas, J. A. (2022). *The Effects of Noise on Animals. Exploring Animal Behavior through Sound: Volume 1*, 1, 459–506. https://doi.org/10.1007/978-3-030-97540-1_13; Di Iorio, L., & Clark, C. W. (2010). Exposure to Seismic Survey Alters Blue Whale Acoustic Communication. *Biology Letters*, *6*(1), 51–54. ; Jason Bittel, *Oil and Gas Drilling Is Causing Birds to Have Fewer Chicks*, Nat'l. Geographic, (Apr. 9, 2019), https://www.nationalgeographic.co.uk/2018/01/oil-and-gas-drilling-is-causing-birds-to-have-fewer-chicks.

[93] Nat'l Oceanic Atmospheric Admin. ("NOAA") Fisheries, *Sea Turtles, Dolphins, and Whales – 10 years after the Deepwater Horizon Oil Spill*, https://www.fisheries.noaa.gov/national/marine-life-distress/sea-turtles-dolphins-and-whales-10-years-after-deepwater-horizon-oil#:~:text=An%20estimated%204%2C900%E2%80%937%2C600%20large,on%20sea%20turtle%20nesting%20beaches (last updated Sept. 10, 2021).

parasites, and histopathological lesions.[94] Chronic exposure to oil, even at sublethal levels, can impact species and ecosystems for decades.[95]

Plastics production directly contributes to biodiversity loss by causing pollution[96] and the destruction of critical habitats.[97] Habitats are fragmented or lost due to the extraction and

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[94] Moore, S. F. & Dwyer, R. L. (1974). Effects Of Oil on Marine Organisms: A Critical Assessment of Published Data. *Water Research*, 8(10), 819–827. https://doi.org/10.1016/0043-1354(74)90028-1; Neff, J. M., & Anderson, J. W. (1981). *Response of Marine Animals to Petroleum And Specific Petroleum Hydrocarbons*. Applied Science; Holdway D. A. (2002). The Acute and Chronic Effects Of Wastes Associated With Offshore Oil And Gas Production On Temperate And Tropical Marine Ecological Processes. Marine Pollution Bulletin, 44(3), 185–203. https://doi.org/10.1016/s0025-326x(01)00197-7; Geraci, J. (2012). *Sea Mammals and Oil: Confronting the Risks*. Elsevier; Almeda, R., Hyatt, C., & Buskey, E. J. (2014). Toxicity Of Dispersant Corexit 9500A And Crude Oil to Marine Microzooplankton. *Ecotoxicology And Environmental Safety*, 106, 76–85. https://doi.org/10.1016/j.ecoenv.2014.04.028.

[95] Peterson, C. H., Rice, S. D., Short, J. W., Esler, D., Bodkin, J. L., Ballachey, B. E., & Irons, D. B. (2003). Long-term ecosystem response to the Exxon Valdez oil spill. *Science (New York, N.Y.)*, *302*(5653), 2082–2086. https://doi.org/10.1126/science.1084282; Robin Rorick et al. (2012). Comment on "A Tale of Two Spills: Novel Science and Policy Implications of an Emerging New Oil Spill Model", *BioScience,* 62(12), 1009–1010. https://doi.org/10.1525/bio.2012.62.12.16; Loughlin, T. R., *Marine mammals and the Exxon Valdez* (2013); Walker, C. H., Livingstone, D. R., Lipnick, R. L., & La Point, T. W. (2013). *Persistent Pollutants in Marine Ecosystems*.

[96] Basel/Rotterdam/Stockholm Conventions*, Pollution From Chemicals And Wastes A Key Driver Of Biodiversity Loss: Joint Statement By The Secretariats Of The Basel, Minamata, Rotterdam, & Stockholm Conventions In Launching Key Insights From A Study On The Interlinkages Between Chemicals And Waste And Biodiversity*, https://www.brsmeas.org/Implementation/MediaResources/PressReleases/Chemicalspollutionbiodiversityloss/tabid/8858/language/en-US/Default.aspx ("Pollution, including from hazardous wastes and chemicals, is widely accepted as one of the main drivers of biodiversity loss.").

[97] Hanski I. (2011). Habitat Loss, The Dynamics Of Biodiversity, and A Perspective On Conservation. *Ambio*, *40*(3), 248–255, 248. https://doi.org/10.1007/s13280-011-0147-3 ("Habitat loss has been, and still is, the greatest threat to biodiversity.").

transportation of fossil fuel feedstocks,[98] as well as from plastics pollution.[99] In addition, as discussed in Part I.A., above, plastics and their feedstocks are major contributors to climate change across the entirety of the life-cycle, and climate change will soon become the biggest threat to biodiversity.[100] Notably, the petrochemical buildouts in the Gulf and the Ohio River Valley appear to overlap with high concentrations of already imperiled biodiversity.[101]

2. Biodiversity harms linked to disposal of plastics

The direct impact of plastics on marine biodiversity continues post-production when discarded plastic products enter the ocean. About 14 million tons of plastic enter the ocean every year. Some of the plastic that enters the ocean remains at the surface, some remains suspended in the water column, and still more settles on the ocean floor, even at great depths. One study found that by 2015, 10,000 to 100,000 tons of plastic were circulating in ocean surface waters,[102] with additional plastic spread throughout other depths. The prevalence of plastic in marine

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[98] Moran, M. D., Cox, A. B., Wells, R. L., Benichou, C. C., & McClung, M. R. (2015). Habitat Loss and Modification Due To Gas Development In The Fayetteville Shale. *Environmental Management*, *55*(6), 1276–1284. https://doi.org/10.1007/s00267-014-0440-6.

[99] U.N. Env't Programme, *Plastic Pollution*, https://www.unep.org/plastic-pollution#:~:text=Plastic%20pollution%20can%20alter%20habitats,capabilities%20and%20social%20well%2Dbeing ("Plastic pollution can alter habitats and natural processes, reducing ecosystems' ability to adapt to climate change.") (last visited July 25, 2023).

[100] Alison Cagle, *There's a Biodiversity Crisis, and Oil and Gas Are Making It Worse*, Earthjustice (Mar. 16, 2023), https://earthjustice.org/article/biodiversity-crisis-fossil-fuels. Moreover, destruction of ecosystems also reduces the planet's natural defenses for withstanding climate impacts. *Id*.

[101] *Compare* maps in Catrin Einhorn & Nadja Popovich, *This Map Shows Where Biodiversity Is Most at Risk in America*, The NY Times (Mar. 3 2022), https://www.nytimes.com/interactive/2022/03/03/climate/biodiversity-map.html, *with* Hamilton, H., Smyth, R. L., Young, B. E., Howard, T. G., Tracey, C., Breyer, S., Cameron, D. R., Chazal, A., Conley, A. K., Frye, C., & Schloss, C. (2022). Increasing Taxonomic Diversity and Spatial Resolution Clarifies Opportunities For Protecting US Imperiled Species. *Ecological Applications: A Publication of The Ecological Society of America*, *32*(3), e2534. https://doi.org/10.1002/eap.2534.

[102] Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., Narayan, R., & Law, K. L. (2015). Plastic Waste Inputs from Land into the Ocean. *Science*, 347(6223), 768–771. https://doi.org/10.1126/science.1260352.

ecosystems results in myriad harms to marine animals, including entanglement, suffocation, starvation, drowning, infection, and internal organ injuries.[103] Sea turtles, as well as other species, become entangled in plastic materials and drown if they are unable to reach the surface.[104] Whales ingest large volumes of plastics, giving them a false sense of fullness and blocking their intestines, both of which can cause starvation and ultimately lead to their death. Multiple whale deaths have been linked to plastic pollution.[105] Zooplankton species suffer from infertility due to ingestion of microplastics.[106] Microplastics also cause neurotoxicity, growth retardation, and various behavioral abnormalities in fish.[107] Even species that do not ingest plastic are at risk. For instance, contact with plastic increases the risk of corals contracting an infection.[108]

Ocean plastic pollution, however, does not stop with land-based plastics entering marine systems. Plastic also enters the ocean through fishing fleets, which discard fishing nets, lines,

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[103] Simon Reddy, *Plastic Pollution Affects Sea Life Throughout the Ocean*, Pew (Sept. 24, 2018), https://www.pewtrusts.org/en/research-and-analysis/articles/2018/09/24/plastic-pollution-affects-sea-life-throughout-the-ocean.

[104] Kühn, S., Bravo Rebolledo, E.L., van Franeker, J.A. (2015*). Deleterious Effects of Litter on Marine Life*. *Marine Anthropogenic Litter*, 75–116.https://doi.org/10.1007/978-3-319-16510-3_4.

[105] Associated Press, *Swallowed Fishing Gear and Plastic Most Likely Cause Of Hawaii Whale's Death,* The Guardian (Feb. 2, 2023), https://www.theguardian.com/us-news/2023/feb/02/whale-hawaii-swallowed-fishing-gear-plastic#:~:text=A%20sperm%20whale%20that%20washed,up%20in%20oceans%20every%20year; Daniel Victor, *Dead Whale Found With 88 Pounds of Plastic Inside Body in the Philippines*, The NY Times (Mar. 18, 2019), https://www.nytimes.com/2019/03/18/world/asia/whale-plastics-philippines.html.

[106] Cole, M., Lindeque, P., Fileman, E., Halsband, C., & Galloway, T. S. (2015). The Impact of Polystyrene Microplastics on Feeding, Function And Fecundity In The Marine Copepod Calanus Helgolandicus. *Environmental Science & Technology,* 49(2), 1130–1137. https://doi.org/10.1021/es504525u.

[107] Bhuyan, Md. S. (2022). Effects of Microplastics on Fish and in Human Health. *Frontiers in Environmental Science*, 10. https://doi.org/10.3389/fenvs.2022.827289.

[108] Reddy, *supra* note 103; Center for Biological Diversity, *Ocean Plastics Pollution: A Global Tragedy for Our Oceans and Sea Life,* (https://www.biologicaldiversity.org/campaigns/ocean_plastics/ (last visited July 25, 2023).

ropes, and other plastic materials while at sea.[109] This type of plastic is commonly known as "ghost gear."[110] About 20% of the plastic in the ocean comes from marine-based sources.[111] Ghost gear is a significant source of plastic pollution and causes substantial harm to marine life. EPA must address ghost gear plastic pollution and its impacts on ocean biodiversity in its final strategy.

3. Harms to communities that depend on a healthy marine environment from ocean plastic pollution

The detrimental impacts of plastic pollution on marine biodiversity and ecosystem health do not end at the ocean's edge; they threaten the health and livelihoods of communities throughout the United States and around the world. Coastal communities rely on thriving marine ecosystems for sustenance and other essential aspects of daily life, including cultural and spiritual practices. Macro- and micro-plastic pollution threatens the very ecosystems that provide these critical services. For instance, macro-plastics may affect populations of commercially valuable fish through entanglement, which affects fish population abundance and, in turn, impacts communities' ability to catch that species. In addition to reducing fish populations, microplastics contaminate the fish people eat and threaten human health as microplastics and the associated toxic chemicals are passed on through ingestion.[112] Populations

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[109] Britta Denise Hardesty et al., *740,000 km Of Fishing Line and 14 Billion Hooks: We Reveal Just How Much Fishing Gear Is Lost At Sea Each Year*, The Conversation (Oct. 12, 2022), https://theconversation.com/740-000km-of-fishing-line-and-14-billion-hooks-we-reveal-just-how-much-fishing-gear-is-lost-at-sea-each-year-192024.

[110] NOAA, *What Is Ghost Fishing?*, https://oceanservice.noaa.gov/facts/ghostfishing.html (last updated Jan. 20, 2023).

[111] Hannah Ritchie, *Which Countries and Rivers Emit the Most Plastic to The Ocean? What Does This Mean For Solutions To Tackle Plastic?,* Our World Data (May 1, 2021), https://ourworldindata.org/ocean-plastics#:~:text=Most%20of%20the%20plastic%20in,%2C%20ropes%2C%20and%20abandoned%20vessels.

[112] Smith M, Love DC, Rochman CM, Neff RA. Microplastics in Seafood and the Implications for Human Health. *Current Environmental Health Reports*, 5(3), 375–386. https://doi.org/10.1007/s40572-018-0206-z.

that fish for subsistence, such as Tribal communities and Alaskan Native communities, are most harmed.

II. EPA's Draft Strategy's Fails to Consider the Broad Array of Harms Caused by Plastics Across Their Life-cycle

Part I of these comments provides an overview of the ways that plastics and their oil and gas feedstocks contribute to climate change and biodiversity loss and harm human health—particularly the health of environmental justice communities—throughout their life-cycle. We commend EPA for recognizing the need for a strategy to mitigate and prevent these serious harms. However, even if EPA's strategies were fully implemented, they would not successfully reduce the serious harms caused by the production of plastics because they are focused on increasing the circularity of the plastics economy. This ignores the fact that plastics and their feedstocks harm the planet and its inhabitants throughout their life-cycle, not just at the end of life.[113] And even if it were possible to significantly increase recycling and re-use rates for plastic (which is doubtful for the reasons below), it would not address the serious problems that arise from exposures to toxic chemicals and microplastic pollution during the use and recycling of plastics. For this reason, the only true solution to our plastics problem is to dramatically reduce production.

A. Strengths of the Draft Strategy

Although the Draft Strategy is not as strong as is necessary to address the full spectrum of harms caused by plastics, many of the measures it calls for would be welcome. In particular, we appreciate the objectives that center the needs of fenceline communities, including the commitments to: conduct an environmental justice assessment of waste management facilities (including recycling and those that operate under the guise of so-called "chemical" or "advanced" recycling) (Goal B4.4); provide financial support to environmental justice communities to create plans to grow reuse systems and infrastructure to reduce single-use, unrecyclable, and frequently littered items, while also providing job opportunities for the local community (Goal B2.1); map existing and proposed plastic production facilities, and evaluate their environmental justice and public health impacts on neighboring communities (A2.5); and

[113] *See* Part I, *supra*.

analyze the cost, effectiveness, and equity of policies and programs that address the problems of litter and illegal dumping in disadvantaged and vulnerable communities (Goal C1.1).

We also support the objectives to gather information that will inform future policies since so much is unknown about the impacts of plastics across their life-cycle. In particular, we agree with the objectives for increasing the availability of data on plastics and performing life-cycle assessments to better understand the health, environmental, social, and economic impacts of plastics and their alternatives (A2.1); evaluating whether production facilities within the plastic sector are in compliance with applicable federal, state, Tribal, and local regulatory requirements (A2.4); evaluating industry claims about the degradability of plastics to eliminate "greenwashing" (B3.5); and developing methods to measure reductions in GHG emissions from the life-cycle of plastics and alternatives as part of meeting global, national, and state GHG emissions goals (A2.6).

We are also very pleased that EPA has confirmed that activities that convert solid waste to fuels or fuel substitutes or for energy production are not recycling.[114]

Finally, we support the objectives laid out in sections A2.4a and A2.4b of the Draft Strategy, which call for EPA to "examine existing authorities, policies, and actions to determine how they could be adjusted or built upon to avoid and reduce negative environmental or human health impacts, including safety threats like chemical leaks, fires, and explosions," and to "[r]eview and update, as appropriate, regulations relating to air emissions and water discharges of pollutants or waste disposal from plastic production and recycling facilities, and other health and safety measures, including regulation of the production and transport of plastic pellets. In addition, work across the federal government to prevent accidental releases of hazardous chemicals related to plastic production into the environment during transit."[115] EPA is currently engaged in multiple rulemaking processes under the Clean Air Act and the Toxic Substances Control Act that offer important opportunities for addressing the pollution and health risks from

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[114] Draft Strategy at 15 (citing EPA, *Measuring Recycling A Guide for State and Local Governments*, EPA Doc No. EPA530-R-97-011 (1997), https://archive.epa.gov/wastes/conserve/tools/recmeas/web/pdf/guide.pdf).

[115] Draft Strategy at 20.

producing plastics and plastic feedstocks. We strongly urge EPA to take meaningful action to protect communities, workers, consumers, and the environment from plastics and their feedstocks in the context of the regulatory processes currently underway *immediately*, without waiting for some future examination of its authorities. It is especially critical that EPA use its authorities under these laws to consider and manage cumulative risks from producing, using, and disposing of plastics and plastic feedstocks.

While we support the idea of EPA examining how it could better use its authorities to protect human health and the environment from the harms of plastics and their feedstocks, this examination should be very expedited since the undersigned groups and others have been advising EPA for decades (via comments, letters, meetings, and briefs filed in lawsuits) how to better use its existing authorities to protect communities from the petrochemical and plastics industries, which in many cases is required by the laws EPA implements. In the final strategy, we urge EPA to set expedited timeframes for completing this examination and review, and explaining how it will determine whether it is "appropriate" to update regulations and other health and safety measures. We also urge EPA to be more concrete about the work it plans to prevent accidental releases during transit.

We note that in developing the Draft Strategy, EPA did not consult directly with any fenceline community groups who could have helped EPA develop policies that would truly address the harms they face.[116] We urge EPA to confer directly with fenceline communities before it finalizes the strategy, and in particular in connection with finalizing sections A2.4a and A2.4b.

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[116] The Draft Strategy indicates that in preparing this document, EPA met with nine entities that are described as nonprofit organizations: Beyond Plastics, Center for Biological Diversity, Ellen MacArthur Foundation, Five Gyres, Keep America Beautiful, Manufacturing Communities Collaborative, Ocean Conservancy, Pew Charitable Trusts, and the National Environmental Justice Advisory Council. *See* Draft Strategy at 14. None of these organizations are comprised primarily of people who live on the frontlines of plastic pollution. We note that both the NEJAC and the Manufacturing Communities Collaborative appear to be entities that operate under the auspices of the federal government. We also note that two of the organizations are foundations.

B. Aspects of EPA's Plastics Strategy that Need Further Development

The goals laid out in the Draft Strategy—to "(A) reduce pollution during plastic production, (B) improve post-use materials management, and (C) prevent trash and microplastics from entering waterways and remove escaped trash from the environment—"[117] do not address many of the serious harms caused by plastics. In particular, the Draft Strategy does not address the harms caused by producing the oil and gas feedstocks needed to make plastics, nor the harms from the use and recycling of plastics, nor the full array of impacts to species and biodiversity.

1. The draft strategy does not seriously contend with the climate and biodiversity harms from plastics

The Draft Strategy acknowledges that plastics contribute to GHG emissions and that, at current rates, these emissions would double by 2060.[118] It also notes that, without intervention, the global plastics industry will account for 20% of total oil consumption and up to 15% of global carbon emissions by 2050.[119] But insofar as the Draft Strategy does not include interventions that require reduction in production and use of plastics, and its strategy to promote recycling and re-use is dubious, see Part II.B.3, *infra*, the Draft Strategy is unlikely to meaningfully reduce the volume of virgin plastics produced in the United States. It therefore does not include measures that will address the climate harms caused by producing plastic feedstocks and plastics. *See* Part I.A, *supra*. It also does not take into account the climate impacts of landfilling and recycling plastics. *See id.* and Part I.C, *supra*.

Likewise, EPA's Draft Strategy does not even mention the connection between producing, using, and disposing of plastics and biodiversity loss, including due to climate change and pollution.

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[117] Draft Strategy at 6.

[118] Draft Strategy at 8 (citing OECD (2022), Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options, *OECD Publishing*, Paris, https://doi.org/10.1787/de747aef-en).

[119] *Id.* (citing Ellen Macarthur Foundation, *The New Plastics Economy: Rethinking the Future Of Plastics,* https://ellenmacarthurfoundation.org/the-new-plastics-economy-rethinking-the-future-of-plastics (last visited July 25, 2023)).

The final strategy must include approaches for addressing climate change and biodiversity loss linked to the life-cycle of plastics and their feedstocks.

2. The draft strategy does not address the full array of toxic exposures resulting from plastics production and use

The Draft Strategy's objectives related to minimizing pollution from plastics are too narrow, leaving communities and ecosystems in danger. For example, the pollution-minimization of the Draft Strategy (section A2) says nothing about reducing pollution during the processes of extracting the oil and gas feedstocks that are used to make plastics for transporting their products to petrochemical facilities.[120] As discussed in Part I above, pollution from oil and gas extraction harms humans, wildlife, and the environment; it therefore must be addressed in a strategy focused on plastic pollution.

While the strategy does address pollution minimization at plastic production operations, many of the proposed measures involve voluntary certifications and design guidelines, voluntary government procurement standards, data-gathering, studies, and literature reviews.[121] While we have no objection to the proposals in section A1 of the Draft Strategy, and we believe that all of these ideas have merit, we are concerned that the Draft Strategy includes primarily *voluntary* approaches aimed at reducing—not eliminating—use of single-use plastics, focusing on incentivizing reduced use by the federal government, and challenge programs and other voluntary programs and goals.[122] Given the immense power of the oil and gas/chemical/plastic industry, calling for voluntary reduction in production is highly unrealistic and destined to be ineffective.

As explained in Part III, we believe EPA can—and must—be more aggressive in setting policies that will eliminate non-essential single-use plastics and ratchet down production of all plastics. Many other developed countries, including the European Union ("EU"), are doing much more to eliminate reliance on single-use plastics than EPA is proposing. The meaningful, mandatory measures that are now in place in similar countries to ratchet down manufacture and

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[120] Draft Strategy at 17–21.
[121] *Id.*
[122] Draft Strategy at 17–18.

use of non-essential single use plastics demonstrate the feasibility of a more aggressive approach in the United States. In particular, the EU prohibits sale of these products made with plastic: cotton swabs, cutlery, plates, straws, and stirrers; it is also regulating additional categories of single use plastics, including with labelling requirements.[123] In addition, Canada has adopted regulations that prohibit the manufacture, import and sale of six categories of single-use plastics: checkout bags, cutlery, foodservice-ware made from or containing problematic plastics,[124] ring carriers, stir sticks, and straws (except where medically necessary).[125] Likewise, Scotland has adopted regulations banning the manufacture and commercial supply of these single use plastics: cutlery, plates, beverage stirrers, food containers made of expanded polystyrene, cups and lids made of expanded polystyrene, and straws (except where medically necessary).[126] It is also exploring charging for use of other types of single-use plastics.[127]

While it is critical to improve compliance with and enforcement of existing laws and regulations, we do not believe that compliance with existing regulations—many of which are outdated or tethered to under-protective health benchmarks, or fail to meaningfully consider cumulative chemical exposures and risk (as EPA has implemented them) —would fully protect fenceline communities who are suffering devastating rates of cancer and other health harms due to the toxic releases from petrochemical and plastics facilities under the existing regulatory regimes.[128]

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[123] Eur. Commission, *Single-Use Plastics*, https://environment.ec.europa.eu/topics/plastics/single-use-plastics_en; Directive 2019/904, of the European Parliament and of the Council of 5 June 2019 on the Reduction of The Impact of Certain Plastic Products on the Environment, 2019 O.J. (L 155) 1–19, https://eur-lex.europa.eu/eli/dir/2019/904/oj.

[124] This includes expanded and extruded polystyrene foam, polyvinyl chloride, and carbon black. Gov't of Can., *Single Use Plastics Prohibition Regulations-Overview*, https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/single-use-plastic-overview.html#toc0.

[125] *Id*.

[126] Zero Waste Scot., *Single-use Plastic Products (Scotland) Regulations 2021* (Mar. 21, 2023), https://www.zerowastescotland.org.uk/resources/single-use-plastic-products-scotland-regulations-2021#:~:text=The%20new%20regulations%20essentially%20mean,for%20these%20items%20or%20not.

[127] *Id*.

[128] *See* Parts I.B; 1.C, *supra*.

A major gap in the Draft Strategy is the failure to take into account that consumers' use of plastic exposes them to toxic chemicals, which increases their risk of serious health harms, as discussed above. EPA acknowledges "growing health concerns" related to chemicals that may leach out of products,[129] but none of its strategies are targeted to addressing these health concerns. The fact that everyone in the United States is exposed to known toxic chemicals that leach out of consumer products and food packaging—a problem that would only be perpetuated by increased recycling or re-use of plastic products (unless plastics are re-formulated to remove toxic additives)—is a major problem that any plastics strategy must address.

3. The draft strategy is premised on a baseless view of the potential to recycle and re-use plastics

The Draft Strategy promotes a vision where plastic products are "kept in use for as long as possible"[130] in a circular economy via practices like sharing, reusing, remanufacturing, recycling, and composting to reduce the demand for virgin plastics. However, this is not a realistic vision. Less than 9% of total plastics generated in the municipal waste stream in the United States in 2018 were recycled.[131] And because most types of plastic are economically impossible to recycle and will remain so in the future,[132] it will be very hard to meaningfully increase the proportion of plastic that is recycled. Indeed, it appears that much of the plastic scrap that the United States sent to China for recycling before China stopped receiving plastic waste from other countries was actually "burned or buried," rather than recycled into new products.[133] Moreover, even under ideal conditions, plastic can be recycled only a few times

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[129] Draft Strategy at 9.
[130] Draft Strategy at 10.
[131] EPA, *Advancing Sustainable Materials Management: 2018 Tables and Figures,* at 2 tbl. 2 (Dec. 2020), https://www.epa.gov/sites/default/files/2021-01/documents/2018_tables_and_figures_dec_2020_fnl_508.pdf.
[132] Greenpeace, *Circular Claims Fall Flat: Comprehensive U.S. Survey of Plastics Recyclability* (Feb. 18, 2020), https://www.greenpeace.org/usa/wp-content/uploads/2020/02/Greenpeace-Report-Circular-Claims-Fall-Flat.pdf; *see generally* Elizabeth Kolbert, *How Plastics Are Poisoning Us,* The New Yorker (June 26, 2023), https://www.newyorker.com/magazine/2023/07/03/book-reviews-plastic-waste.
[133] Lerner 2019, *supra* note 78.

because "[the] polymer degrades each time it's heated."[134] So, recycling can never end the need for virgin plastics.

The notion that plastic can be effectively recycled, meaningfully reducing the levels of virgin plastic that are produced, has its roots in a chemical industry disinformation campaign. As National Public Radio and PBS Frontline found: the oil and gas industry "sold the public on an idea it knew wouldn't work— that the majority of plastic could be, and would be, recycled—all while making billions of dollars selling the world new plastic."[135] A recent *New Yorker* piece aptly notes that recycling plastic is "smoke and mirrors," promoted by an industry "playbook."[136] The charade of "plastic recycling" should not be the centerpiece of an EPA strategy to address one of the most complex environmental challenges of our time.

An additional flaw in the Draft Strategy's goal of circularity – whether via recycling or reuse – is that it does not take into account the toxic exposures that result from reusing, recycling, and composting plastic. These toxic exposures directly impact workers in recycling facilities and communities in areas surrounding them.[137] Many of these workers are in developing countries with even fewer legal protections for workers than in the United States. Indeed, in 2018, the equivalent of 68,000 shipping containers of American plastic recycling were

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[134] Kolbert, *supra* note 132.

[135] Laura Sullivan, *How Big Oil Misled the Public Into Believing Plastic Would Be Recycled,* NPR (Sept. 11, 2020), https://www.npr.org/2020/09/11/897692090/how-big-oil-misled-the-public-into-believing-plastic-would-be-recycled.

[136] Kolbert, *supra* note 132.

[137] Stubbings, W. A., Nguyen, L. V., Romanak, K., Jantunen, L., Melymuk, L., Arrandale, V., Diamond, M. L., & Venier, M. (2019). Flame Retardants and Plasticizers in A Canadian Waste Electrical and Electronic Equipment (WEEE) Dismantling Facility. *The Science of the Total Environment*, *675*, 594–603. https://doi.org/10.1016/j.scitotenv.2019.04.265 (concluding that waste electrical and electronic equipment facilities in Canada are a serious concern as a source of emissions for a wide range of flame retardants at relatively high concentrations to both workers and the immediate environment).

exported from the United States to developing countries that mismanage more than 70% of their own plastic waste.[138]

Toxic exposures also impact end-users of plastic products that contain toxic chemicals that leach out. Indeed, allowing recycling of plastic perpetuates the cycle of toxicity, even for chemicals that have been banned for primary use due to unacceptable toxicity.[139] Moreover, EPA's plan for composting plastic does not factor in that compostable materials are often treated with persistent and toxic chemicals, so composting them is a vector for spreading those chemicals into soils and agricultural products.[140]

The final strategy must be honest and realistic about the limited options for non-toxic, circular uses of plastic.

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[138] Erin McCormick, et al., *Where Does Your Plastic Go? Global Investigation Reveals America's Dirty Secret,* The Guardian (June 17, 2019), https://www.theguardian.com/us-news/2019/jun/17/recycled-plastic-america-global-crisis; Lerner, *supra* note 78.; *see also* Sharon Lerner, *Africa's Exploding Plastic Nightmare: As Africa Drowns in Garbage, the Plastics Business Keeps Booming*, The Intercept (April 19, 2020), https://theintercept.com/2020/04/19/africa-plastic-waste-kenya-ethiopia/.

[139] For example, studies show that recycled plastic toys are a major source of children's exposure to the very toxic flame retardant decaBDE that has been globally banned.
See, e.g., Health Can., *Human Health State of the Science Report on DecaBDE,* at 5 (Dec. 2012), https://www.ec.gc.ca/ese-ees/92D49BA9-4B11-4C56-BDB0-9A725C5F688E/DecaBDE%20-%20Final%20SoS%20-%20EN.pdf ("Mouthing of hard plastic toys is estimated to be the highest source of exposure for children ages 0.5 to 4 years of age.");
Norwegian Env't Agency*, Literature Study – DecaBDE in Waste Streams,* EPA Doc. No. EPA-HQ-OPPT-2019-0080-0031, at 64 (Dec. 11, 2015), https://www.regulations.gov/document/EPA-HQ-OPPT-2019-0080-0031 (click "Download") (finding DecaBDE in 25% of recycled plastic toys bought in the Netherlands); DiGangi, *supra* note 88, at 8 (noting that DecaBDE is "widely present in children's toys made of recycled plastic," including at "significant levels . . . of 50 ppm or greater."); Jitka Strakova, et al., *Toxic Loophole, Recycling Hazardous Waste Into New Products* (Oct. 2018), https://www.env-health.org/wp-content/uploads/2018/10/Toxic_Loophole-Arnika_IPEN_HEAL-2018-brochure_en-6.pdf.

[140] Choi, Y. J., Kim Lazcano, R., Yousefi, P., Trim, H., & Lee, L. S. (2019). Perfluoroalkyl Acid Characterization in U.S. Municipal Organic Solid Waste Composts. Environmental Science & Technology Letters, 6(6), 372–377. https://doi.org/10.1021/acs.estlett.9b00280.

III. Our Recommended Additions to EPA's Draft Strategy

Part I of these comments shows that production, use and disposal of plastics and their feedstocks at current (and projected) levels is unsustainable for the planet and its inhabitants; Part II describes shortcomings in the Draft Strategy that will reduce its effectiveness in addressing the plastics crisis, as well as some of its strengths. In this section, we set forth additional measures that we urge EPA to incorporate into its final plastics strategy.

Our recommended additions focus on reducing production of plastic by phasing out and ultimately eliminating non-essential uses. Significant source reduction is essential since it will not be possible to truly eliminate the serious harms from the production, use and disposal of plastic. Moreover, source reduction is consistent with EPA's longstanding pollution prevention guidance, which makes clear that source reduction—including substitution with safer alternatives—is EPA's "preferred" strategy for reducing risk, which should be used whenever feasible.[141]

A. Measures to Reduce Production of Plastics and Their Oil and Gas Feedstocks:

1. Given the inextricable connection between plastics production, the oil and gas industry and climate change, EPA should ask the National Climate Task Force[142] to set target dates for the full phase out of single use and nonessential uses of plastics, similar to the target dates the U.S. Government has set for a net zero emissions economy and carbon pollution-free electricity, and to develop concrete plans for reaching these goals.

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[141] Carol M. Browner, *Pollution Prevention Policy Statement,* EPA (June 15, 1993), https://www.epa.gov/p2/pollution-prevention-policy-statement (last updated June 13, 2023); *see also* 42 U.S.C. § 13101 (establishing a "national policy of the United States that pollution should be prevented or reduced at the source whenever feasible" because "[s]ource reduction is . . . more desirable than waste management and pollution control.").

[142] *See* The White House, *President Biden's Actions to Tackle the Climate Crisis*, Nat'l Climate Crisis Task Force (Jan. 27, 2021), https://www.whitehouse.gov/climate/#:~:text=Reaching%20100%25%20carbon%20pollution%2Dfree,zero%20emissions%20economy%20by%202050.

2. EPA should work with the White House and other federal agencies to end federal loans and subsidies for facilities that produce, or aid in the production of, non-essential plastics.

3. EPA should work with the White House and other federal agencies to adopt policies requiring that all leases of federal land for oil and gas extraction prohibit the fossil fuels from those wells to be used for production of plastics, as the rationale for those leases is to provide affordable energy (not plastics).[143]

4. EPA should commit not to seek to block international efforts to regulate plastics or toxic additives used in plastics.[144]

5. Using its authorities under the Toxic Substances Control Act ("TSCA"), EPA should exercise more oversight of new plastics that manufacturers seek to produce in this country so that it can better manage the risks related to their conditions of use, including to greater risk subpopulations, including:

a. EPA should prospectively eliminate the exemption from the TSCA premanufacture notice ("PMN") requirement for polymers that are used to make plastics, so that they can no longer enter commerce without full EPA review.[145] This would enable EPA to review these substances for safety before they are commercialized and would authorize EPA to disapprove a proposed new plastic or impose restrictions to prevent unreasonable risk. Once a polymer is approved via the PMN process, it would go on the TSCA Inventory,

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[143] U.S Dep't of the Interior Bureau of Land Mgmt. ("BLM"), *About the BLM Oil and Gas Program*, https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/about.

[144] We include this recommendation based on recent reporting indicating that EPA attempted to block efforts to list UV-328 – a persistent, bioaccumulative and toxic chemical used as a stabilizer in plastics – on the Stockholm Convention. *See* Sharon Lerner, *The U.S. Banned Farmers from Using a Brain-Harming Pesticide on Food. Why Has It Slowed a Global Ban?*, ProPublica (July 6, 2023), https://www.propublica.org/article/chlorpyrifos-ban-epa-official-kovner-pesticide.

[145] 40 C.F.R. § 723.250; Exemptions for Polymers, 49 Fed. Reg. 46,066 (Nov. 21, 1984).

and would be subject to TSCA's Chemical Data Reporting rules, increasing information on these substances in the future.[146]

b. EPA should require that manufacturers (including importers) of polymers currently used in the production of plastics, and that were commercialized under the PMN polymer exemption, to submit PMNs within one year or cease manufacturing (as EPA has previously done for perfluorinated polymers).[147]

B. Measures to Reduce Harms from Production, Use and Disposal of Plastics:

1. EPA should adopt an agency-wide policy stating that in all agency decision-making that involves or may involve the production or disposal of plastics, it will consider cumulative effects and risks (including nonchemical stressors) related to plastics across their life-cycle. In addition, it should adopt an agency-wide policy stating that in all agency decision-making that involves or may involve the production or disposal of plastics, it will conduct a robust review for compliance with Title VI of the Civil Rights Act.

2. EPA should adopt an agency-wide policy stating that in all agency decision-making that involves or may involve production or disposal of plastics, it will evaluate impact against a zero baseline to fully account for emissions, rather than assessing impacts relative to potential alternatives.

3. EPA should work with the White House and other federal agencies to ensure that no federal loans or other subsidies go to facilities that are involved in converting plastic waste into fuel or fuel substitutes under the guise of chemical or advanced "recycling."

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[146] 40 C.F.R. Part 711.

[147] Premanufacture Notification Exemption for Polymers; Amendment of Polymer Exemption Rule to Exclude Certain Perfluorinated Polymers, 75 Fed. Reg. 4,295, 4,295 (Jan. 27, 2010) (requiring submission of PMN within two years).

4. EPA should robustly enforce existing laws and regulations designed to protect fenceline communities from toxic pollution produced by petrochemical facilities and waste disposal facilities.

5. EPA should take the following actions under the **Clean Air Act** to strengthen protections from toxic air emissions from all industrial sectors involved in plastics production and disposal. These actions should not wait for any assessment of EPA's authorities:

a. Review and revise all NESHAP rules for source categories related to the production of plastics or precursors/feedstock, including new risk assessments and controls that reduce communities' cancer risk to no higher than a 1-in-1 million cancer threshold.

b. Apply the more stringent Maximum Achievable Control Technology (MACT) standard to all facilities involved in plastics production and not just major sources.[148]

c. Modify all NESHAP for sectors related to plastics production so they take into account cumulative impacts of exposure to the air pollutants of concern with other air pollutants released by other industrial sectors.

d. Remove all loopholes in Clean Air Act regulations for malfunctions.

e. Require fenceline monitoring of all facilities involved in plastics production to better control fugitive emissions, ensure more accurate

[148] For example, in EPA's upcoming review of the NESHAP for Chemical Manufacturing Area Sources (CMAS), EPA will be looking in particular at those sources' emissions of ethylene oxide, which currently does not have standards under the existing NESHAP. In fact, many CMAS sources are former major sources that have adopted permit requirements in order to take "synthetic" status as area sources—and thereby avoid the stricter controls of major source NESHAP. EPA should use its discretion to set MACT for these CMAS sources, rather than the less stringent Generally Applicable Control Technology (GACT) standards.

reporting and compliance, provide data to the public, and reduce risk to surrounding communities.

f. Not allow states to abuse significant impact levels to authorize heavy concentrations of plastic-production plants in areas where air quality fails to meet National Ambient Air Quality Standards or Prevention of Significant Deterioration increments, in violation of Section 165 of the Clean Air Act.[149]

g. Adopt a rule that requires gasification and pyrolysis facilities to be regulated as incinerators (which they are) under Clean Air Act section 129.[150]

h. Use its enforcement authority to ensure states are regulating pyrolysis and gasification facilities as incinerators as required by the Clean Air Act.

6. EPA should take the following actions under the **Clean Water Act** to strengthen protections from toxic water discharges from all industrial sectors involved in plastics production and disposal. These actions should not wait for any assessment of EPA's authorities:

a. EPA should expeditiously update its Clean Water Act effluent limitation guidelines for oil refineries, plastics manufacturers, plastics disposal facilities, and all other industrial sectors involved in plastics production and disposal, as called for in Environmental Integrity Project's recent report, "Oil's Unchecked Outfalls".[151]

b. EPA should adopt numeric criteria for Clean Water Act water quality standards for all pollutants used and discharged by oil

[149] 42 U.S.C. § 7475.
[150] 42 U.S.C. § 7429.
[151] Env't Integrity Project, *Oils Unchecked Outfalls: Water Pollution from Refineries and EPA's Failure to Enforce the Clean Air Act* (Jan. 26, 2023), https://environmentalintegrity.org/wp-content/uploads/2023/01/Oils-Unchecked-Outfalls-03.06.2023.pdf (last updated Mar. 6, 2023).

refineries, plastics manufacturers, plastics disposal facilities, and all other industrial sectors involved in plastics production and disposal—including for microplastics.

c. In 2019, the Office of the Inspector General ("IG) announced its plans to conduct fieldwork to evaluate the Office of Water's ("OW") and Office of Research and Development's ("ORD") programs to address microplastic pollution.[152] The IG issued a report regarding the ORD, but not the OW.[153] We urge EPA to inquire about the completion of this report, and then to act on the IG's recommendations without delay.

7. EPA should take the following actions under the **Safe Drinking Water Act** ("SDWA") to strengthen protections from exposures to microplastics in drinking water. These actions should not wait for any assessment of EPA's authorities:

a. EPA should add microplastics to the next contaminant candidate list," since they are "known or anticipated to occur in public water systems, and … may require regulation under this subchapter,"[154] and then make a regulatory determination for these substances.[155]

b. EPA should issue a health advisory for microplastics in drinking water.[156]

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[152] EPA, *Notification: Effectiveness of Clean Water Act to Protect from Plastic Pollution*, Off. of the Inspector Gen. (Oct. 30, 2019), https://www.epa.gov/office-inspector-general/notification-effectiveness-clean-water-act-protect-plastic-pollution.

[153] Memorandum from Sean W. O'Donnell, to Jennifer Orme-Zavaleta, Principal Deputy Assistant Adm'r for Sci. and EPA Sci. Advisor, Off. of Rsch. and Dev., Re: Office of Research and Development Initiatives to Address Threats and Risks to Public Health and the Environment from Plastic Pollution Within the Waters of the United States Report No. 21-N-0052 (Jan 6, 2021), https://www.epa.gov/sites/default/files/2021-01/documents/_epaoig_20210106-21-n-0052.pdf.

[154] 42 U.S.C. § 300g-1(b)(1)(B)(i)(I).

[155] 42 U.S.C. § 300g-1(b)(1)(B)(ii).

[156] 42 U.S.C. §300g-1(b)(1)(F).

c. Since the SDWA emphasizes that consumers have a right to know what is in their drinking water, where it comes from, how it is treated, and how to help protect it, EPA should hold public meetings on microplastics in drinking water to educate the public about this emerging problem, and encourage community engagement.[157]

8. EPA should take the following actions under the **Resource Conservation and Recovery Act** ("RCRA") to strengthen protections from exposures related to the disposal of plastics. These actions should not wait for any assessment of EPA's authorities:

a. EPA should clarify that plastic waste is solid waste for purposes of RCRA, and transportation, storage and disposal of plastic waste is subject to regulation under RCRA.

b. EPA should designate plastics made with toxic classes of chemicals— including ortho-phthalates, bisphenols, halogenated flame retardants, PFAS, heavy metals and compounds (including lead, hexavalent chromium, cadmium and mercury), perchlorate, formaldehyde, toluene, antimony and compounds, UV 328, and all other additives that are persistent, bioaccumulative and toxic—as hazardous waste under RCRA.

9. EPA should take the following actions under **TSCA** to strengthen protections from exposures related to the life-cycle of plastics. These actions should not wait for any assessment of EPA's authorities:

a. EPA is currently conducting risk evaluations and developing risk management rules for many substances used in the production of petrochemicals and plastics. It should ensure that these risk

[157] EPA, *Understanding the Safe Drinking Water Act*, Off. of Water, EPA Doc. No. EPA 816-F-04-030 (June 2004), https://www.epa.gov/sites/default/files/2015-04/documents/epa816f04030.pdf.

evaluations and risk management rules fully take into account the cumulative risks from these substances across all conditions of use, taking into account co-exposures and non-chemical stressors. It should also ensure that its risk management rules consider and effectively manage fenceline communities' risks, and that these rules are designed so that enforcement mechanisms such as fenceline monitoring are built-in from the outset.

b. EPA should use its next round of chemical prioritizations to designate as high priority for risk evaluation[158] chemicals that align with its plastics strategy.

c. EPA should commit to reconsider all prior approvals of chemical substances made with pyrolysis oils or other substances made from discarded plastics, and at a minimum, require testing (or additional testing) of those substances.

d. EPA should remove "waste-derived feedstocks used to make transportation fuel substitutes" from its fast-track approvals of biofuel premanufacture notices under TSCA.[159]

C. Measures to Protect Consumers from Toxic Exposures from Use of Plastics:

1. Using its TSCA authorities, EPA should phase out use of the most toxic classes of chemicals as additives in plastics, including ortho-phthalates, bisphenols, halogenated flame retardants, PFAS, heavy metals and compounds (including lead, hexavalent chromium, cadmium and mercury), perchlorate, formaldehyde, toluene, antimony and compounds, UV 328, and all other additives that are persistent,

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[158] 15 U.S.C. § 2605(b)(1)(B).

[159] EPA, *Integrated Approach for Biofuel Premanufacture Notices* https://www.epa.gov/reviewing-new-chemicals-under-toxic-substances-control-act-tsca/integrated-approach-biofuel (last updated Mar. 16, 2023).

bioaccumulative and toxic. It could begin by designating these classes as chemicals of concern under TSCA.[160]

2. Using its TSCA authorities, EPA should phase out use of the most toxic types of plastics, other than essential uses, including polyvinyl chloride, polystyrene, and polycarbonate.[161]

3. EPA should work with the FDA to phase out use of the most toxic additives in plastic food packaging, including those listed directly above.

D. Measures to Increase Information and Transparency Related to The Composition and Dangers Posed by Plastics:

1. EPA should assess the total GHG footprint and environmental justice impact of petrochemicals and petrochemical expansion. Beyond Petrochemicals has identified 120 proposed projects[162] to expand petrochemical capacity at existing and new facilities in the United States. This expansion would result in disproportionate harm to communities already suffering from toxic exposure from petrochemical production, as well as a significant increase in US greenhouse gas emissions from fossil fuels. EPA's assessment should include an analysis of the combined impact of announced and proposed expansions on greenhouse gas emissions, including new facilities and expanded facilities. In addition to directly collecting permit application data, EPA should consult publicly available databases, including the project database from Oil and Gas Watch,[163] to identify announced projects that have not yet reached the permitting stage. In addition

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[160] 15 U.S.C. § 2604(b)(4)(A).

[161] *See* Rochman, C. M., Browne, M. A., Halpern, B. S., Hentschel, B. T., Hoh, E., Karapanagioti, H. K., Rios-Mendoza, L. M., Takada, H., Teh, S., & Thompson, R. C. (2013). Policy: Classify Plastic Waste as Hazardous. *Nature,* 494(7436), 169–171. https://doi.org/10.1038/494169a.

[162] Beyond Petrochemicals, *Priority Facility Map*, Bloomberg Philanthropies, https://www.beyondpetrochemicals.org/about/.

[163] Oil & Gas Watch, *Projects Database*, https://oilandgaswatch.org/project-index?sort=text:1:asc.

to covering direct facility emissions, EPA's assessment should include quantitative assessments of upstream and downstream emissions.

2. EPA should use its testing authorities under TSCA[164] to require toxicity testing of any proposed new chemical substances made with pyrolysis oils or other substances or mixtures made from discarded plastics.

3. Using its TSCA testing authorities,[165] EPA should order health and safety testing of plastics, as well as of added microplastics in products such as cleaning products, waxes, polishes, detergents, and paints.

4. EPA should adopt a rule under section 8(a) of TSCA[166] that requires manufacturers of plastics to report to EPA on key information about each of the plastics it manufactures, including, but not limited to: molecular structures, total amount manufactured for each category of use, byproducts resulting from the manufacture, processing or disposal, and all existing information about health and environmental effects of the plastics.

5. EPA should lower the TSCA Chemical Data Reporting rule threshold for substances used to produce plastics to 2,500 pounds per year.

6. EPA should list microplastics on the next list of substances subject to the Safe Drinking Water Act Unregulated Contaminant Monitoring Rule so that we know the extent and location of drinking water contamination.

7. EPA should expand the list of types of facilities that are subject to reporting to the Toxics Release Inventory to include all types of facilities involved in the production and disposal of plastics. It should also add to the list of chemicals reportable under TSCA all chemicals known to be used in the production of plastics.

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[164] 15 U.S.C. § 2603.
[165] *Id*.
[166] 15 U.S.C. § 2607(a).

8. EPA should expand the list of "extremely hazardous substances" that trigger emergency release notification under EPCRA to include all substances used to produce plastics.

9. EPA should work with the Centers for Disease Control and Prevention to conduct regular biomonitoring of human blood, breastmilk, urine, organs and tissues for microplastics.

E. Measures to Minimize Biodiversity/Ocean Impacts from Plastics:

1. EPA must address ghost gear plastic pollution and its impacts on ocean biodiversity in its final strategy.

CONCLUSION

We appreciate the work that has gone into the Draft Strategy, and urge EPA to make the changes set forth above in its final strategy. If you would like to meet to discuss any of these recommendations, please contact Eve Gartner at Earthjustice (egartner@earthjustice.org).

SUBMITTED BY:

Air Alliance Houston

Alaska Community Action on Toxics

Cedar Lane Environmental Justice Ministry

Center for Biological Diversity

Center for Environmental Health

Center for Food Safety

Clean Air Council

Clean Water Action/Clean Water Fund

Defend Our Health

Environmental & Public Health Consulting

Environmental Health Project

Environmental Protection Network

Ethical And Respectful Treatment of Humans (EARTH)

FreshWater Accountability Project

Friends of the Earth

Green America

Harambee House, Inc./ Citizens for Environmental Justice

Health Care Without Harm

Healthy Building Network

Indian Point Safe Energy Coalition

Locust Point Community Garden

Los Jardines Institute

Micah Six Eight Mission

Moms for a Nontoxic New York

Natural Resources Defense Council (NRDC)

Northwest Center for Alternatives to Pesticides

Ohio Valley Environmental Advocates (OVEA)

PennFuture

Rural Coalition

Safer States

Science and Environmental Health Network

Texas Campaign for the Environment

The Center for Oceanic Awareness, Research, and Education (COARE)

The Just Transition Alliance

Toxic Free NC

Vessel Project of Louisiana

Waterkeeper Alliance