The MONACO Declaration

Advancing Human Health & Well-Being by Preventing Ocean Pollution

On 2-3 December 2020, the Centre Scientifique de Monaco, the Prince Albert II de Monaco Fondation and Boston College convened the Monaco International Symposium on Human Health & the Ocean in a Changing World in partnership with the Government of the Principality of Monaco, the European Marine Board, the European Centre for Environment & Human Health, the French National Centre for Scientific Research (CNRS), the French National Institute for Ocean Science (IFREMER), the Mediterranean Science Commission (CIESM), the Monaco Oceanographic Institute, the Scripps Institution of Oceanography, the United Nations Environment Programme (UNEP), the Woods Hole Oceanographic Institution and the World Health Organization (WHO) under the High Patronage of H.S.H. Prince Albert II of Monaco.
Symposium participants presented comprehensive, up-to-date information on all forms of ocean pollution and their effects on human health. They examined trends and geographic patterns of ocean pollution and pollution-related disease. They proposed recommendations for the prevention and control of ocean pollution and the improvement of human health and well-being.

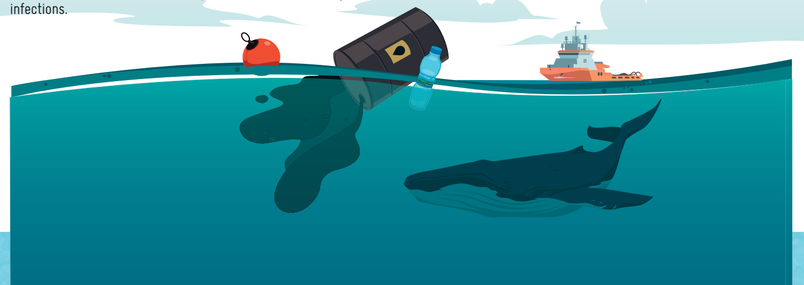
MAJOR CONCLUSIONS OF THE SYMPOSIUM ARE THESE:

A POLLUTION OF THE OCEANS IS WIDESPREAD, WORSENING, AND IN MANY PLACES POORLY CONTROLLED. HUMAN ACTIVITY THAT RELEASES UNWANTED WASTES INTO THE SEA IS THE MAJOR SOURCE.

- Ocean pollution is a complex mixture of plastic waste, toxic metals, manufactured chemicals, oil spills, urban and industrial wastes, pesticides, fertilizers, pharmaceutical waste, agricultural runoff and sewage.
- More than 80% arises from land-based sources.
- Chemical and plastic pollutants have become ubiquitous in the earth's oceans. They contaminate seas and marine organisms from the high Artic to the abyssal depths.

B OCEAN POLLUTION HAS MULTIPLE NEGATIVE IMPACTS ON HUMAN HEALTH AND WELL-BEING. THE MAGNITUDE, SEVERITY AND GEOGRAPHIC RANGES OF THESE EFFECTS ARE INCREASING.

- Petrochemicals and persistent organic pollutants (POPs) in the oceans threaten the marine microorganisms that produce much of the earth's oxygen supply.
- Mercury pollution of the oceans causes high levels of contamination in tuna and other widely eaten fish. When pregnant mothers eat mercury-contaminated fish, mercury enters their bodies and can damage their children's developing brains. The consequences are lifelong reductions in intelligence (IQ), developmental delays, and increased risk of attention deficit/ hyperactivity disorder (ADHD).
- Coal combustion in power plants and factories is the main source of marine mercury pollution. Gold mining is a second source.
- In adults, mercury pollution increases risk of cardiovascular disease and accelerates cognitive decline, thus increasing risk of dementia.
- Plastic microparticles and microfibers – the microscopic breakdown products of plastic pollution – persist in the oceans for years, enter the marine food web and concentrate in fish and shellfish consumed by humans
- Plastic microparticles carry multiple toxic chemicals– PCBs, phthalates, bisphenol A, brominated flame retardants, organophosphorus compounds, organotin compounds, and perfluorinated chemicals. When they enter the human body in plastic microparticles, these chemicals can reduce male fertility, increase risk of heart disease, disrupt endocrine signaling, depress immune function, and cause cancer.
- Agricultural runoff. Industrial waste and human sewage released into harbors and coastal waters trigger Harmful Algal Blooms (HABs), increase incidence of ciguatera fish poisoning and toxic shellfish poisoning, build antibiotic resistance, and accelerate the spread of life-threatening infections.



C OCEAN POLLUTION HAS MULTIPLE HARMFUL EFFECTS ON MARINE ECOSYSTEMS. CLIMATE CHANGE AND OCEAN ACIDIFICATION ARE EXACERBATING THESE EFFECTS.

- Plastic pollution kills seabirds, fish and marine mammals.
- Pharmaceutical waste, chemical pollution and sewage discharges damage fragile estuaries and mangrove swamps that are the nurseries of the sea.
- Chemical pollutants and pharmaceutical wastes destroy coral reefs.
- Increased absorption of carbon dioxide into the oceans – the direct consequence of fossil fuel combustion - results in ocean acidification. Ocean acidification destroys coral reefs, dissolves oysters, and dissolves calcium-containing plankton at the base of the marine food web.
- Pollution contributes to declines in fish stocks and threatens food security of millions.

D OCEAN POLLUTION IS DEEPLY UNJUST.

- Ocean pollution and all its impacts fall disproportionately on people in small island nations, indigenous communities in the far North, coastal communities in the Global South, and fishing communities worldwide -populations that create only miniscule amounts of pollution.
- This is environmental injustice on a global scale.

E OCEAN POLLUTION IS NOT WELL MAPPED.

- Current knowledge of ocean pollution and its impacts on human health is incomplete.
- Information on the geographic distribution and concentrations of pollutants in the oceans and on the sizes of the human populations exposed to ocean pollution is fragmentary and confined mostly to the seas that border high-income countries.
- Conference participants note that this lack of complete information provides no excuse for delaying action to control ocean pollution.

F THE GOOD NEWS: OCEAN POLLUTION CAN BE PREVENTED AND CONTROLLED.

- Like all forms of pollution, ocean pollution can be prevented and controlled.
- The key first step is to identify and control the land-based sources that account for 80% of ocean pollution
- Targeted, data-driven strategies based on law, policy, and technology and backed by strong enforcement are essential to achieve control.
- These strategies are highly effective and have achieved significant successes against ocean pollution.
- Polluted harbors have been cleaned, estuaries rejuvenated, and coral reefs restored.
- Interventions against ocean pollution are highly cost-effective. They have boosted economies, increased tourism, and restored fisheries. These benefits will last for centuries
- Prevention and control of ocean pollution have improved human health, prevented disease and extended longevity.

World leaders and global citizens who recognize the gravity of ocean pollution, acknowledge its growing dangers, engage civil society and the global public, and take bold, evidence-based action to stop pollution at source will be critical to preventing ocean pollution and safeguarding human health.

BOSTON COLLEGE

CSM CENTRE SCIENTIFIQUE DE MONACO

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A CALL FOR ACTION TO END OCEAN POLLUTION AND PROTECT HUMAN HEALTH AND WELL-BEING

Acting on the above Conclusions, the participants in the Monaco International Symposium on Human Health & the Ocean in a Changing World call upon leaders in all countries and all citizens of Earth to safeguard human health and to preserve the beautiful, but fragile planet that is our Common Home by taking the following science-based actions:

- Transition rapidly from fossil fuels to renewable energy: wind, solar, tidal and geothermal power.
- Prevent mercury pollution of the oceans by eliminating coal combustion and controlling industrial uses of mercury and point sources of mercury release.
- End plastic pollution of the oceans by reducing plastic production and imposing a global ban on production of single-use plastic.
- Reduce agricultural releases of nitrogen, phosphorus and animal waste; industrial discharges; and releases of human sewage into coastal waters.
- Promote effective waste management and recycling.
- Support robust monitoring of ocean pollution.
- Extend regional and international marine pollution control programs to all countries.
- Support research programs that increase knowledge of the extent, severity and humanhealth impacts of ocean pollution.
- Create, expand and safeguard Marine Protected Areas.

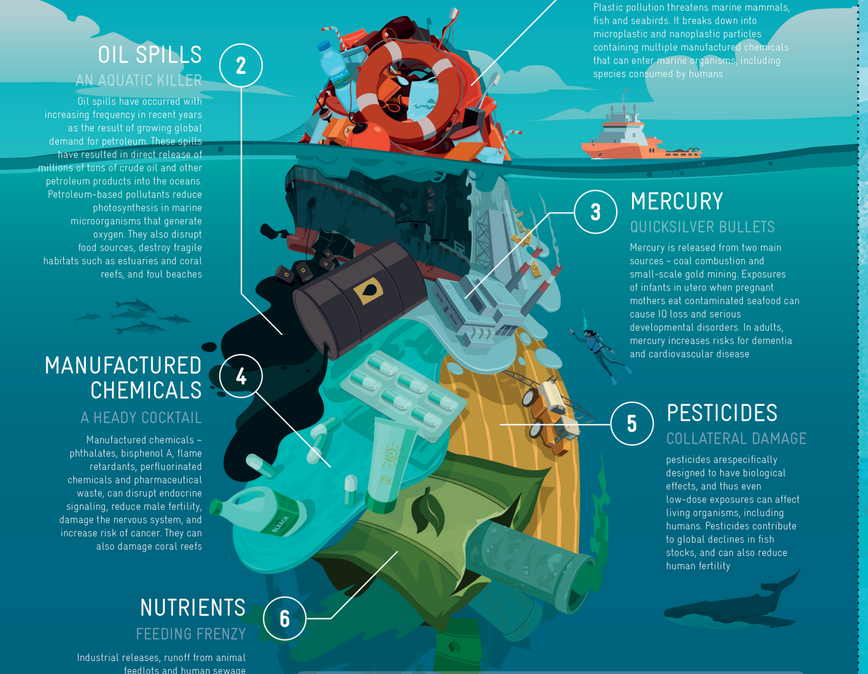
THE OCEAN POLLUTION-BERG

PLASTIC WASTE IS JUST THE TIP OF A LARGER PROBLEM

Pollution of the oceans is widespread, worsening, and in most countries poorly controlled. Human activities result in a complex mixture of substances entering the aquatic environment.

More than 80% arises from land-based sources

It reaches the oceans through rivers, runoff, atmospheric deposition and direct discharges. Ocean pollution has multiple negative impacts on ecosystems and human health, particularly in vulnerable populations



1 PLASTIC WASTE

THE TIP OF THE POLLUTION-BERG

Plastic is a rapidly increasing and highly visible component of ocean pollution. An estimated 10 million metric tons enter the seas each year. Plastic pollution threatens marine mammals, fish and seabirds. It breaks down into microplastic and nanoplastic particles containing multiple manufactured chemicals that can enter marine organisms, including species consumed by humans

2 OIL SPILLS

AN AQUATIC KILLER

Oil spills have occurred with increasing frequency in recent years as the result of growing global demand for petroleum. These spills have resulted in direct release of millions of tons of crude oil and other petroleum products into the oceans. Petroleum-based pollutants reduce photosynthesis in marine microorganisms that generate oxygen. They also disrupt food sources, destroy fragile habitats such as estuaries and coral reefs, and foul beaches

3 MERCURY

QUICKSILVER BULLETS

Mercury is released from two main sources - coal combustion and small-scale gold mining. Exposures of infants in utero when pregnant mothers eat contaminated seafood can cause IQ loss and serious developmental disorders. In adults, mercury increases risks for dementia and cardiovascular disease

4 MANUFACTURED CHEMICALS

A HEADY COCKTAIL

Manufactured chemicals – phthalates, bisphenol A, flame retardants, perfluorinated chemicals and pharmaceutical waste, can disrupt endocrine signaling, reduce male fertility, damage the nervous system, and increase risk of cancer. They can also damage coral reefs

5 PESTICIDES

COLLATERAL DAMAGE

pesticides arespecifically designed to have biological effects, and thus even low-dose exposures can affect living organisms, including humans. Pesticides contribute to global declines in fish stocks, and can also reduce human fertility

6 NUTRIENTS

FEEDING FRENZY

Industrial releases, runoff from animal feedlots and human sewage increase frequency and severity of harmful algal blooms (HABs), bacterial pollution and anti-microbial resistance.

THE WAY FORWARD

World leaders who take bold, evidence-based action to stop pollution at source will be critical to preventing ocean pollution and safeguarding human health. Measures such as these could help with the six problems:

1. Better management of plastic waste
   - Bans on single-use plastic
2. Wide-scale transition to renewable fuels
3. Banning mercury use
   - Eliminating coal combustion
4. Chemical control policies
   - Mandatory premarket toxicity testing
5. Bans on persistent organic pollutants (POPs)
   - Control of industrial discharges
6. Better treatment of sewage
   - Reduced applications of fertilizers

ALL
- Transition to a circular economy
- Building scientific capacity
- Embracing green chemistry
- Designation of Marine Protected Areas (MPAs)

FOR MORE INFORMATION, SEE THE FULL PAPER AT:
http://bit.ly/pollutionberg

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DESIGNED IN 2020 BY WILL STAHL-TIMMINS

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This statement was prepared by the members of the Monaco Commission on Ocean Pollution and Human Health, whose work was the subject of a special report published in the journal "Annals of Global Health" on 3 December 2020.

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The MONACO Declaration

Advancing Human Health & Well-Being by Preventing Ocean Pollution

Human health and its interactions with other issues is currently at the heart of many of our concerns: biodiversity, with zoonotic diseases such as the Coronavirus disease, the Oceans, whose situation poses so many risks.
Your discussions have demonstrated that human health is being affected more and more by the state of the oceans.
We know the consequences of the proliferation of micro-plastics, the effects of mercury and the damage caused by chemical pollution. We know that they derive primarily from land-based sources, that they are linked to our industrial and agricultural practices, to our excessive and haphazard use of plastic, to the lack of waste sorting and recycling infrastructure, and more generally to our dependance on hydrocarbons.
And we also know of course that it is vital to break away from all of this if we want to ensure ocean health more effectively – and in so doing, ensure the health of the human population.

H.S.H. Prince Albert II

THE FOLLOWING DECLARATION: "ADVANCING HUMAN HEALTH & WELL-BEING BY PREVENTING OCEAN POLLUTION" WAS ADOPTED IN THE CONCLUDING SESSION OF THE MONACO INTERNATIONAL SYMPOSIUM, "HUMAN HEALTH AND THE OCEAN IN A CHANGING WORLD" HELD IN MONACO ON DECEMBER 2-3, 2020 UNDER THE HIGH PATRONAGE OF H.S.H. PRINCE ALBERT II OF MONACO.

This Declaration summarizes the key findings and conclusions of the Monaco Commission on Human Health and Ocean Pollution.

It is based on the recognition that all life on Earth depends on the health of the seas. It presents a Call to Action -an urgent message addressed to leaders in all countries and to all citizens of Earth urging us to safeguard human health and preserve our Common Home by acting now to end pollution of the ocean.

The Declaration was endorsed by the scientists, physicians and global stakeholders who participated in the Symposium in-person in Monaco and virtually from around the world.