

# OCEANIC PLASTIC POLLUTION FROM FISHERIES



## INTRODUCTION

Over the past few years, plastic has become increasingly popular due to its cost-effectiveness, strength, moldability, and affordability. However, the widespread use and disposal of plastic have led to severe plastic pollution worldwide, which is a significant threat to the ecosystem, marine life, and the environment. One of the most concerning issues is plastic pollution in the oceans, where plastic already accounts for up to 85% of overall marine litter (Table 1: Plastic % in different Oceans). It's alarming to know that by 2050, the amount of plastic in the oceans will outweigh the number of fish. Therefore, it has become essential to take immediate action to address the issue of ocean plastic pollution.

Plastic pollution in the ocean comes from many sources, and one of the biggest culprits is the fishing industry. Every year, more

than 4.5 million metric tonnes of plastic waste from fishing is dumped into the ocean<sup>1</sup>. This plastic waste doesn't degrade but rather persists in the form of fragments. Fragments, larger than 5mm (macro plastics) may disintegrate and gradually break down into particles smaller than 5mm, called microplastics. Microplastics may further disintegrate into even smaller particles which are called nanoplastics (<100 nanometers). All three-macro, micro and nano plastics are extremely harmful to the ocean ecology, economy, and human health on exposure<sup>2</sup>.



'17% of the species ingesting or entangled in marine debris are classified as Near-threatened, Vulnerable, Endangered or Critically Endangered on the International Union for Conservation of Nature (IUCN) Red List'

Table 1 Plastic % in oceans around the world (Sharma et al., 2017<sup>3</sup>)

Location	Regions	Plastic (%)	Reference
<b>Atlantic Ocean</b>	North Sea	48.3	Galgani (2000)
	Channel East	84.6	Galgani (2000)
	Celtic Sea	29.5	Galgani (2000)
	Portuguese coast	43.8-91.7	Fries (2014)
<b>Baltic Sea</b>	Baltic Sea	35.7	Galgani (2000)
<b>Pacific Ocean</b>	North Pacific Central Gyre	98	Moore (2001)
	Waters around Australia	80	Reisser (2013)
	The South Pacific subtropical gyre	38.8	Enkson (2013a)
	NE Pacific Ocean	75	Desfanges (2014)
	South Sea of Korea	<10	Lee (2006)
<b>Mediterranean Sea</b>	Adriatic Sea	69.5	Galgani (2000)
	East Corsica	45.8	Galgani 2000
	Gulf Lion	70.5	Galgani (2000)
	Greece Gulfs	56	Koutsodendrakis et al (2008)

## MAIN SOURCES OF OCEAN PLASTIC POLLUTION FROM FISHERIES

Within fisheries, there are various plastic pollution sources. Some of the major ones have been discussed below.

### Fishing Gears

In the past two decades, fisheries have switched from traditional material gears to using plastic fishing gear to meet the increasing demand for seafood.<sup>4</sup> Plastic fishing gears like fishing nets, lines, traps, and pots, helped the sector boost catch productivity and became very popular for their cheaper prices. However,



'25 million pots and traps, nearly 80,000 square km of nets, nearly 740,000 km of monofilament longline, and more than 13 billion longline hooks, used for commercial fishing, are lost annually'<sup>vi</sup>.

once used, in the absence of any waste management system, these fishing gears are dumped into the sea and are termed as Abandoned, Lost, Discarded Fishing gear (ALDFG) or ghost gears. Every year, fisheries discard an astonishing 640,000 tonnes of ghost gears into the oceans, which shockingly make up almost half of the Great Pacific Garbage Patch<sup>5</sup>. According to Richardson et al (2019), globally, 5.7% of all fishing nets, 8.6% of all traps, and 29% of all lines used for commercial fishing are lost every year<sup>6</sup>.

'It is worrying that the amount of ALDFG lost from artisanal fisheries, recreational fishing, and illegal, unreported and unregulated (IUU) fishing is yet to be quantified'<sup>vi</sup>

### Fish Aggregating Devices (FADs)



Discarded FADs in the ocean<sup>7,8</sup>

Fish Aggregating Devices (FADs) are floating objects that help capture fish living in the upper layers of the water column<sup>9</sup>. The commonly used FADs include surface floats, purse seine nets, and circular nets, made from polyamide and polyethylene. While plastic FADs increase the catch volume, they also cause a massive amount of plastic pollution. It is reported that over 90% of FADs after fishing are dumped into the oceans, making FADs a threat to marine habitats and ecology<sup>10</sup>.

## MARICULTURE

Modern mariculture of bivalve molluscs and crustaceans uses equipment made of plastic. Molluscs (clams, oysters, mussels) are cultured using polyamide ropes, plastic frames, and containers by seafloor culture<sup>11</sup>. Once discarded these equipments also add to marine pollution.



Expanded Polystyrene used in mariculture<sup>12</sup>

Nearly all mariculture gears are also supported by plastic structures that keep them afloat. These structures are commonly made of polypropylene and EPS (expanded polystyrene)<sup>13</sup>. Studies have reported that plastic fragments from EPS formed up to 90% of microplastic samples from beach litter<sup>14</sup>

## Garbage Pollution by Fishing Ships

While fishing, vessels tend to discharge a significant amount of garbage, which mainly comprises plastic packaging, ropes, rubbish bags, and plastic bottles. Studies have revealed that ships only bring back a small portion of the garbage generated onboard due to the absence of proper storage and waste processing facilities<sup>15</sup>.

## IMPACTS

### Environmental

**Ghost gears** have been called the deadliest form of marine litter. The discarded plastic fishing gears continue to fish when dumped in the oceans, this phenomenon is called ghost fishing. When compared to traditional (non-plastic) gears, the ghost fishing rate of plastic gears is higher. This is extremely worrying as such ghost nets entangle all kinds of species, threatening critical and endangered species like turtles and dolphins<sup>16</sup>. Ghost gears have also been reported to damage critical habitats like coral reefs, ocean currents drag gears like gillnets that hit the coral reefs and physically damage them<sup>17</sup>. Moreover, such gears also increase microplastic pollution in oceans, many studies have shown that fish in such areas ingested microfilaments from gears being used in that fishing zone<sup>18</sup>. Increased microplastic pollution is extremely detrimental to marine animals, as they mistake microplastics for food and consume microplastics. Consuming microplastics deprives them of real nutrition and ultimately causes death by starvation. Microplastics also act as carriers of pathogenic microbes, that threaten marine organisms living in the habitat.



**'Abandoned, lost and discarded fishing gear is the deadliest form of marine plastic, experts say, threatening 66% marine animals including sea turtles and 50% of seabirds' -UNEP**

One of the most serious concerns from plastics in oceans is chemical pollution. When dumped into the oceans, chemicals that are used to manufacture plastic fishing gear can leach into the ocean. These chemicals include harmful flame retardants and additives like PTBD (polybrominated diphenyl ethers), BTBPE (1,2-Bis (2,4,6-tribromophenoxy) ethane and UV stabilizers<sup>19</sup>. These chemicals are potential endocrine disruptors and tend to accumulate in animal tissues leading to increased toxicity<sup>20</sup>.

### Human Health

Plastic fragments from fishing gears could lead to an increase in the overall plastic and microplastic contamination in the ocean<sup>21</sup>; on consumption of marine organisms, this could potentially increase human exposure to microplastics. It is estimated that on an average when a person eats seafood, they ingest around 1-30 particles of microplastics<sup>22</sup>. The ingested microplastics also contain many chemicals (used in fishing gears) that tend to accumulate in marine animal tissues upon leaching. When humans consume seafood, these chemicals are easily transferred from marine animals to human bodies. Though there are no established health studies yet on the impact of microplastics on human health, many of the chemicals in plastic are known

to be detrimental to human health causing infections, hepatitis stress and endocrine disruption<sup>23</sup>. More research is needed to understand the impact of microplastics on human health.

## Economical

Reports indicate that plastic litter in oceans causes an economic loss of around \$13 billion annually across the globe, including losses in revenue from fishery, tourism, and beach clean-up costs<sup>24</sup>. Studies have shown that up to 90% of organisms captured and killed by ghost gears are commercially viable

marine animals. The capture of commercial species by ghost gears can cause a decrease of 30% in catch volume and the incomes earned<sup>25</sup>. For example, ghost gears killed about 3.3 million blue crabs annually in the Chesapeake Bay and led to almost two thousand job losses<sup>26</sup>.

Ghost gears have also been reported to hamper ship navigation by entangling propellers. The cost of removal of gears from propeller is significant, making repair and shipping economically unfeasible.

## INITIATIVES TO ADDRESS OCEAN PLASTIC POLLUTION FROM FISHERIES

Marine plastic pollution is a critical global issue. Initiatives have been launched to address concerns, including those targeting the marine plastic pollution caused by the fishery sector.

### Global Initiatives

Region/Organisation	Instrument	Target
UNEP	Global Plastic Treaty	ALDFG and Microplastics
	Manila Declaration, 2012	Marine litter
	Regional Seas Programme and Global Programme of Action 2003	Marine litter
G20	Chennai High-Level Principles for a Sustainable and Resilient Blue/Ocean-based Economy	ALDFG and marine-based plastic litter
	G20 Marine Litter Action Plan 2017	Marine Litter
FAO	Voluntary Marking Scheme	ALDFG
UNEA	Resolutions	Microplastic and Marine litter from fisheries
United Nations Convention on the Law of the Sea 1982 Part XII (Articles 192–237) UNCLOS	Resolution	Marine Litter
International Maritime Organisation (IMO)	London Convention 1972	None
	London Convention 1996	Marine Litter from Fisheries

The United Nations Convention on the Law of the Sea (UNCLOS) is one of the most important conventions that addresses the problem of marine pollution. It states that the nations are responsible to “prevent, reduce and control pollution of the marine environment by dumping”. In June 2023, the UNCLOS was amended to incorporate the Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ). The BBNJ treaty ensures the governance of two-thirds of the world’s ungoverned oceans and safeguards ocean biodiversity from plastic pollution and unsustainable use.

The International Convention for the Prevention of Pollution from Ships (MARPOL) created by IMO, prohibits the discharge of fishing gears into the oceans (Annex V) and mandates marking of fishing gears. However, the MARPOL does not address plastic pollution by smaller vessels (< 100 gross tonnages) and accidental loss of fishing gear.

*‘The Global Plastic Treaty is also considering the issue of ghost gears. The Zero Draft from the second session recognises ghost gears as a concern and advocates for specific national plans (under part IV.1) for plastic fishing gears management’.*

## THE GHOST GEAR INITIATIVE

The Ghost Gear Initiative (GGI) is a multistakeholder alliance that aims to solve the issue of abandoned fishing gear worldwide. The alliance connects the fishing industry, the private sector, NGOs, academia and governments. GGI works to retrieve and mark dumped ghost gears along with creating a database to monitor abandoned fishing gears across twenty countries.

### Regional Initiatives

The European Union (EU) addresses the ocean plastic pollution under two directives: EU Marine Directive (2008) and EU Plastic Directive (2018). Both the directives target plastic pollution caused by ghost gears, establishing an Extended Producers Responsibility (EPR) system for fishing gears. While the Plastic Directive recognises microplastics as a threat, it does not specify steps to reduce the microplastics in the oceans.

Even in the North East Atlantic region, the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) focuses on researching issues related to ghost gears and microplastics, but so far, no steps have been recommended to curb plastic pollution by fisheries.

## RETRIEVING PLASTIC FISHING GEAR

In the Greek port of Keratsini, fishermen used to discard their old fishing nets into the sea. However, Enaleia, a non-profit organization, has taken the initiative to raise awareness and train the local fishermen to retrieve ghost gear using their fishing nets. These ghost gears are then collected and recycled to make new products. Enaleia has successfully collected over 770 tonnes of plastic and aims to collect 1000 tonnes of plastic by 2024.

## THE INDIAN SCENARIO

With a vast coastline of 8,118 km and access to 2.02  $km^2$  of exclusive economic zone, India supports a robust marine fishing economy. The total marine fish production was 3.72 million metric tonnes between 2019 and 2020<sup>27</sup>.

It is estimated that India dumps around 0.6 million tonnes of plastic waste into the oceans<sup>28</sup>. A significant fraction of the total plastic waste comes from fishing gear. For example, a diver's survey in the Gulf of Mannar region reported that approximately 49% of marine debris consisted of ghost gears<sup>29</sup>. Ghost gears

are also a threat to Olive Ridley turtles, reportedly a volunteer program removed more than 58 ghost nets to protect the endangered turtles. Ghost gear dumped from India flows with ocean currents and even threatens sea turtles in the Maldives<sup>30</sup>.

### National Marine Litter Policy Draft, 2018

In 2018, the Ministry of Earth Science and Technology introduced the National Marine Litter Policy aiming to reduce, reuse and recycle waste and build a monitoring and management system to tackle the issue of marine litter in India. The Ministry also joined the UN Clean Seas Campaign. Under its National Centre for Coastal Research (NCCR), the Ministry has conducted studies to quantify and assess the existing marine litter.

### The Blue Economy Draft (2022)

The Blue Economy draft aims to promote economic growth in India using marine resources. It does not deal specifically with plastic pollution caused by fisheries. According to the draft, India is committed to reduce plastic pollution through its Plastic Waste Management Rules and the Single-Use Plastic ban on select products. Further, the draft specifies that the Marine Litter Policy will address the issue of plastic pollution.

## UPCYCLING GHOST GEAR

Green Environmental Solutions collaborated with WWF, India in Visakhapatnam to reduce marine waste and protect marine wildlife. Together with the local fishing community, the organization collected approximately 1.5 tonnes of ghost gear, which were then upcycled into accessories such as bracelets, earrings, and bags.



Image credit: Umair Bin Habib / Olive Ridley Project

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### Links to access other Factsheets and Reports related to Plastics and Microplastics

- <https://toxicslink.org/publications/factsheet/microplastics-meandering-in-air-are-they-alarming>
- <https://toxicslink.org/publications/reports/single-use-plastic-ban-in-india>
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