IPEN Ocean Pollutants Platform

Addressing Ocean Pollutants to achieve a toxics-free future

Marine pollutants are threatening the health of our oceans. Every day, a cocktail of intentional and unintentional chemical releases, as well as the unrelenting tidal wave of wastes, particularly plastic waste, enter our oceans and waterways.

Ocean pollutants include persistent organic pollutants (POPs), endocrine disrupting compounds (EDCs), mercury compounds, plastic wastes and related chemical compounds (e.g., BPA, phthalates) as well as other industrial and agricultural emissions. These toxic ocean pollutants disproportionately impact remote Arctic and Pacific Island communities and are a serious threat to their environment, food security, health, culture and human rights.

IPEN research has already demonstrated the impact of mercury pollution in the Asia Pacific region and IPEN's work on new POPs, through the Stockholm Convention POPs Review Committee, has highlighted the increasing detection of new POPs such as PFOS (perfluoro octane sulfonate) and PBDEs (polybrominated diphenyl ethers / brominated flame retardants) in the marine environment.

IPEN's campaigns for non-combustion destruction of hazardous waste have highlighted the failures of countries to manage hazardous and plastic wastes, which results in ongoing chemical contamination of the oceans and predictions that there will be more plastic by weight than fish in our oceans by 2050.

In response to the increasing threat of marine pollutants in our oceans, IPEN has developed the 'Addressing Ocean Pollutants Platform' incorporating commitments to address identified problems. The platform will be based on the principles of good chemical management; right-to-know, polluter pays, precaution and substitution, as well as the principles of social, environmental and intergenerational equity.

Mercury Contamination in the Marine Environment

Thousands of tons of mercury are emitted and re-emitted each year to the atmosphere, with much of it finding its way into the marine environment, where it bioaccumulates and biomagnifies in aquatic organisms, reaching high concentrations in predators such as sharks, tuna, halibut, lingcod, and swordfish. Mercury is also released to waterways through industrial emissions and from artisanal small scale gold mining (ASGM) practices. Human consumption of contaminated fish can lead to toxic levels of mercury accumulating in body tissues while those communities dependent on seafood for their protein, suffer a chronic, disproportionate and more dangerous dose of toxic mercury. In some countries, mercury is also found in salts processed from sea water.

Mercury exposure can harm the brain, heart, kidneys, lungs, and immune system of people of all ages. Methylmercury is especially harmful to the developing nervous system of the human fetus, impacting on a child's development and potentially reducing their IQ.

Sources of mercury pollution, such as coal burning power generation also impact on climate, increasing POPs chemical releases, remobilization and bioaccumulation.

IPEN mercury monitoring

IPEN's report[1] showed high levels of mercury in communities across the Asia Pacific Region. Women from Small Island Developing States (SIDS) in the Pacific had very high levels of mercury in their bodies compared to other locations. The Pacific Islanders' diet is predominantly rich in seafood and the large predatory fish they eat have high methyl mercury (MeHg) concentrations in their flesh. Of the 150 Pacific Island participants, 96% exceeded the reference level of 1 ppm total mercury in hair[2], compared to 21.4% of participants living elsewhere.

IPEN will continue mercury monitoring of women of child-bearing age in the SIDS.

IPEN actively participates in the Minamata Convention, whose objective is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

Persistent Organic Pollutants

Many POPs and endocrine disrupting chemicals (EDCs) contaminate the marine environment and its inhabitants including in very remote regions. Regularly detected POPs include:

- Polychlorinated biphenyls (PCBs); highly toxic, chlorinated, industrial chemicals; endocrine disruptors and carcinogens;
- Dichlorodiphenyltrichloroethane (DDT) and its breakdown products; an organochlorine insecticide banned due to serious health effects in animals; an endocrine disruptor;
- Hexachlorocyclohexane (HCH); organochlorine insecticide e.g., lindane; a neurotoxin and endocrine disruptor;
- Hexachlorobenzene (HCB); fungicide and industrial chemical; carcinogen and endocrine disruptor;
- Perfluorinated compounds (PFOS, PFOA); industrial and consumer chemicals; carcinogens and endocrine disruptors; and
- Polybrominated diphenyl ethers (PentaBDE, OctaBDE, DecaBDE; neurotoxins, developmental toxins.

[1]Bell L (2017) Mercury monitoring in women of child-bearing age in Asia and the Pacific Region, April 2017, UN Environment, Biodiversity Research Institute, IPEN http://ipen.org/sites/default/files/documents/Mercury%20Monitoring%20Women%20Asia%20Pacific%20April%2011%20Short_0.pdf

[2]Corresponding with the U.S. EPA's reference dose (RfD) of 0.1 ug/kg bw/day and a blood mercury concentration of 4-5 µg/L).

Adding New POPs

IPEN continues its commitment to the POPs Review Committee, which assesses new POPs for listing on the Stockholm Convention and eventual elimination. The fluorinated chemicals (e.g. perfluorooctane sulfonate (PFOS); perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate PFHxS) are of particular concern due to their extreme persistency and resistance to degradation under environmental and marine conditions. As chemicals capable of disrupting the endocrine and immune systems of marine organisms, their presence in invertebrates, fish, reptiles, and marine mammals worldwide calls for urgent action to eliminate their use.

Unintentionally produced POPs are also a concern. IPEN Participating Organizations (POs) have demonstrated POPs pollution from the combustion of wastes and continue to campaign for non-combustion destruction technologies.

IPEN POs continue their work to ensure effective implementation of the Stockholm convention, including participation in the National Implementation Plan (NIPs) processes of parties to the convention.

Endocrine Disrupting Chemicals

Endocrine Disrupting Chemicals (EDCs) affect reproduction, development and immune function, resulting in increased susceptibility to infectious diseases in vertebrates, notably in marine mammals.[3] Body burdens of POPs such as PCBs, organochlorine pesticides (as well as methylmercury) in some fish-eating birds and marine mammal populations are at levels known to cause effects on breeding and on the immune system. Some of these populations are already threatened or endangered and higher rates of reproductive problems are found in animals exposed to EDCs. Very low exposures to chemicals can have an effect on the endocrine system and current exposure to EDCs may be playing a significant role in the worldwide loss of species and reduced population numbers of amphibians, mammals, birds, reptiles, fresh water and marine fishes and invertebrates.[4]

Contaminants in Marine Plastics

Marine plastic wastes are found in every marine habitat, including estuaries, the breeding grounds for fish. Once in marine environments, plastic polymers undergo weathering and degradation, aiding the adsorption of contaminants from seawater. The contaminants concentrate in micro-plastic fragments at several orders of magnitude higher than background levels in seawater.

POPs and other persistent bioaccumulative toxics contaminate all forms of marine plastic pollution including, resin pellets, microbeads, polystyrene and micro-plastic debris. Studies of seabirds have shown that contaminant loads are positively correlated with the amount of plastic ingested. As well as adsorbed contaminants, plastic additives such as phthalates, nonylphenols and bisphenol A (BPA) are found in marine plastic debris and in the wider marine environment.

[3]State of the Science of Endocrine Disrupting Chemicals 2012, United Nations Environment Programme and the World Health Organization, 2013
[4]Ibid

Examples of contaminants in marine plastics include:

Phthalates: commonly used as plasticizers to soften or enhance pliability in plastics, are found in children's toys, personal care products and food containers. Some are known EDCs. Phthalates have been measured in marine plastic pellets.[5] In one study, over half of surface plankton samples analyzed contained micro-plastic particles with high concentrations of phthalates (DEHP and MEHP).[6] The study noted that concentrations of mono-(2-ethylhexyl) phthalate (MEHP) found in the blubber of stranded fin whales warned of the emerging threat of micro-plastics and their contaminants to baleen whales.

Nonylphenols (NP): formed from the environmental degradation of Nonylphenol Ethoxylates (NPEs). NPEs are used as surfactants but can cause feminization of aquatic species and decrease male fertility and survival in young fish. NP found in polypropylene resin pellets collected from Japanese coasts, were two orders of magnitude higher than those found in sediment.[7]

Bisphenol A (BPA): one of the highest volume chemicals produced worldwide. As a monomer of polycarbonate plastic and epoxy resin, it is used in food containers and the epoxy-based linings of canned foods. BPA is released to the marine environment via sewage effluents, rivers and coastal waters and from plastic wastes. BPA is a known endocrine disruptor. Relatively high concentrations of BPA have been detected in plastic fragment samples from remote beaches and the open ocean. Sand and seawater analyzed from more than 20 countries found significant amounts of BPA.[8]

Plastic degradation products

Marine organisms are also exposed to the chemical intermediates from the plastic's partial degradation such as carcinogenic styrene and highly toxic, polycyclic aromatic hydrocarbons (PAHs).

Current use pesticides

Many pesticides also enter the marine environment through sewerage systems, storm water systems, rivers and streams, and as direct runoff from use on farmland, golf course, residential properties, and even in aquaculture. Most of these and/or their metabolites are

[5]Mato, Isobe, Takada, Kahnehiro, Ohtake, and Kaminuma. Plastic Resin Pellets as a Transport Medium for Toxic Chemicals in the Marine Environment *Environ. Sci. Technol*. 2001, 35, 318-324
[6]Fossi et al., Are baleen whales exposed to the threat of microplastics? A case study of the Mediterranean fin whale (Balaenopteraphysalus), Marine Pollution Bulletin Vol. 64, Issue 11, November 2012, 2374–2379
[7]Mato, Isobe, Takada, Kahnehiro, Ohtake, and Kaminuma. Plastic Resin Pellets as a Transport Medium for Toxic Chemicals in the Marine Environment Environ. Sci. Technol. 2001, 35, 318-324)
[8]American Chemical Society. "Hard plastics decompose in oceans, releasing endocrine disruptor BPA." Science Daily. Science Daily, 24 March 2010. <www.sciencedaily.com/releases/2010/03/100323184607.htm>.

toxic to marine organisms causing reproductive failure, behavioral changes that alter their survivability, and changes in population dynamics and/or ecosystem imbalance. Some are also persistent and/or bioaccumulative. Glyphosate for example, which has been found in marine sediments in several countries,[9,10] can alter microbial diversity and community composition[11] and promote algal blooms.[12,13]

Raising Awareness of EDCs

To raise global awareness about EDCs, the Endocrine Society and IPEN developed an "Introduction to Endocrine Disrupting Chemicals (EDCs) A Guide for Public Interest Organizations and Policy-Makers."[14] Prepared to help global policy-makers, government leaders, and public interest organizations better understand EDCs, it provides information about the human endocrine system, the impacts of EDCs on human health and the environment on which we all depend and the need for a new scientific paradigm to evaluate the potential harms of EDCs.

Nexus between Ocean Pollutants and Production Systems

Ocean pollutants, particularly plastic marine debris and micro-plastics, are now recognized globally as a pervasive and shared threat to humanity.[15] The fossil fuel origins of plastic production represent a complex and difficult challenge for all countries. Any proposed solutions to ocean pollution and particularly plastic marine debris and micro-plastics, need to acknowledge this.[16]

While many countries have committed to the Paris Climate Agreement and to reducing consumption of fossil fuels for energy, in contrast, plastics production has historically and continues to be, on a rapidly increasing trajectory with an expected doubling of production over the next 20 years to more than 600 million tons per year.[17] The projected increase in plastic production demonstrates the need for a multi-sector and multi-stakeholder approach

[9]Field Analysis of Chemicals of Emerging Environmental Concern in Auckland's Aquatic Sediments. ARC Technical Report 2009/021. Prepared by National Institute of Water and Atmosphere for Auckland Regional Council, Auckland

[10]Stachowski-Haberkorn S, Becker B, Marie D, Haberkorn H, Coroller L, de la Broise D. 2008. Impact of Roundup on the marine microbial community, as shown by an in situ microcosm experiment. AquatToxicol 89(4):232-41.

[11]Ibid.

[12]Qiu H, Geng J, Ren H, Xia X, Wang X, Yu Y. 2013. Physiological and biochemical responses of Microcystis aeruginosa to glyphosate and its Roundup® formulation. J Hazard Mater 248-249:172- 6.

[13]Pérez GL, Torremorell A, Mugni H, Rodríguez P, Solange Vera M, do Nascimento M, Allende L, Bustingorry J, Escaray R, Ferraro M,Izaguirre I, Pizarro H, Bonetto C, Morris DP, Zagarese H. 2007. Effects of the herbicide Roundup on freshwater microbial communities: a mesocosm study. EcolAppl 17(8):2310-22.

[14]Introduction to Endocrine Disrupting Chemicals (EDCs) A Guide for Public Interest Organizations and Policy-Makers by Andrea C. Gore, PhD, David Crews, PhD, Loretta L. Doan, PhD, Michele La Merrill, PhD, MPH, Heather Patisaul, PhD, and Ami Zota, ScD, MS

[15]UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme, Nairobi.

[16]The Center for International Environmental Law (2017) *Fossils, Plastics, & Petrochemical Feedstocks,* Washington, DC

[17]World Economic Forum, (2016) The New Plastics Economy: Rethinking the future of plastics, Geneva, Switzerland.

to developing solutions. This approach needs to go beyond the downstream impacts of waste management and disposal to include the full lifecycle impacts and the upstream causes of ocean pollutants and plastic marine debris.

The failure of industries to eliminate toxic and hazardous substances from both production and manufacturing life cycles or redesign their products for future reuse, composting and recycling outcomes, has resulted in a legacy of toxic releases and plastic wastes to our oceans. This undermines both sustainable waste management and zero waste objectives, such as reuse, recycling and composting needed to meet the promise of a circular economy.

As well as participation in clean-up activities and improved waste management, public awareness, product redesign and detoxification of production systems are necessary. In addition, a decoupling of plastic production and manufacturing from the fossil fuel industry will contribute sustainable and effective upstream ways to address ocean pollutants and marine plastic debris.

IPEN Ocean Pollutant Working Group to develop options for action on marine pollutants.
IPEN representatives attended the *Break Free From Plastics* coalition meeting in Bali, Indonesia in July 2017. IPEN identified options for an international response to ocean pollutants and marine plastics including extending or adapting existing international agreements such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1989 and the Stockholm Convention on Persistent Organic Pollutants 2001. In 2017, researchers argued that micro-plastics fulfil the criteria for classification of pollutants as persistent organic pollutants under the Stockholm Convention.[18] Other options identified included utilizing UNEP Regional Centres more effectively, developing a new international instrument while also facilitating action through global agreements such as the Strategic Approach to International Chemicals Management (SAICM).

UN Environment Assembly 2017
The third Meeting of the UN Environment Assembly (UNEA3), from the 4th to 6th of December 2017 has, as its theme, *Towards a Pollution Free Planet* and will consider responses to address marine plastic pollution - including a process to develop a new legal instrument. Existing international agreements such as the UN *Convention on the Law of the Sea* (UNCLOS); *International Convention for the Prevention of Pollution From Ships* (MARPOL); and *London Dumping Convention* address marine pollution but largely ignore land-based sources of plastics, estimated to be responsible for the majority of plastic litter in oceans.[19]

[18] 'Tamara S. Galloway, Matthew Cole and Ceri Lewis, (2017) Interactions of microplastic debris throughout the marine ecosystem *Nature Ecology & Evolution*1, 0116, 2017
[19]Pritzker Environmental Law and Policy BRIEF NO. 5 | October 2013 Stemming the Tide of Plastic Marine Litter: A Global Action Agenda by Mark Gold, Katie Mika, Cara Horowitz, Megan Herzog, & Lara Leitner. (www.law.ucla.edu/emmett Pritzker Brief No. 5 | October 2013)

UNEA 3 resolution on Marine Litter and Microplastics

UNEA3 will consider a resolution submitted by Norway on Marine Litter and Microplastics. The draft resolution notes with concern, *"that marine litter and microplastics can contribute to the spreading of toxic chemicals/hazardous substances…harmful to ecosystems and human health."* The draft resolution also stresses that, *"prevention of marine litter is key."* The draft resolution calls on governments to fully implement all previous UNEA recommendations on marine litter and micro-plastics and consider regional reduction targets based on monitoring and assessment of the sources of marine litter and micro-plastics. As well as a number of other actions for countries to take, the resolution includes a proposal to establish an *Open-Ended Ad Hoc Working Group* to assess potential strategies to address the problem including consideration of a legally binding instrument. Their recommendations would be presented at the next UN Environment Assembly in 2019.

IPEN POs attending UNEA3 advocate for:

Increased support for current programs on marine pollution

Regardless of the decision on a new instrument, support is needed to expand and strengthen existing regional and international agreements by incorporating enforceable marine litter standards, closing loopholes, strengthening penalties and supporting improved monitoring and enforcement.

Relevant international marine-based and land-based voluntary frameworks include the Honolulu Strategy; Global Partnership on Marine Litter (GPML); Regional Seas Programme (RSP) and Global Programme of Action for the Protection of the Marine environment from Land-based Activities (GPA). There are also a range of regionally-focused agreements and directives which could be used to more quickly introduce bans on the most damaging types of plastic marine litter (e.g., microbeads, fish-egg-sized nurdles, single-use plastic bags, and polystyrene foam food packaging) and phase out plastics that are not recyclable.

To achieve the Sustainable Development Goal Target 14.1 which states, *"By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land based activities, including marine debris and nutrient pollution"*, increased support needs to be given to current ongoing programs including civil society campaigns for awareness-raising, prevention and clean-up, fishing and ocean certification systems as well as expanding extended producer responsibility programs.

Support for essential elements for legally binding instrument on marine plastics

To be effective, a new agreement would have to address far more than the end of life of plastics. It would need to:

- Focus on sustainable management of plastics throughout their lifecycle including design, production, use, recycling and disposal of plastics;
- Phase out EDCs and other toxic ingredients in plastic manufacture;
- Assist in building effective national collection and auditing recycling systems;

- Develop and implement extended producer responsibility schemes;
- Ban the most common or damaging types of plastic marine litter (e.g., microbeads, single-use plastic bags, and other single use items);
- Support the development of and transition to product substitutes;
- Develop criteria for product and material substitutes that incorporate and emphasize potential marine impacts;
- Incorporate strong monitoring, reporting and enforcement mechanisms;
- specify necessary steps to achieve agreed goals and review system;
- Research and funding to recover marine plastic debris;
- Identification and support for non-combustion treatment / destruction of contaminated plastics / unrecyclable plastics;
- Include multi-stakeholder partnerships with a multi sectoral scope;
- Adequate funding mechanism.

IPEN POs may also consider the following Draft IPEN Declaration on Marine Plastics and Ocean Pollutants

Draft Statement of IPEN Participating Organizations attending UNEA3
December 2017

The Participating Organizations of IPEN hereby stand in solidarity with the global community, including island and coastal residents, Indigenous Peoples, fisher folk, independent scientists, researchers, experts and civil society organizations, to demand an end to the pollution of our oceans and marine ecosystems from all different sources.

As IPEN Participating Organizations, we declare our firm resolve and our expanded commitment to work toward ensuring a reduction and elimination of ocean pollutants so that plastics production, consumption and disposal does not contaminate our environments, our oceans, our bodies and especially those of future generations.

Furthermore:

We welcome the global consensus that marine pollutants, including plastic wastes, are a serious threat to the marine ecosystem and that action is urgently needed to prevent and reduce all forms of marine pollutants entering our oceans.

We acknowledge ocean pollutants such as mercury, POPs and EDCs threaten the viability of all marine ecosystems and those communities who depend on them.

We recognize the immense global challenge we face to decouple plastic production from its petrochemical origins and the linear economic system that drives the generation of plastic waste and industrial pollution on land and in the marine environment.

We stress that production of plastic products comes with significant upstream and downstream impacts related to climate, sustainability, environmental health and justice and human rights.

We highlight the adverse health impacts related to the full life cycle of plastic production, particularly on vulnerable populations, such as women, children, and, through them, future generations, especially in developing and transition countries.

We acknowledge the well-established scientific evidence of the harm caused by plastic marine debris, chemical pollutants, microplastics and microfibres in seafood, which impact many communities dependent on fish and seafood as their primary source of protein and for their livelihoods.

We highlight the adverse impacts of toxic and hazardous chemicals used in plastic production on human health and the terrestrial and marine ecosystems globally.

We emphasize the need for cleaner production within the entire plastic production economy and the urgent need for industry to commit and act on the principles of sustainability, clean production and a circular economy.

We emphasize the need for effective, rigorous, transparent and accountable regulation of the plastics production industry for the protection of the terrestrial and marine environments, atmosphere, health and human rights of all citizens.

We emphasize the urgent need for a global reduction in the production of virgin plastic products and chemicals so as to uphold country commitments made under the Paris Agreement to reduce global CO2 emissions and address the threats posed by climate change.

We highlight with concern industry claims of a 10-fold projected increase in plastics production at this particular time when the global community is already struggling to address the adverse impacts of plastic marine debris and plastic pollution in our environment, food, air and bodies.

We acknowledge and support the existing international conventions and instruments that support and uphold human rights, sustainable development, toxics elimination and environmental protection.

We highlight the urgent need for increased monitoring and reporting of plastic pollution in our marine and terrestrial environments and in humans.

We call on the private sector to take responsibility to rigorously reduce production, use and releases of plastic, plastic products, single-use plastic and especially packaging; and to ensure contaminated plastics are not recycled or exported to developing countries where they may enter the recycling stream.

We recognize and reaffirm the precautionary principle and principles of right to know, intergenerational equity, environmental justice, polluter pays, and liability and compensation.

We are determined to take ongoing action to highlight the damage caused by ocean pollutants to human health and the environment and to foster international support for further national and global governance measures and instruments to reduce and eliminate all sources of plastic pollution, especially toxic and hazardous chemicals throughout the entire plastics economy.