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END PLASTIC POLLUTION:  
TOWARDS AN INTERNATIONAL  
LEGALLY BINDING INSTRUMENT

# THE IMPACT OF FISHING GEAR AS A DISTINCT SOURCE OF MARINE PLASTIC POLLUTION

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In March 2022, a historic resolution was adopted by the United Nations Environment Assembly (UNEA) to *End plastic pollution: towards an international legally binding instrument* (UNEA resolution 5/14), marking the first major effort to address plastic pollution globally. Tasked with ambitiously completing negotiations by the end of 2024, the Intergovernmental Negotiating Committee (INC) will develop the international legally binding instrument (ILBI) adopting a comprehensive approach to addressing plastic pollution, including in the marine environment, across the full life cycle of plastics.

The decision-making process will include four sessions of the INC in consultation with negotiators and interested parties, including the Global Ghost Gear Initiative (GGGI) and Ocean Conservancy, taking place through 2024 in various countries around the world. The INC consists of delegates from countries that are part of this multilateral process and a Bureau that provides guidance to the secretariat of the process.

Abandoned, lost and discarded fishing gear (ALDFG), being purposely designed to catch aquatic species, is pound for pound the most harmful form of marine debris to aquatic life<sup>1</sup>. Due to the majority of ALDFG being made of plastic, it is also a significant contributor to ocean plastic pollution, including microplastics. Recent studies indicate that ALDFG represents 46<sup>2</sup>–86%<sup>3</sup> of all floating macroplastics in the ocean gyres by weight. Its impacts on aquatic life and habitats are also quite distinct from other forms of marine plastic pollution (i.e. single use plastics). The existing international governance framework is inadequate to tackle the scourge of ALDFG.

Currently there is no formal, internationally binding agreement for the management of ALDFG and, due to its broad range of sources, deadly impact on marine life, and ability to destabilize fish stocks, addressing ALDFG necessitates being specifically addressed in the ILBI. Countries now have a unique opportunity to secure bold and meaningful measures to prevent, mitigate and remediate the impacts of ALDFG through the ILBI—preventing plastic pollution, safeguarding global food security, fisheries sustainability and the lives and livelihoods of those who depend on fishing.

The Global Ghost Gear Initiative, [hosted by Ocean Conservancy](#)<sup>4</sup>, is a cross-sectoral alliance committed to combatting ALDFG globally and believes a comprehensive ILBI *must* include actions related to lost fishing gear in order to truly fulfil its mandate to holistically address plastic pollution, including in the marine environment across the full life cycle of plastics. **As such, we propose that one of the core obligations to be considered by the committee for inclusion in the ILBI should be the reduction of abandoned, lost, or otherwise discarded fishing gear (ALDFG), commonly known as “ghost gear.”**

## FISHING GEAR AS A SOURCE OF MARINE PLASTIC POLLUTION

ALDFG has been described as the most harmful form of marine plastic debris<sup>5</sup>. Historic estimates have suggested that ALDFG makes up 10% of marine litter in the world’s ocean<sup>6</sup>, but recent surveys put this figure much higher, with fishing gear representing 20% of litter found on beaches in the North-East Atlantic<sup>7</sup>. Globally, an estimated

<sup>1</sup> Wilcox, C., Mallos, N.J., Leonard, G.H., Rodriguez, A. & Hardesty, B.D. 2016. Using expert elicitation to estimate the impacts of plastic pollution on marine wildlife. *Marine Policy*, 65: 107–114.

<sup>2</sup> Lebreton, L., Slat, B., Ferrari, F. *et al.* Evidence that the Great Pacific Garbage Patch is rapidly accumulating plastic. *Sci Rep* 8, 4666 (2018). <https://doi.org/10.1038/s41598-018-22939-w>

<sup>3</sup> Lebreton, Laurent & Royer, Sarah-Jeanne & Peytavin, Axel & Strietman, Wouter & Smeding-Zuurendonk, Ingeborg & Egger, Matthias. (2022). Industrialised fishing nations largely contribute to floating plastic pollution in the North Pacific subtropical gyre. *Scientific Reports*. 12. 10.1038/s41598-022-16529-0.

<sup>4</sup> <https://oceanconservancy.org/trash-free-seas/take-deep-dive/international-plastics-agreement/>.

<sup>5</sup> Wilcox, C., Mallos, N.J., Leonard, G.H., Rodriguez, A. & Hardesty, B.D. 2016. Using expert elicitation to estimate the impacts of plastic pollution on marine wildlife. *Marine Policy*, 65: 107–114.

<sup>6</sup> Macfadyen, G., Huntington, T. & Cappell, R. (2009). Abandoned, lost or otherwise discarded fishing gear. FAO Fisheries and Aquaculture Technical Paper 523

<sup>7</sup> OSPAR Beach Litter Assessment, 2021 (in draft)

5.7% of fishing nets, 8.6% of traps and pots, and 29% of fishing lines end up lost or abandoned in the marine environment annually<sup>8</sup>. Fish is a crucial form of animal protein in people's diets all over the world, and global fish consumption has risen 122% in the past 30 years<sup>9</sup>. Fishing is a major source of both nutrition and employment for people on almost every continent and crucial to sustaining the livelihoods of coastal communities. For the most part, fishing gear is a significant financial investment, and most fishers do not want to lose it. However, gear can enter the marine environment due to rough weather conditions, mechanical problems, human error, or gear snagging. Fishing gear can also be lost intentionally or unintentionally during on-board gear repairs, and can be deliberately discarded, either to conceal illegal, unreported, or unregulated (IUU) fishing or as a disposal method when gear reaches the end of its useful life and no other options—such as port side reception facilities—are available for fishers.

Plastics are also used extensively in aquaculture; for example, in cages (e.g., in the collars and nets themselves, as well as in feeding systems), in coastal fishponds (e.g., in pond liners), and in shellfish farming (e.g., in mussel socks, oyster spat collectors and mussel pegs). These plastics are susceptible to loss through extreme weather events, mismanagement of waste or deliberate discharge. Although global losses of plastics from aquaculture to the aquatic environment are probably lower in volume than from fishing<sup>10</sup>, aquaculture continues to grow worldwide, being

the fastest growing food producing sector with an expected growth of 37% by 2030 over 2016 rates<sup>11</sup>.

## WHY IS ALDFG A PROBLEM?

ALDFG impacts the marine environment primarily through 'ghost fishing,' whereby abandoned fishing gear continues to catch fish and other marine animals indiscriminately. In Australia alone, an estimated 1,500 sea lions die from becoming entangled in gillnets annually<sup>12</sup>. Marine mammals, birds, and reptiles caught in abandoned gear are all at risk, and 45% of all marine mammals on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species have been impacted by marine plastic litter and ALDFG through ingestion and/or entanglement<sup>13</sup>. A single abandoned net is estimated to kill on average 500,000 marine invertebrates, 1,700 fish, and 4 seabirds<sup>14</sup>. As ALDFG breaks down in the marine environment, it can cause further damage. Plastic degrades over decades, shedding microplastic fibres that are ingested by fish and other filter feeding organisms.

The economic impacts of ALDFG are considerable. In some places, researchers have identified that over 90% of the species caught in ghost gear are estimated to be commercially valuable, meaning that the impact of ALDFG is economic as well as environmental, impacting the sustainability of fisheries as well as their profits, as ghost fishing can greatly reduce their harvest<sup>15</sup>. Additionally, ALDFG costs governments and marine industries

<sup>8</sup> Richardson, K., Wilcox, C., Vince, J. & Hardesty, B.D. 2021. Challenges and misperceptions around global fishing gear loss estimates. *Marine Policy*, 129. <https://doi.org/10.1016/j.marpol.2021.104522>

<sup>9</sup> Food and Agriculture Organisation of the United Nations 2020 <https://www.fao.org/state-of-fisheries-aquaculture>.

<sup>10</sup> Huntington, T. 2019. Marine litter and aquaculture gear—white paper. Report produced by Poseidon Aquatic Resources Management Ltd. for the Aquaculture Stewardship Council. 20 pp. plus appendices. [https://www.ascaqua.org/wpcontent/uploads/2019/11/ASC\\_Marine-Litter-and-Aquaculture-Gear-November-2019.pdf](https://www.ascaqua.org/wpcontent/uploads/2019/11/ASC_Marine-Litter-and-Aquaculture-Gear-November-2019.pdf)

<sup>11</sup> FAO. 2020. The State of World Fisheries and Aquaculture 2020: Sustainability in Action. <https://doi.org/10.4060/ca9229en>

<sup>12</sup> Page, B., McKenzie, J., McIntosh, R., Baylis, A., Morrissey, A., Calvert, N., Haase, T., Berris, M., Dowie, D., Shaughnessy, P., Goldsworthy, S., 2014. Entanglement of Australian sea lions and New Zealand fur seals in lost fishing gear and other marine debris before and after Government and industry attempts to reduce the problem. *Marine Pollution Bulletin*. Volume 49, Issues 1–2.

<sup>13</sup> Werner, S., Budziak, A., van Franeker, J., Galgani, F., Hanke, G., Maes, T., Matiddi, M., Nilsson, P., Oosterbaan, L., Priestland, E., Thompson, R., Veiga, J. and Vlachogianni, T.; 2016; Harm caused by Marine Litter. MSFD GES TG Marine Litter—Thematic Report; JRC Technical report; EUR 28317 EN; doi:10.2788/690366

<sup>14</sup> Hardesty, B. D., Good, T. P., & Wilcox, C. (2015). Novel methods, new results and science-based solutions to tackle marine debris impacts on wildlife. *Ocean & Coastal Management*, 115, 4–9

<sup>15</sup> Al-Masroori, H., Al-Oufi, H., McIlwain, J.L. & McLean, E. 2004. Catches of lost fish traps (ghost fishing) from fishing grounds near Muscat, Sultanate of Oman. *Fisheries Research*, 69(3): 407–414. <https://doi.org/10.1016/j.fishres.2004.05.014>

hundreds of thousands of dollars annually in clean-up expenses and lost fishing time<sup>16</sup>.

ALDFG significantly hinders progress towards the United Nation's Sustainable Development Goal (SDG) 14, to conserve and sustainably use the oceans, seas, and marine resources for sustainable development, specifically adding to two of the five severe threats to our oceans identified: plastic pollution and fisheries collapse. In addition to supporting SDG 14, the successful management of marine litter, including ALDFG, also contributes to other SDGs. Addressing the adverse impacts of ghost fishing on potential catch, contributes to people's livelihoods (SDG 1: No poverty) and food security (SDG 2: Zero hunger). From a supply chain perspective, implementing good practices, circular economy principles and innovative gear design to mitigate the impact of fishing gear when it gets abandoned, lost or discarded will continue to support both SDG 12: Responsible Consumption and Production; and SDG 9: Innovation and Infrastructure.

## WHERE DOES ALDFG OCCUR?

ALDFG is a significant global issue. Wherever fishing takes place, gear can become abandoned, lost, or discarded. In the seas around the European Economic Area alone, an estimated 550,000 tonnes of debris from the fishing industry have accumulated since the 1950s with up to 12,000 tonnes being added to this number every year<sup>17</sup>. In the coastal waters of South Korea, 38,535 tonnes of gillnets are estimated to be lost every year<sup>18</sup>. On the uninhabited Henderson Island in the South Pacific, an expedition found 18 tonnes of plastic waste on just 2.5km of coast<sup>19</sup>. Of this, an estimated 60% was ALDFG, some originating

from New Zealand, roughly 5,000 kilometres away<sup>20</sup>. In the North Pacific Gyre, 46% of the plastic comes from fishing and shipping. It is estimated that there are between 20,000 and 50,000 tonnes of plastic nets, lines, and ropes in the area<sup>21</sup>.

## WHAT HAS BEEN DONE ABOUT IT?

Despite the global impact of ALDFG, there is currently no dedicated international instrument in place. Existing international regulatory frameworks are fragmented and often voluntary, with varying approaches in individual regions and nations (appendix 1). The most significant advance in mandatory measures has been the announcement by the Marine Environmental Protection Committee (MEPC) of the International Maritime Organization (IMO) announcing a mandatory goal-based requirement for the marking of fishing gear. The Global Ghost Gear Initiative will continue to work as part of the Clean Shipping Coalition at the IMO's Pollution Prevention and Response (PPR) subcommittee to help make draft amendments to MARPOL Annex V and the associated guidelines; and help develop a Circular to the MEPC to promote the use of fishing gear marking systems, internationally recognized guidelines, and technical support documents. The UN Food and Agriculture Organization's (FAO) Code of Conduct for Responsible Fisheries provides legal principles for responsible fishing on an international level, but it is a voluntary instrument and not globally enforced. This is also the case for the FAO's Guidelines for the Marking of Fishing Gear. UN SDG 14 aims to conserve marine resources and promote sustainable development, but its goals and

<sup>16</sup> Mouat, J., Lozano, R. L., and Bateson, H. Economic Impacts of Marine Litter. KIMO. September 2010. [http://www.kimointernational.org/wp/wp-content/uploads/2017/09/KIMO\\_Economic-Impacts-of-Marine-Litter.pdf](http://www.kimointernational.org/wp/wp-content/uploads/2017/09/KIMO_Economic-Impacts-of-Marine-Litter.pdf)

<sup>17</sup> OSPAR 2017 [https://www.noordzeeloket.nl/publish/pages/122125/a\\_review\\_of\\_marine\\_litter\\_management\\_practices\\_for\\_the\\_fishing\\_industry\\_in\\_the\\_north-east\\_atlantic.pdf](https://www.noordzeeloket.nl/publish/pages/122125/a_review_of_marine_litter_management_practices_for_the_fishing_industry_in_the_north-east_atlantic.pdf)

<sup>18</sup> Kim, S. G., Lee, W. I., & Moon, Y. (2014). The estimation of derelict fishing gear in the coastal waters of South Korea: Trap and gill-net fisheries. *Marine Policy*, 119–122.

<sup>19</sup> Lavers J, Bond A (2017). Significant anthropogenic debris on remote island. *Proceedings of the National Academy of Sciences*; 114: 6052–5. doi: 10.1073/pnas.1619818114

<sup>20</sup> Vance A, McGregor I (2019). Desert island dump: The shameful state of Henderson Island. *Stuff*, July 2019. <https://interactives.stuff.co.nz/2019/07/desert-island-dump/desert-island-dump-pointer.html>

<sup>21</sup> Lebreton, L., Slat, B., Ferrari, F., Sainte-Rose, B., Aitken, J., Marthouse, R., Hajbane, S., Cunsolo, S., Schwarz, A., Levivier, A., Noble, K., Debeljak, P., Maral, H., Schoeneich-Argent, R., Brambini, R., Reisser, J. (2018). Evidence that the Great Pacific Garbage Patch is rapidly accumulating plastic. *Sci. Rep.* 8, 1–15. <https://doi.org/10.1038/s41598-018-22939-w>

targets are not legally binding. The UN Fish Stocks Agreement requires states to implement gear marking schemes and minimise damage caused by lost fishing gear. However, implementation is fragmented since the responsibility falls on regional fishery management bodies.

Additionally, not all fish stocks are included in the agreement. Article 194 of the UNCLOS<sup>22</sup> requires state regulation of fishing gear, but this regulation is under national jurisdiction and not coordinated at a global or even regional level. The IMO's Action Plan to address marine plastic litter from ships provides support for addressing the issue, including sanctions against littering (including the discard of unwanted fishing gear). However, enforcing these sanctions requires the littering to be observed, which is rare. MARPOL<sup>23</sup> Annex V requires a written garbage management plan for ships larger than 100 gross tonnes, but many fishing vessels are far smaller than this.

Additionally, there are regional regulations such as the extended producer responsibility schemes for fishing gear being developed by the EU, which requires producers of fishing gear containing plastic to cover the cost of collection, transport, and treatment of end-of-life (EOL) gear for recycling as well as awareness raising costs. However, the practical implementations of this scheme are still being developed and they will not launch until January 2025.

Some individual nations have their own regulations, such as the US Marine Debris Act, which monitors, removes, and prevents marine debris through guidance and enforcement. There are also gear marking schemes in countries such as Portugal, Spain, Costa Rica, Namibia, Canada and Sri Lanka. In Iceland, a national fishing gear return scheme is in operation, where EOL gear is reused, refurbished or recycled, with an 80% success rate<sup>24</sup>. In the US, the California Fish & Game Code requires nets and lines to be marked and

losses to be reported, in addition to sanctions for failing to comply. In Puget Sound, Washington, the Northwest Straits Foundation and the Washington Department of Fish and Wildlife have developed a lost gear prevention and retrieval program which has been very successful.

Whilst progress has been made to date, it is evident that it has been largely piecemeal and, the presence of existing frameworks to manage fishing gear should not be a reason for inaction or lack of inclusion of ALDFG in the ILBI. Rather, the ILBI should compliment existing frameworks as would be the case for the other elements to be considered for inclusion for the ILBI.

## **HOW CAN THE INTERNATIONAL LEGALLY BINDING INSTRUMENT TO END PLASTIC POLLUTION ADVANCE THE ELIMINATION OF ALDFG?**

Regional and national approaches to best practices of the management of fishing gear have had some success, but the problem of ALDFG is a global issue and must be treated that way. Tackling the problem of marine litter from the fishing industry requires legislation that sets clear, ambitious global targets, as well as standards for monitoring and reporting, and clearly defined and enforceable obligations and responsibilities. These measures should be globally applicable, providing support mechanisms that consider the needs and capabilities of developing countries.

Broadly, three types of action can be taken against ALDFG: prevention, mitigation, and remediation. A combination of all three should be included in any global approach to tackle the issue, filtering down to regionally, nationally and locally appropriate action. There needs to be global recognition of the problem and collective action. Education and awareness raising on best practices for gear

<sup>22</sup> United Nations Convention on the Law of the Sea (UNCLOS)

<sup>23</sup> The International Convention for the Prevention of Pollution from Ships (MARPOL)

<sup>24</sup> OSPAR 2020. OSPAR scoping study on best practices for the design and recycling of fishing gear as a means to reduce quantities of fishing gear found as marine litter in the North-East Atlantic. Available: <https://www.ospar.org/documents?v=42718>

management and disposal is key. Projects in Nigeria and Myanmar and various countries in the Caribbean, facilitated by the GGGI, have found education on a local level is an effective tool in reducing the quantity of ALDFG in those areas. Practical preventative measures also include the implementation of gear management systems combined with fishing gear marking to reduce deliberate disposal at sea, extending producer responsibility for plastic fishing gear, providing adequate port reception facilities, zoning schemes, mandatory gear return, certification and eco-labels, and other fiscal incentives. Circular design of fishing gear is also a key action that can impact the quantity of ALDFG—developing global design standards for fishing gear to allow them to be recycled or reused at end-of-life, creating a global marketplace for collection and recycling of gear, and boosting coastal economies in developing nations by providing additional income streams.

Mitigating actions include using truly biodegradable<sup>25</sup> components to make fishing gear that will break down into benign biomass rather than petroleum-based microplastic, a clear framework for lost gear reporting, and ‘no fault’ reporting which has been shown to increase the reporting of lost gear. The only real remedial action is removal. This can be expensive, particularly in deep marine habitats. A combination of passively fished waste schemes on a global scale combined with hotspot clean-ups is recommended. Fishing-for-litter initiatives have the additional benefit of educating fishing communities on the harm that plastic pollution causes.

## WHAT CAN MEMBER STATES DO?

This paper has been prepared to demonstrate the significant contribution ALDFG plays in the broader issue of marine plastic pollution. In order to successfully combat marine plastic pollution, it

is essential to include ALDFG in the ILBI. It is clear that wherever fishing activity takes place, there is some degree of gear loss due to rough weather, snags beneath the surface, and interaction with other fishing gear and marine traffic. The impacts of ghost fishing, both ecological and economic, are accumulative and felt globally. The problem of marine litter from fishing and aquaculture industries is therefore a global issue that must be tackled with a coordinated global effort. **We urge member states to support the proposal that one of the core obligations to be considered by the committee for inclusion in the ILBI should be the reduction of ALDFG.** To support this proposal, the GGGI has developed a series of specific voluntary approaches and control measures for reducing ALDFG (appendix 2), which would contribute to building a truly robust ILBI to end plastic pollution and positively supports a comprehensive approach that addresses the full life cycles of plastics, including the marine environment, as called for by the Environment Assembly resolution 5/14.

In addition to supporting the inclusion of ALDFG in the ILBI, governments can become a member of the Global Ghost Gear Initiative (GGGI), joining a community focused on delivering evidence-based solutions to the problems of ALDFG, where research and best practices for the implementation of global regulations are shared.

As countries are defining their national positions through the INC process, we urge governments to consider specific measures to address ALDFG within the ILBI. The time to act is now. An ambitious and well-crafted ILBI could have a positive impact on the interlinked global environmental crises (climate, biodiversity loss, and plastic pollution) the world currently faces—all of which are also public health and environmental justice priorities. If we are to achieve this, ALDFG, the most harmful form of marine plastic pollution, *must* be included.

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<sup>25</sup> Biodegradable materials are only suitable for specific components of specific types of gear (e.g. escape hatches in lobster pots) and should not be seen as the solution for all ALDFG

# APPENDIX 1

## EXISTING INTERNATIONAL AND REGIONAL FRAMEWORKS IN PLACE FOR THE MANAGEMENT OF FISHING GEAR.

International	Key components
<p>International Convention for the Prevention of Pollution from Ships (1973) as modified by the Protocol of 1978 (MARPOL 73/78), Annex V (Regulations for the Prevention of Pollution by Garbage from Ships)</p>	<ul style="list-style-type: none"> <li>• Administered by the International Maritime Organization (IMO).</li> <li>• The Convention includes regulations aimed at preventing and minimizing pollution from ships—both accidental pollution and that from routine operations—and currently includes six technical Annexes. Special Areas with strict controls on operational discharges are included in most Annexes.</li> <li>• MARPOL Annex V generally prohibits the discharge of all plastics and other garbage into the sea, including but not limited to synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator ashes from plastic products.</li> </ul>
<p>United Nations Convention of the Law of the Sea of 10 December 1982 (UNCLOS)</p>	<ul style="list-style-type: none"> <li>• The basic objective of UNCLOS is to establish a universally accepted, just and equitable legal order, or “Constitution” for the oceans, which lessens the risk of international conflict and enhances peace and stability in the international community.</li> <li>• UNCLOS is relevant to ALDFG because it confers the right upon States to regulate the issue of ALDFG within their national legislation.</li> </ul>
<p>Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. The 2005 United Nations Fish Stocks Agreement (UNFSA).</p>	<ul style="list-style-type: none"> <li>• UNFSA is one of two implementing agreements adopted pursuant to UNCLOS; it is concerned with the conservation and exploitation of highly migratory fish species and straddling stocks.</li> <li>• It contains a reference to “lost or abandoned gear” in its article 5, which sets out general principles for coastal States and States fishing in the high seas.</li> </ul>

International	Key components
<p>Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, 2009 (PSMA)</p>	<ul style="list-style-type: none"> <li>• To prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing through the adoption and implementation of effective port state measures.</li> <li>• Does not refer to ALDFG, but includes fishing gear and their markings as an element of the Port State inspections procedures.</li> </ul>
<p>Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention), modernized as the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Protocol)</p>	<ul style="list-style-type: none"> <li>• London Convention: <ul style="list-style-type: none"> <li>– promotes the effective control of all sources of marine pollution;</li> <li>– take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. This includes the (deliberate) disposal at sea of “persistent plastics and other persistent synthetic materials” (e.g. netting and ropes).</li> </ul> </li> <li>• London Protocol: <ul style="list-style-type: none"> <li>– all dumping is prohibited, except for possibly acceptable wastes on the “reverse list”.</li> </ul> </li> </ul>
<p>FAO Code of Conduct for Responsible Fisheries, 1995 (CCRF)</p>	<ul style="list-style-type: none"> <li>• Voluntary guidelines</li> <li>• Sets out principles and international standards of behaviour for responsible practices with a view to ensuring the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity.</li> <li>• Contains a number of references to ALDFG within sections 7.2 on Management Objectives, 7.6 Management Measures and 8.4 Fishing Operations.</li> </ul>
<p>International Guidelines on Bycatch Management and Reduction of Discards, 2011</p>	<ul style="list-style-type: none"> <li>• Voluntary guidelines providing a reference instrument to help States and RFMO/As formulate and implement appropriate measures for the management of bycatch, and reduce discards in all fisheries and regions of the world.</li> <li>• Contain a number of references to ghost fishing.</li> </ul>
<p>FAO Voluntary Guidelines on the Marking of Fishing Gear, 2019 (VGMFG)</p>	<ul style="list-style-type: none"> <li>• Voluntary guidelines to contribute to sustainable fisheries, improve the state of the marine environment, and enhance safety at sea by combatting, minimizing and eliminating ALDFG and facilitating the identification and recovery of such gear.</li> </ul>



Regional	Key components
European Union's Common Fisheries Policy (CFP)	<ul style="list-style-type: none"> <li>• Legislation governing the management of fishing fleets and the conservation of fish stocks in the European Union (EU).</li> <li>• Policies are translated into associated mandates in the form of EC Council Regulations (binding) and directives (goals that countries must achieve).</li> <li>• Directive on Port Reception Facilities for the Delivery of Waste from Ships (2019/883; PRF Directive), which requires that all European Union ports provide reception facilities for the waste generated by all seagoing vessels. Follows MARPOL requirements but focuses more on ports than vessels. Upon adoption of the directive, Member States have two years to ensure their national laws comply.</li> </ul>
Regional fishery bodies (RFBs) <ul style="list-style-type: none"> <li>• regional fisheries management organisations (RFMOs)</li> <li>• regional fisheries advisory bodies (RFABs)</li> </ul>	<ul style="list-style-type: none"> <li>• International bodies consisting of nations that share a practical and/or financial interest in managing fish stocks in a specific geographic area.</li> <li>• RFMOs can adopt resolutions, recommendations and conservation and management measures (CMMs) that obligate parties to consider or take implementing actions.</li> <li>• RFABs are purely advisory, providing advice to members on fisheries conservation and management. In contrast with RFMOs, RFABs do not have the authority to adopt binding measures.</li> </ul>
UNEP's Regional Seas Programme	<ul style="list-style-type: none"> <li>• Has played an increasingly important role in recent years, developing programmes and action plans to combat marine litter, including ALDFG.</li> </ul>

## APPENDIX 2

# POTENTIAL OPTIONS PROPOSED BY THE GLOBAL GHOST GEAR INITIATIVE<sup>®</sup> FOR THE REDUCTION OF FISHING GEAR TO BE INCLUDED AS A CORE OBLIGATION IN THE INTERNATIONAL LEGALLY BINDING INSTRUMENT TO END PLASTIC POLLUTION, INCLUDING IN THE MARINE ENVIRONMENT.

**The Global Ghost Gear Initiative<sup>®</sup> (GGGI) proposes that one of the core obligations to be considered by the committee for inclusion in the International Legally Binding Instrument to End Plastic Pollution (ILBI) should be the reduction of abandoned, lost, or otherwise discarded fishing gear (ALDFG), commonly known as “ghost gear.”**

ALDFG is the deadliest form of aquatic pollution, with causes, impacts and potential solutions being significantly different from other forms of plastic debris, and which vary significantly by local and regional contexts. Being predominantly made of plastic, ALDFG also contributes to the proliferation of microplastics in the environment. As such, in order for the ILBI to be based on a comprehensive approach that addresses the full life cycle of plastics as called for by Environment Assembly 5/14, the committee may wish to consider the inclusion of specific control measures and voluntary approaches aimed specifically to reduce ALDFG.

To holistically address ALDFG and its myriad causes and impacts in a global context, a hybrid binding and non-binding approach, (i.e. specific binding control measures/legislation and voluntary

elements in national action plans), should be established. The existing international governance framework is inadequate to tackle the scourge of ALDFG. To carry out this work, we must ensure coherent and interlinked international, regional and national regulations and actions. To this end, the current negotiations for an ILBI present a once in a lifetime opportunity to incorporate specific language around preventing and mitigating the impacts of ALDFG at a global level, similar to that proposed for microplastics in UNEP’s options paper (UNEP/PP/INC.2/4<sup>1</sup>). The ILBI could serve as a single umbrella where a comprehensive body of work to address ALDFG could be discussed and would promote measures across the full lifecycle of fishing gear.

The below recommendations are suggestions for countries to consider during their negotiations that apply a combined approach of both mandatory international commitments and voluntary national actions, both of which are critical to address the full lifecycle of plastics in fishing gear in developing an international legally binding instrument on plastic pollution, including the **marine**

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<sup>1</sup> Potential options for elements towards an international legally binding instrument, based on a comprehensive approach that addresses the full life cycle of plastics as called for by the United Nations Environment Assembly resolution 5/14 (UNEP/PP/INC.2/4)



Photo credit: © Shin Arunrugstichai

**environment.** For this to be effective, binding control measures and voluntary commitments must address ALDFG across prevention, remediation, and mitigation strategies. The below recommendations are organized by those concerning wild capture fisheries and aquaculture respectively, with specific recommendations across various stakeholder groups within each. We recognize that the ILBI itself will provide control measures and voluntary approaches for Member States specifically (as opposed to other stakeholders such as private sector companies, academia, etc. as listed below), but the intent of this document is to provide guidance to Member

States about how they could include measures for these specific groups to prevent, mitigate and remediate ALDFG within the context of the ILBI. Where applicable, we have identified the possible core obligations<sup>2</sup> that would be complimented by each proposed recommendation within the chart.

The GGGI recommends that the Member States encourage the committee to consider including the reduction of ALDFG as a core obligation in the ILBI. As such, we recommend specific voluntary approaches (left column) and control measures (right column) measures for reducing ALDFG aimed at the stakeholder groups referenced in the chart below.

<sup>2</sup> Potential options for elements towards an international legally binding instrument, based on a comprehensive approach that addresses the full life cycle of plastics as called for by the United Nations Environment Assembly resolution 5/14 (UNEP/PP/INC.2/4)

Wild Capture Fisheries	
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)
<b>Gear designers, manufacturers, retailers</b>	<p><b>V1:</b> Facilitate and promote fishing gear recycling and responsible disposal including buy-back of old gear for reconditioning or recycling into new fishing gear (<i>compliments possible core obligations No. 5 strengthening waste management; No. 7 encouraging reduce, reuse and repair of plastic products and packaging</i>).</p> <p><b>V2:</b> Work with management authorities to assist in tracing the origin and ownership of recovered fishing gear to directly support mandatory gear loss reporting (<i>compliments additional matter No. 4 cooperation &amp; coordination</i>).</p>
	<p><b>M1:</b> Member states should mandate that gear designers, manufacturers and retailers ensure gear components have built-in traceability where practical and where realistically feasible, based on an industry-wide code of practice including manufacturer name, year of manufacture, type of product and production batch of key gear components, e.g., ropes, net panels, traps etc. Where feasible, these gear traceability systems should be linked to standard record-keeping practices of commercial transactions and in the occurrence that retailers of fishing gear are different to the manufacturer, batch numbers should be included in all appropriate record keeping (<i>compliments possible core obligations No. 2 banning, phasing out and/or reducing the use of problematic and avoidable plastic products; No. 3 banning, phasing out and/or reducing the production, consumption and use of chemicals and polymers of concern; No. 6 fostering design for circularity; No. 7 encouraging reduce, reuse and repair of plastic products and packaging; No. 8 promoting the use of safe, sustainable alternatives and substitutes</i>).</p> <p><b>M2:</b> The ILBI should include design and labelling standards based on international best practices and on the latest technology available for gear designers, manufacturers and retailers to implement. These standards should be included to support research and development of both materials and gear design to disable fishing gear after control is lost. This fishing gear should be designed to stop fishing after control is irretrievably lost, e.g., escape hatches in traps and pots, and through the use of truly marine biodegradable/compostable materials that will break down into biomass not petroleum-based microplastic. These should also retain as much as possible the catching effectiveness of traditional equipment and be both practical and cost effective (<i>compliments possible core obligations No. 2 banning, phasing out and/or reducing the use of problematic and avoidable plastic products; No. 3 banning, phasing out and/or reducing the production, consumption and use of chemicals and polymers of concern; No. 6 fostering design for circularity; No. 7 encouraging reduce, reuse and repair of plastic products and packaging</i>).</p>

Wild Capture Fisheries	
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)
<p><b>Fishers, vessel operators</b></p> <p><b>V3:</b> In order to reduce the risk of gear loss or abandonment. Fishers and vessel operators should avoid high-risk areas/ situations, use well-maintained fishing gear, and minimize the amount of gear set/duration of set gear (<i>compliments possible core obligation No. 9 eliminating the release and emission of plastics into the water, soil and air</i>).</p> <p><b>V4:</b> Adjust fishing methods to prevailing conditions to reduce the risk of gear loss, e.g., shorter soak time, etc. (<i>compliments possible core obligation No. 9 eliminating the release and emission of plastics into the water, soil and air</i>).</p> <p><b>V5:</b> Governments should subsidize courses for training and awareness-building for fishers and vessel operators in good practice and responsible fishing. Examples include British Columbia’s government <a href="#">scheme</a> and <a href="#">FishSafe BC</a> (<i>compliments additional matter No. 1 awareness-raising &amp; education</i>).</p> <p><b>V6:</b> Best practical recovery (and subsequent reporting) of ALDFG, its transport to shore and its subsequent responsible disposal (<i>compliments possible core obligation No. 10 addressing existing plastic pollution</i>).</p>	<p><b>M3:</b> Fishers and vessel operators are required to clearly mark and provide identification of fishing gear and its main components in accordance with the amendments made under MARPOL Annex V for the mandatory marking of fishing gear. As such, the marking of fishing gear should be a condition of any authorization to fish, as should the reporting of gear loss (<i>compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air</i>).</p> <p><b>M4:</b> Provide means for the responsible disposal of end-of-life fishing gear and other potential aquatic litter to strengthen existing frameworks such as EU’s plastics strategy and the EU Directive on port reception facilities in addition to the provision of adequate port reception facilities for the disposal of fishing gear in accordance with MARPOL Annex V (<i>compliments possible core obligation No. 5 strengthening waste management; No. 9 eliminating the release and emission of plastics into the water, soil and air; additional matter No. 4 cooperation &amp; coordination</i>).</p> <p><b>M5:</b> Fishers and vessel operators should be required to report lost or abandoned fishing gear under national reporting schemes. As such, countries should establish appropriate gear loss reporting regimes, such as those stipulated by MARPOL and the London Convention. A few countries have implemented such mandatory national reporting schemes which can serve as examples of best practices for implementation (<i>compliments possible core obligation No. 10 addressing existing plastic pollution; additional matter No. 4 cooperation &amp; coordination</i>).</p>

Wild Capture Fisheries		
Voluntary Measures to include in National Plans of Action (non-binding)		
	Mandatory Control Measures (binding)	
<b>Fisheries control agencies</b>	<p><b>V7:</b> A combination of intelligence-based information and risk assessment should be used by fishery control agencies to identify IUU fishing hotspots and to predict where illegally-placed gear and gear lost through resulting gear conflict might occur. This can be used for both anti-IUU fishing operations as well as focused ALDFG clean-up operations.</p>	<p><b>M6:</b> The relevant authority should consider fair and reasonable penalties or sanctions for noncompliance with the various requirements of fishing gear marking and identification systems.</p>
<b>Fisheries organisations</b>	<p><b>V8:</b> Work with the fishers and other competent authorities in establishing marine spatial planning tools to minimize gear conflict (<i>compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air</i>).</p>	<p><b>M7:</b> Development of means and mechanisms to comply with MARPOL Annex V, in conjunction with regulatory bodies and fisheries managers where appropriate.</p> <p><b>M8:</b> Member states should liaise with third party seafood certification bodies to address management and information requirements for reducing ghost fishing and the impacts of ALDFG on aquatic fauna, flora and habitats including the labelling and use of standards to certify their good fishing gear practices (<i>compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air</i>).</p>
<b>Port Operators</b>	<p><b>V9:</b> Port operators should include end-of-life fishing gear into Port Waste Management Plans where appropriate. They should also develop agreements with both local gear manufacturers and recycling businesses to maximize opportunities for the cost-effective and environmentally responsible disposal of landed waste and foster information exchange with IMO's Port Reception Facility (PRF) database and the GGGI global data portal to ensure that specialist reception facilities are easily located (<i>compliments possible core obligation No. 5 strengthening waste management</i>).</p>	

Wild Capture Fisheries	
Voluntary Measures to include in National Plans of Action (non-binding)	
	Mandatory Control Measures (binding)
<p><b>Fisheries and aquatic environment research</b></p>	<p><b>V10:</b> Support research and development of low-cost gear marking, identification and traceability technologies and the development of improved low carbon power generation technologies and energy efficient lighting and communication solutions for fishing gear and gear marking systems (<i>compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air; additional matter No. 5 research</i>).</p> <p><b>V11:</b> Adhere to standard definitions and methodologies for ALDFG data collection, based on GGGI data card.</p>
<p><b>Seafood ecolabel standards and certificate holders</b></p>	<p><b>V12:</b> Recognition of fisheries that participate in programs that recover ALDFG and other aquatic litter (<i>compliments possible core obligation No. 10 addressing existing plastic pollution</i>).</p>

## Wild Capture Fisheries

Voluntary Measures to include in National Plans of Action (non-binding)		Mandatory Control Measures (binding)
<b>Seafood businesses</b>	<p><b>V13:</b> Seafood businesses should require their suppliers to conform with best practice as promoted through GGGI BPFs or applicable local legislation to the same effect.</p> <p><b>V14:</b> Businesses should where possible participate in providing an alternate, less costly means of end-of-life fishing gear disposal to actively incentivize the retrieval of lost nets and their proper disposal (e.g., by supporting harbors/ports by providing disposal facilities, buyback schemes or reuse/recycling initiatives through their supply chain) <i>(compliments possible core obligation No. 7 encouraging reduce, reuse and repair of plastic products and packaging).</i></p>	
<b>NGOs</b>	<p><b>V15:</b> Identify, catalyze funding for and where appropriate manage and implement remediation projects for end-of-life fishing gear removal and fisheries-related aquatic litter recycling <i>(compliments possible core obligation No. 10 addressing existing plastic pollution).</i></p>	
<b>International development and funding agencies</b>	<p><b>V16:</b> Develop and promote best practice and proven technologies that reduce the incidence and impact of ALDFG.</p>	<p><b>M9:</b> Member states should use evidence-based management and regulation of fisheries to prevent ALDFG and support proposed actions embedded in a coherent policy and action framework with an agreed roadmap <i>(compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air).</i></p>



Wild Capture Fisheries	
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)
<p><b>Municipality councils and authorities</b></p> <p><b>V17:</b> Municipality councils and authorities should ensure local fishers and members of the public are educated about the ghost gear issue. In order to mitigate and remediate the impacts of lost gear, they should:</p> <ul style="list-style-type: none"> <li>• promote reporting of ALDFG by the community via the GGGI Ghost Gear Reporter App;</li> <li>• support fisher-led gear/debris retrieval programs in accordance with local laws, such as <a href="#">Fishing for Litter</a>;</li> <li>• liaise with local fishing ports to promote gear retrieval ahead of extreme weather events.</li> </ul> <p><i>(compliments possible core obligations No. 7 encouraging reduce, reuse and repair of plastic products and packaging; No. 9 eliminating the release and emission of plastics to water, soil and air; No. 10 addressing existing plastic pollution; additional matters No. 1 awareness raising and education).</i></p>	

Aquaculture	
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Aquaculture equipment gear designers, manufacturers and installers</b></p> <p><b>V1:</b> Ensure deployed gear, particularly in offshore aquaculture facilities, is designed to reduce and ease maintenance needs and improve equipment reliability within clearly stated specifications.</p> <p><b>V2:</b> Support development and introduction of new materials that are simple to reuse, disassemble and recycle. Collaborate with aquaculture operators, industry organizations and researchers to test and improve equipment design and materials (<i>compliments possible core obligation No 8 promoting the use of safe, sustainable alternatives and substitutes</i>).</p> <p><b>V3:</b> Facilitate and promote aquaculture equipment recycling and responsible disposal where possible. Consider EPR to add the environmental costs associated with a product throughout the product life cycle to the value chain. Where EPR for fishing gear has been implemented successfully, share best practices and lessons learned with other countries to encourage further adoption (<i>compliments possible core obligation No. 5 strengthening waste management; No 7 encouraging reduce, reuse and repair of plastic products and packaging; No 8 promoting the use of safe, sustainable alternatives and substitutes</i>).</p>	<p><b>M1:</b> Build in traceability for equipment and components where practical, based on an industry-wide Code of Practice whilst recognizing the interaction required with research and development in areas where the technology doesn't yet exist. Gear traceability systems should be linked to standard record-keeping practices of commercial transactions. Retailers of aquaculture equipment, if different from the manufacturer, should include batch numbers in their record keeping. All records should be made available to relevant local/national authorities (<i>compliments possible core obligations No. 2 banning, phasing out and/or reducing the use of problematic and avoidable plastic products; No. 3 banning, phasing out and/or reducing the production, consumption and use of chemicals and polymers of concern; No. 6 fostering design for circularity; No. 7 encouraging reduce, reuse and repair of plastic products and packaging; No. 8 promoting the use of safe, sustainable alternatives and substitutes</i>).</p> <p><b>M2:</b> Require effective, integrated, and cost-efficient equipment marking and lighting systems for aquaculture gear. And require appropriate gear marking for offshore aquaculture gear and trace the origin and ownership of recovered aquaculture equipment (<i>compliments possible core obligation No. eliminating the release and emission of plastics to water, soil and air</i>).</p>

Aquaculture	
Voluntary Measures to include in National Plans of Action (non-binding)	
	Mandatory Control Measures (binding)
<p><b>Aquaculture producer associations</b></p>	<p><b>M3:</b> Develop reporting protocols for reporting the loss or abandonment of aquaculture facilities and/ or their components and develop recovery procedures (<i>compliments possible core obligation No. 10 addressing existing plastic pollution</i>).</p>
<p><b>Harbor and port operators</b></p>	<p><b>V4:</b> For ports servicing offshore aquaculture operations, provide affordable facilities for the landing and, where appropriate, temporary storage of redundant, end-of-life or recovered aquaculture equipment. This may require public funding to ensure affordability (<i>compliments possible core obligations No. 5 strengthening waste management; No. 9 eliminating the release and emission of plastics to water, soil and air</i>).</p> <p><b>V5:</b> Exchange information with IMO’s Port Reception Facility (PRF) database to ensure that specialist reception facilities are easily located (<i>compliments possible core obligations No. 5 strengthening waste management</i>).</p>

Aquaculture	
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)
<p style="text-align: center;"><b>Aquaculture operators</b></p> <p><b>V6:</b> Ensure that farm operations are risk-assessed to allow for proportionate, targeted and effective approaches to aquaculture facility management to avoid loss of gear and other plastic waste (<i>compliments possible core obligation No. 9 eliminate the release and emission of plastics to water, soil and air</i>).</p> <p><b>V7:</b> Require development of corporate policies for the use and disposal of solid, nonbiological waste and to ensure that facilities are well-managed so that equipment loss from accidents and negligent third-party actions or force majeure are minimized (<i>compliments possible core obligation No. 5 strengthening waste management</i>).</p> <p><b>V8:</b> Encourage or require aquaculture operators to participate in debris reporting schemes to ensure that damage to the environment and risks to safe navigation are minimized (<i>compliments possible core obligation No. 10 addressing existing plastic pollution</i>).</p> <p><b>V9:</b> Prepare and develop standard operating procedures (SOPs) for locating, tracking and recovering lost equipment and other debris from farming operations (<i>compliments possible core obligation No. 10 addressing existing plastic pollution</i>).</p>	<p><b>M4:</b> Ensure that a circular approach is taken from farm (particularly offshore) design and construction to operation and end-of-life decommissioning (<i>compliments possible core obligation No. 6 fostering design for circularity</i>).</p> <p><b>M5:</b> Require aquaculture operators to establish contingency plans to minimize infrastructure loss due to extreme weather or other events threatening farm infrastructure (<i>compliments possible core obligation No. 9 eliminate the release and emission of plastics to water, soil and air</i>).</p>

Aquaculture		
Voluntary Measures to include in National Plans of Action (non-binding)		
	Mandatory Control Measures (binding)	
<p><b>Aquaculture producer associations</b></p>	<p><b>V10:</b> Encourage or require the development of Codes of Practice on behalf of aquaculture operators to facilitate and encourage responsible farming operation, cooperation among operators and end-of-life equipment/solid waste management (<i>compliments possible core obligation No. 5 strengthening waste management; No. 9 eliminating the release and emission of plastics to water, soil and air</i>).</p>	<p><b>M6:</b> As the use of offshore facilities and vessel-based aquaculture increases, develop means and mechanisms to comply with MARPOL's Annex V, in conjunction with regulatory bodies where appropriate (<i>compliments additional matter No. 4 cooperation &amp; coordination</i>).</p>
<p><b>Aquaculture sector managers and regulators</b></p>	<p><b>V11:</b> Provide public sector financial support to address common issues through research and development (R&amp;D), infrastructure development, lost equipment reporting and monitoring, etc.</p> <p><b>V12:</b> Partner or collaborate with appropriate organizations, NGOs, commercial entities and/or other national governments to fully recognize the potential threat of aquaculture derived debris to the aquatic environment and its users (<i>compliments additional matter No. 5 stakeholder engagement</i>).</p>	<p><b>M7:</b> Develop national/regional standards for aquaculture site surveys, risk analyses, design, dimensioning, production, installation and operation.</p> <p><b>M8:</b> Include aquaculture facility decommissioning responsibilities into site and operator licensing conditions. Incorporate decommissioning plans at the beginning of the licensing process.</p> <p><b>M9:</b> Establish appropriate reporting regimes, such as those stipulated by MARPOL, the London Convention and others. These will need to cover all aquatic debris, whether from aquaculture, fishing or other aquatic and even terrestrial sources (<i>compliments additional matter No. 4 cooperation &amp; coordination</i>).</p>

Aquaculture	
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)
<p style="text-align: center;"><b>Fisheries, environmental protection and waste management agencies</b></p> <p><b>V13:</b> Use spatiotemporal zoning and planning within a multisectoral framework to prioritize and, where appropriate, restrict permitted economic activities (including aquaculture) to maximize the sustainable use of sea areas and reduce the potential for spatial conflicts (<i>compliments possible core obligation No. 9 eliminate the release and emission of plastics to water, soil and air</i>).</p> <p><b>V14:</b> Design, monitor and enforce aquaculture and other maritime economic activities to ensure that they adhere to zoning and permitted activity rules and regulations.</p> <p><b>V15:</b> Provide information and technical and logistical support to aquaculture operations in the event of a catastrophic or major event that results in damage, unit fragmentation and debris production at aquaculture facilities.</p> <p><b>V16:</b> Provide information and technical and logistical support to the aquaculture sector where appropriate to support locating and recovering aquaculture debris (<i>compliment possible core obligation No. addressing existing plastic pollution</i>).</p>	<p><b>M10:</b> Set standards for the marking, identification and electro-optical position signaling (e.g., radar reflectors, lighting, AIS/GPS beacons, etc.) for sea-borne aquaculture facilities and components.</p> <p><b>M11:</b> Ensure that large scale/ high-risk (as defined in the <a href="#">Global Ghost Gear Initiative’s Best Practice Framework for the Management of Aquaculture Gear</a>) aquaculture activities put in place environmental and waste management plans as part of the permitting process.</p>

Aquaculture		
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)	
Aquaculture and aquatic environment research	<p><b>V17:</b> Require improved containment systems at aquaculture sites that minimize the risk of (i) catastrophic loss and debris production and (ii) low-level littering (<i>compliments possible core obligation No. 9 eliminate the release and emission of plastics to water, soil and air</i>).</p>	
	<p><b>V18:</b> Develop practical and effective technology for maritime surveillance to better detect and quantify lost or derelict aquaculture equipment in the water column or on the seabed (<i>compliments possible core obligation No. 10 addressing existing plastic pollution; additional matter No. 3 research</i>).</p> <p><b>V19:</b> Examine the opportunities for remote sensing, ROVs, UAVs, artificial intelligence and other emerging technologies in maritime surveillance and environmental monitoring (<i>compliments possible core obligation No. 10 addressing existing plastic pollution; additional matter No. 3 research</i>).</p>	
	<p><b>V20:</b> Develop interdisciplinary and cross-border collaborations with and between academic and commercial research into robust offshore engineering solutions and aquatic debris management (<i>compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air; additional matter No. 3 research</i>).</p>	

Aquaculture	
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Aquaculture and aquatic environment research (continued)</b></p> <p><b>V21:</b> Examine opportunities for the use of new or rebalanced materials that are stronger and less damaging to the environment if lost including the possibility of developing truly biodegradable/ compostable materials that will break down into natural components in the environment and that have a long active life and that can be deactivated (to reduce ghost fishing or other forms of entanglement and habitat smothering) if lost <i>(compliments possible core obligation No. 8 promoting the use of safe, sustainable alternatives and substitutes; additional matter No. 3 research)</i>.</p> <p><b>V22:</b> Provide protocols for equipment/component monitoring programs based on Life Cycle Analysis (LCA)/ circular economy approaches <i>(compliments possible core obligation No. 6 fostering design for circularity; additional matter No. 3 research)</i>.</p>	



Aquaculture	
Voluntary Measures to include in National Plans of Action (non-binding)	Mandatory Control Measures (binding)
<p><b>Seafood ecolabel and certification programs</b></p> <p><b>V23:</b> Identify key risks to aquaculture operations (and their supply chains) that might result in damage to their infrastructure and the consequent generation of aquaculture debris and associated impacts on aquatic ecosystems and their components <i>(compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air).</i></p> <p><b>V24:</b> Develop certification criteria and scoring guideposts that encourage aquaculture businesses to follow best practices in reducing their risk to the aquatic environment throughout the lifetime of a farming operation <i>(compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air).</i></p> <p><b>V25:</b> Encourage larger companies to work with their individual aquaculture production units to reduce the generation of aquatic debris through group certification <i>(compliments possible core obligation No. 9 eliminating the release and emission of plastics to water, soil and air).</i></p>	
<p><b>Seafood companies in the aquaculture value chain</b></p> <p><b>V26:</b> Require suppliers to conform with best practice as promoted through the guidance in the GGGI A-BPF and other relevant guidelines (e.g., AQUA-LIT).</p>	

Aquaculture		
Voluntary Measures to include in National Plans of Action (non-binding)		Mandatory Control Measures (binding)
<b>NGOs</b>	<p><b>V27:</b> Provide direct capacity building and training, mainly (though not exclusively) to small-scale aquaculture operations, to improve practical skills and ensure environmental and financially sustainable businesses (<i>compliments additional matter No. 1 awareness-raising and education</i>).</p> <p><b>V28:</b> Raise public awareness about emerging or underreported issues related to the loss of aquaculture equipment and the subsequent impact on the aquatic environment (<i>compliments additional matter No. 1 awareness-raising and education</i>).</p>	
<b>Other stakeholders potentially impacted by aquaculture</b>	<p><b>V29:</b> Establish linkages between community/local businesses and aquaculture operators (and, where appropriate, producer associations) to build mutual awareness and trust over joint local aquatic environment stewardship (<i>compliments additional matter No. 1 awareness-raising and education; No. 5 stakeholder engagement</i>).</p>	

### Voluntary Measures that apply to both Aquaculture and Capture Fisheries

- Aquaculture producer associations and fisheries control agencies/organizations should identify, map and clear aquaculture and capture fisheries derived aquatic debris “hotspots” that represent either an operational or navigational hazard, or that represent a significant risk to the aquatic environment, including the entangling of aquatic species occupying the region (*compliments possible core obligations No. 10 addressing existing plastic pollution*).
- Where necessary, port operators should encourage/support agreements between aquaculture operators and fishing-orientated ports to address

common waste disposal problems and provide waste sorting, cleaning and disposal facilities for aquaculture and capture fisheries derived debris and litter recovered by third parties, such as fishers and those involved with aquatic litter retrieval initiatives. Port operators should also provide capacity building information (e.g., notice boards, web fora, other communication) for port users on (i) prevention and mitigation approaches and (ii) relaying reports of aquatic debris (including from aquaculture) to other mariners (*compliments possible core obligations No. 5 strengthening waste management; No. 11 facilitating a just transition, including an inclusive transition of the informal waste sector*).

The **Global Ghost Gear Initiative**<sup>®</sup>, hosted by Ocean Conservancy<sup>®</sup>, is the only cross-sectoral alliance driving solutions to the problem of ALDFG, also referred to as ghost gear, worldwide. Founded on the best science and technology, GGGI is the first initiative of its kind dedicated to tackling the problem of ghost fishing gear at a global scale. One of GGGI's key strengths lies in the diversity of its participants, bringing together 20 governments and over 130 members globally across the fishing industry, private sector, academia, intergovernmental and non-governmental organizations.

To learn more about the Global Ghost Gear Initiative, visit: [www.ghostgear.org](http://www.ghostgear.org)

**Ocean Conservancy**<sup>®</sup> is a 50-year-old NGO focused solely on creating evidence-based solutions for a healthy ocean and the wildlife and communities that depend on it. We envision a healthier ocean, protected by a more just world.

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**Note, this paper represents GGGI's opinions as an organization and do not necessarily reflect the opinions or recommendations of the GGGI membership or its supporting governments**

