



BEYOND PESTICIDES

701 E Street, SE ■ Washington DC 20003
202-543-5450 phone ■ 202-543-4791 fax
info@beyondpesticides.org ■ www.beyondpesticides.org

March 30, 2023

Ms. Michelle Arsenault
National Organic Standards Board
USDA-AMS-NOP
1400 Independence Ave. SW.,
Room 2648-S, Mail Stop 0268
Washington, DC 20250-0268

Docket # AMS-NOP-22-0071

Re. CS: Plastic mulch

These comments to the National Organic Standards Board (NOSB) on its Spring 2023 agenda are submitted on behalf of Beyond Pesticides. Founded in 1981 as a national, grassroots, membership organization that represents community-based organizations and a range of people seeking to bridge the interests of consumers, farmers, and farmworkers, Beyond Pesticides advances improved protections from pesticides and alternative pest management strategies that eliminate a reliance on pesticides. Our membership and network span the 50 states and the world.

We have, in our comments on Crops Subcommittee (CS) sunsets, suggested that the NOSB should develop a strategy for eliminating plastics in organic production and handling. A new report¹ by the Mindaroo-Monaco Commission on Plastics and Human Health in the *Annals of Global Health* details findings of the commission relating to hazards to human health and the environment associated with every stage of the plastic life cycle, from extraction of the coal, oil, and gas that are its main feedstocks through to ultimate disposal into the environment. The report is too long to submit as an attachment to these comments. It can be found at <https://www.annalsofglobalhealth.org/collections/special/the-mindaroo-monaco-commission-on-plastics-and-human-health/>. The abstract is reproduced below.

¹ Landrigan PJ, Raps H, Cropper M, Bald C, Brunner M, Canonizado EM, Charles D, Chiles TC, Donohue MJ, Enck J, Fenichel P, Fleming LE, Ferrier-Pages C, Fordham R, Gozt A, Griffin C, Hahn ME, Haryanto B, Hixson R, Ianelli H, James BD, Kumar P, Laborde A, Law KL, Martin K, Mu J, Mulders Y, Mustapha A, Niu J, Pahl S, Park Y, Pedrotti M-L, Pitt JA, Ruchirawat M, Seewoo BJ, Spring M, Stegeman JJ, Suk W, Symeonides C, Takada H, Thompson RC, Vicini A, Wang Z, Whitman E, Wirth D, Wolff M, Yousuf AK, Dunlop S. The Mindaroo-Monaco Commission on Plastics and Human Health. *Annals of Global Health*. 2023; 89(1): 23, 1–215. DOI: <https://doi.org/10.5334/aogh.4056>.

We urge the CS to consider the findings and recommendations in this report in deliberations about plastic mulch. We also urge the NOSB to consider this report in deciding whether to put the elimination of plastics on the work agenda.

Thank you for your consideration of these comments.

Sincerely,



Terry Shistar, Ph.D.
Board of Directors

The Mindaroo-Monaco Commission on Plastics and Human Health

Abstract

Background: Plastics have conveyed great benefits to humanity and made possible some of the most significant advances of modern civilization in fields as diverse as medicine, electronics, aerospace, construction, food packaging, and sports. It is now clear, however, that plastics are also responsible for significant harms to human health, the economy, and the earth's environment. These harms occur at every stage of the plastic life cycle, from extraction of the coal, oil, and gas that are its main feedstocks through to ultimate disposal into the environment. The extent of these harms not been systematically assessed, their magnitude not fully quantified, and their economic costs not comprehensively counted.

Goals: The goals of this Mindaroo-Monaco Commission on Plastics and Human Health are to comprehensively examine plastics' impacts across their life cycle on: (1) human health and well-being; (2) the global environment, especially the ocean; (3) the economy; and (4) vulnerable populations—the poor, minorities, and the world's children. On the basis of this examination, the Commission offers science-based recommendations designed to support development of a Global Plastics Treaty, protect human health, and save lives.

Report Structure: This Commission report contains seven Sections. Following an Introduction, Section 2 presents a narrative review of the processes involved in plastic production, use, and disposal and notes the hazards to human health and the environment associated with each of these stages. Section 3 describes plastics' impacts on the ocean and notes the potential for plastic in the ocean to enter the marine food web and result in human exposure. Section 4 details plastics' impacts on human health. Section 5 presents a first-order estimate of plastics' health-related economic costs. Section 6 examines the intersection between plastic, social inequity, and environmental injustice. Section 7 presents the Commission's findings and recommendations.

Plastics: Plastics are complex, highly heterogeneous, synthetic chemical materials. Over 98% of plastics are produced from fossil carbon- coal, oil and gas. Plastics are comprised of a carbon-

based polymer backbone and thousands of additional chemicals that are incorporated into polymers to convey specific properties such as color, flexibility, stability, water repellence, flame retardation, and ultraviolet resistance. Many of these added chemicals are highly toxic. They include carcinogens, neurotoxicants and endocrine disruptors such as phthalates, bisphenols, per- and poly-fluoroalkyl substances (PFAS), brominated flame retardants, and organophosphate flame retardants. They are integral components of plastic and are responsible for many of plastics' harms to human health and the environment.

Global plastic production has increased almost exponentially since World War II, and in this time more than 8,300 megatons (Mt) of plastic have been manufactured. Annual production volume has grown from under 2 Mt in 1950 to 460 Mt in 2019, a 230-fold increase, and is on track to triple by 2060. More than half of all plastic ever made has been produced since 2002. Single-use plastics account for 35–40% of current plastic production and represent the most rapidly growing segment of plastic manufacture.

Explosive recent growth in plastics production reflects a deliberate pivot by the integrated multinational fossil-carbon corporations that produce coal, oil and gas and that also manufacture plastics. These corporations are reducing their production of fossil fuels and increasing plastics manufacture. The two principal factors responsible for this pivot are decreasing global demand for carbon-based fuels due to increases in 'green' energy, and massive expansion of oil and gas production due to fracking.

Plastic manufacture is energy-intensive and contributes significantly to climate change. At present, plastic production is responsible for an estimated 3.7% of global greenhouse gas emissions, more than the contribution of Brazil. This fraction is projected to increase to 4.5% by 2060 if current trends continue unchecked.

Plastic Life Cycle: The plastic life cycle has three phases: production, use, and disposal. In production, carbon feedstocks—coal, gas, and oil—are transformed through energy-intensive, catalytic processes into a vast array of products. Plastic use occurs in every aspect of modern life and results in widespread human exposure to the chemicals contained in plastic. Single-use plastics constitute the largest portion of current use, followed by synthetic fibers and construction.

Plastic disposal is highly inefficient, with recovery and recycling rates below 10% globally. The result is that an estimated 22 Mt of plastic waste enters the environment each year, much of it single-use plastic and are added to the more than 6 gigatons of plastic waste that have accumulated since 1950. Strategies for disposal of plastic waste include controlled and uncontrolled landfilling, open burning, thermal conversion, and export. Vast quantities of plastic waste are exported each year from high-income to low-income countries, where it accumulates in landfills, pollutes air and water, degrades vital ecosystems, befouls beaches and estuaries, and harms human health—environmental injustice on a global scale. Plastic-laden e-waste is particularly problematic.

Environmental Findings: Plastics and plastic-associated chemicals are responsible for widespread pollution. They contaminate aquatic (marine and freshwater), terrestrial, and atmospheric environments globally. The ocean is the ultimate destination for much plastic, and plastics are found throughout the ocean, including coastal regions, the sea surface, the deep sea, and polar sea ice. Many plastics appear to resist breakdown in the ocean and could persist in the global environment for decades. Macro- and micro-plastic particles have been identified in hundreds of marine species in all major taxa, including species consumed by humans. Trophic transfer of microplastic particles and the chemicals within them has been demonstrated. Although microplastic particles themselves ($>10\ \mu\text{m}$) appear not to undergo biomagnification, hydrophobic plastic-associated chemicals bioaccumulate in marine animals and biomagnify in marine food webs. The amounts and fates of smaller microplastic and nanoplastic particles (MNPs $<10\ \mu\text{m}$) in aquatic environments are poorly understood, but the potential for harm is worrying given their mobility in biological systems. Adverse environmental impacts of plastic pollution occur at multiple levels from molecular and biochemical to population and ecosystem. MNP contamination of seafood results in direct, though not well quantified, human exposure to plastics and plastic-associated chemicals. Marine plastic pollution endangers the ocean ecosystems upon which all humanity depends for food, oxygen, livelihood, and well-being.

Human Health Findings: Coal miners, oil workers and gas field workers who extract fossil carbon feedstocks for plastic production suffer increased mortality from traumatic injury, coal workers' pneumoconiosis, silicosis, cardiovascular disease, chronic obstructive pulmonary disease, and lung cancer. Plastic production workers are at increased risk of leukemia, lymphoma, hepatic angiosarcoma, brain cancer, breast cancer, mesothelioma, neurotoxic injury, and decreased fertility. Workers producing plastic textiles die of bladder cancer, lung cancer, mesothelioma, and interstitial lung disease at increased rates. Plastic recycling workers have increased rates of cardiovascular disease, toxic metal poisoning, neuropathy, and lung cancer. Residents of "fenceline" communities adjacent to plastic production and waste disposal sites experience increased risks of premature birth, low birth weight, asthma, childhood leukemia, cardiovascular disease, chronic obstructive pulmonary disease, and lung cancer.

During use and also in disposal, plastics release toxic chemicals including additives and residual monomers into the environment and into people. National biomonitoring surveys in the USA document population-wide exposures to these chemicals. Plastic additives disrupt endocrine function and increase risk for premature births, neurodevelopmental disorders, male reproductive birth defects, infertility, obesity, cardiovascular disease, renal disease, and cancers. Chemical-laden MNPs formed through the environmental degradation of plastic waste can enter living organisms, including humans. Emerging, albeit still incomplete evidence indicates that MNPs may cause toxicity due to their physical and toxicological effects as well as by acting as vectors that transport toxic chemicals and bacterial pathogens into tissues and cells.

Infants in the womb and young children are two populations at particularly high risk of plastic-related health effects. Because of the exquisite sensitivity of early development to hazardous chemicals and children's unique patterns of exposure, plastic-associated exposures are linked

to increased risks of prematurity, stillbirth, low birth weight, birth defects of the reproductive organs, neurodevelopmental impairment, impaired lung growth, and childhood cancer. Early-life exposures to plastic-associated chemicals also increase the risk of multiple non-communicable diseases later in life.

Economic Findings: Plastic's harms to human health result in significant economic costs. We estimate that in 2015 the health-related costs of plastic production exceeded \$250 billion (2015 Int\$) globally, and that in the USA alone the health costs of disease and disability caused by the plastic-associated chemicals PBDE, BPA and DEHP exceeded \$920 billion (2015 Int\$). Plastic production results in greenhouse gas (GHG) emissions equivalent to 1.96 gigatons of carbon dioxide (CO₂e) annually. Using the US Environmental Protection Agency's (EPA) social cost of carbon metric, we estimate the annual costs of these GHG emissions to be \$341 billion (2015 Int\$).

These costs, large as they are, almost certainly underestimate the full economic losses resulting from plastics' negative impacts on human health and the global environment. All of plastics' economic costs—and also its social costs—are externalized by the petrochemical and plastic manufacturing industry and are borne by citizens, taxpayers, and governments in countries around the world without compensation.

Social Justice Findings: The adverse effects of plastics and plastic pollution on human health, the economy and the environment are not evenly distributed. They disproportionately affect poor, disempowered, and marginalized populations such as workers, racial and ethnic minorities, “fenceline” communities, Indigenous groups, women, and children, all of whom had little to do with creating the current plastics crisis and lack the political influence or the resources to address it. Plastics' harmful impacts across its life cycle are most keenly felt in the Global South, in small island states, and in disenfranchised areas in the Global North. Social and environmental justice (SEJ) principles require reversal of these inequitable burdens to ensure that no group bears a disproportionate share of plastics' negative impacts and that those who benefit economically from plastic bear their fair share of its currently externalized costs.

Conclusions: It is now clear that current patterns of plastic production, use, and disposal are not sustainable and are responsible for significant harms to human health, the environment, and the economy as well as for deep societal injustices.

The main driver of these worsening harms is an almost exponential and still accelerating increase in global plastic production. Plastics' harms are further magnified by low rates of recovery and recycling and by the long persistence of plastic waste in the environment.

The thousands of chemicals in plastics—monomers, additives, processing agents, and non-intentionally added substances—include amongst their number known human carcinogens, endocrine disruptors, neurotoxicants, and persistent organic pollutants. These chemicals are responsible for many of plastics' known harms to human and planetary health. The chemicals leach out of plastics, enter the environment, cause pollution, and result in human exposure and

disease. All efforts to reduce plastics' hazards must address the hazards of plastic-associated chemicals.

Recommendations: To protect human and planetary health, especially the health of vulnerable and at-risk populations, and put the world on track to end plastic pollution by 2040, this Commission supports urgent adoption by the world's nations of a strong and comprehensive Global Plastics Treaty in accord with the mandate set forth in the March 2022 resolution of the United Nations Environment Assembly (UNEA).

International measures such as a Global Plastics Treaty are needed to curb plastic production and pollution, because the harms to human health and the environment caused by plastics, plastic-associated chemicals and plastic waste transcend national boundaries, are planetary in their scale, and have disproportionate impacts on the health and well-being of people in the world's poorest nations. Effective implementation of the Global Plastics Treaty will require that international action be coordinated and complemented by interventions at the national, regional, and local levels.

This Commission urges that a cap on global plastic production with targets, timetables, and national contributions be a central provision of the Global Plastics Treaty. We recommend inclusion of the following additional provisions:

- The Treaty needs to extend beyond microplastics and marine litter to include all of the many thousands of chemicals incorporated into plastics.
- The Treaty needs to include a provision banning or severely restricting manufacture and use of unnecessary, avoidable, and problematic plastic items, especially single-use items such as manufactured plastic microbeads.
- The Treaty needs to include requirements on extended producer responsibility (EPR) that make fossil carbon producers, plastic producers, and the manufacturers of plastic products legally and financially responsible for the safety and end-of-life management of all the materials they produce and sell.
- The Treaty needs to mandate reductions in the chemical complexity of plastic products; health-protective standards for plastics and plastic additives; a requirement for use of sustainable non-toxic materials; full disclosure of all components; and traceability of components. International cooperation will be essential to implementing and enforcing these standards.
- The Treaty needs to include SEJ remedies at each stage of the plastic life cycle designed to fill gaps in community knowledge and advance both distributional and procedural equity.

This Commission encourages inclusion in the Global Plastic Treaty of a provision calling for exploration of listing at least some plastic polymers as persistent organic pollutants (POPs) under the Stockholm Convention.

This Commission encourages a strong interface between the Global Plastics Treaty and the Basel and London Conventions to enhance management of hazardous plastic waste and slow current massive exports of plastic waste into the world's least-developed countries.

This Commission recommends the creation of a Permanent Science Policy Advisory Body to guide the Treaty's implementation. The main priorities of this Body would be to guide Member States and other stakeholders in evaluating which solutions are most effective in reducing plastic consumption, enhancing plastic waste recovery and recycling, and curbing the generation of plastic waste. This Body could also assess trade-offs among these solutions and evaluate safer alternatives to current plastics. It could monitor the transnational export of plastic waste. It could coordinate robust oceanic-, land-, and air- based MNP monitoring programs.

This Commission recommends urgent investment by national governments in research into solutions to the global plastic crisis. This research will need to determine which solutions are most effective and cost-effective in the context of particular countries and assess the risks and benefits of proposed solutions. Oceanographic and environmental research is needed to better measure concentrations and impacts of plastics <10 µm and understand their distribution and fate in the global environment. Biomedical research is needed to elucidate the human health impacts of plastics, especially MNPs.

Summary: This Commission finds that plastics are both a boon to humanity and a stealth threat to human and planetary health. Plastics convey enormous benefits, but current linear patterns of plastic production, use, and disposal that pay little attention to sustainable design or safe materials and a near absence of recovery, reuse, and recycling are responsible for grave harms to health, widespread environmental damage, great economic costs, and deep societal injustices. These harms are rapidly worsening.

While there remain gaps in knowledge about plastics' harms and uncertainties about their full magnitude, the evidence available today demonstrates unequivocally that these impacts are great and that they will increase in severity in the absence of urgent and effective intervention at global scale. Manufacture and use of essential plastics may continue. However, reckless increases in plastic production, and especially increases in the manufacture of an ever-increasing array of unnecessary single-use plastic products, need to be curbed.

Global intervention against the plastic crisis is needed now because the costs of failure to act will be immense.