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Legal aspects of abandoned, lost or otherwise discarded fishing gear

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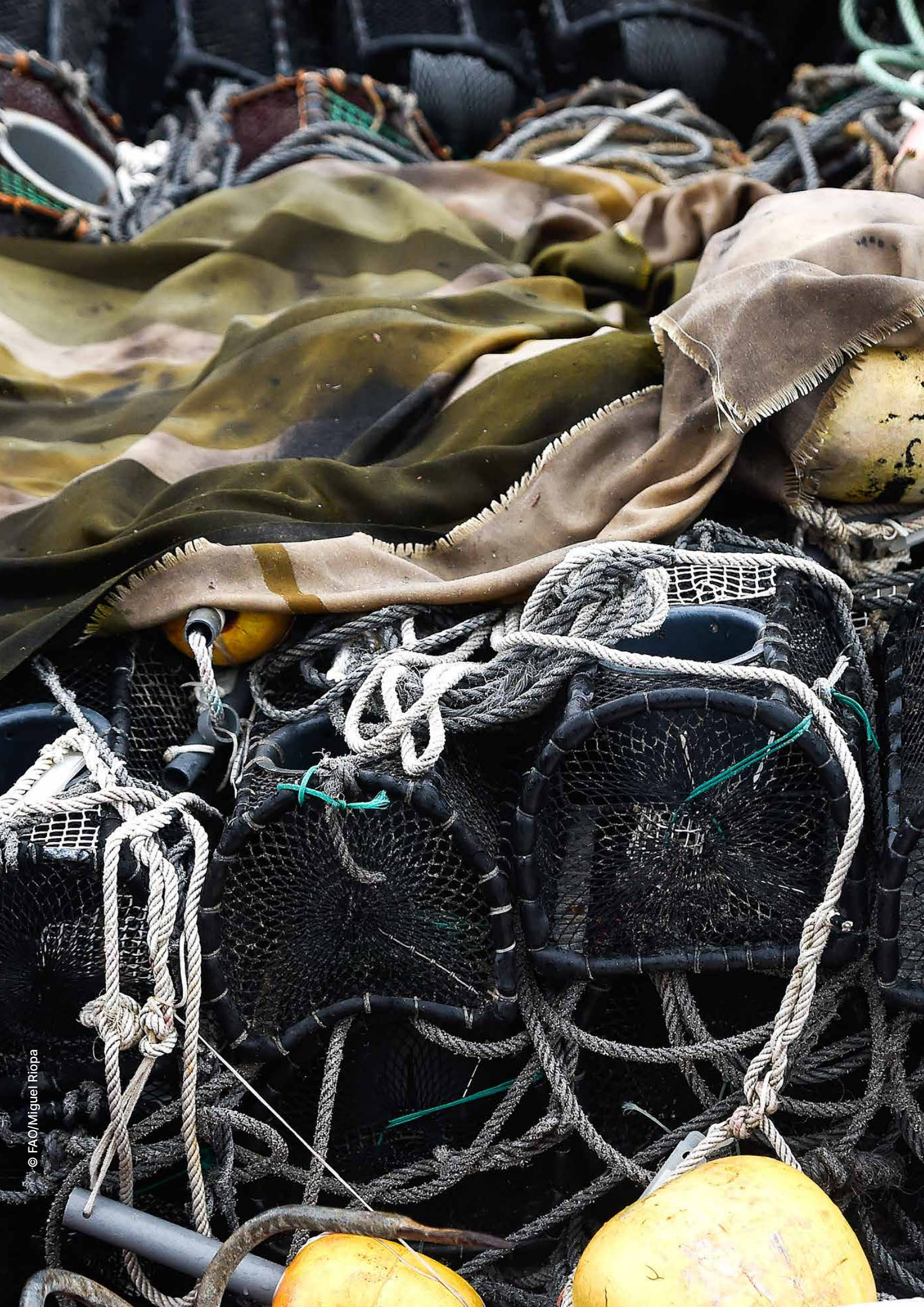
Abstract

The growing quantity of plastic waste in the marine environment, including abandoned, lost or otherwise discarded fishing gear (ALDFG), is a global problem. A particular feature of ALDFG is the potential for some gears to continue fishing for many months or even years after they have been left in the marine environment. This study examines the legal responses to ALDFG in the context of marine fisheries. Following a discussion on the nature of ALDFG and some of the reasons why fishing gear is abandoned, lost, or otherwise discarded, the study examines the international community's response to the problem. One key finding is that ALDFG is simultaneously a fishing problem, a maritime transport problem (regarding vessel source pollution) and an environmental problem resulting in the involvement of the Food and Agriculture Organization of the United Nations (FAO), the International Maritime Organization (IMO), the United Nations Environment Programme (UNEP) and the United Nations General Assembly (UNGA) in seeking solutions. After an examination of potential legal approaches to the problem, the study describes the basic legal and institutional arrangements in four case-study jurisdictions that have adopted legal measures to address ALDFG: Australia, the European Union and its Member States, Norway and the United States of America. These case studies once again reveal a tripartite responsibility shared between fisheries, maritime transport and environment agencies. The intersectoral nature of ALDFG suggests the need for a collaborative and coordinated approach. While not all of the case-study jurisdictions make use of each of the ten individual legal measures identified, the analysis clearly shows that ALDFG is a problem that can be addressed through a legal response at the national or regional level, including through the use of extended producer responsibility schemes, various reporting requirements and gear standards. The legal tools to address the problem of ALDFG clearly exist; however, the extent to which some or all of these are necessary or appropriate in a given context – whether at the national, regional or global level – is ultimately not a legal question, but a political one.

Contents

Abbreviations and acronyms

AFMA	Australian Fisheries Management Authority
ALDFG	abandoned, lost or otherwise discarded fishing gear
AMSA	Australian Maritime Safety Authority
CBD	Convention on Biological Diversity
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
COFI	Committee on Fisheries
DG	Directorate-General
EEZ	exclusive economic zone
EMFF	European Maritime and Fisheries Fund
EU	European Union
FAD	fish aggregating device
GT	gross tonnage
ICCAT	International Commission for the Conservation of Atlantic Tunas
IMO	International Maritime Organization
IUU fishing	illegal, unreported, and unregulated fishing
FAO	Food and Agriculture Organization of the United Nations
MCS	monitoring, control and surveillance
MSC	Marine Stewardship Council
RFMO/A	regional fisheries management organization/arrangement
SEA	strategic environmental assessment
SUP	single-use plastics
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
UNFSA	United Nations Fish Stocks Agreement
UNGA	United Nations General Assembly
VGMFG	Voluntary Guidelines on the Marking of Fishing Gear
WCPFC	Western and Central Pacific Fisheries Commission



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1. Introduction

In recent years there has been increased concern over the growing quantity of waste (litter or debris), and particularly plastic waste, in the marine environment. Marine litter or marine debris results from both on land and at sea activities. It includes litter from seaside tourism, debris from storm-water, unregulated dumping of waste from ships and boats, cargo lost overboard and abandoned, lost or otherwise discarded fishing gear (ALDFG).

Reliable figures on the total volume of ALDFG in the world's oceans are difficult to establish, as is the proportion of ALDFG within the total quantity of marine litter. Nevertheless, there is a clear consensus that ALDFG is both a serious and growing problem, one that has a range of negative impacts on ecosystems, fisheries and navigation. A recent study suggests that 5.7 percent of all fishing nets, 8.6 percent of all traps, and 29 percent of all lines are lost around the world each year (Richardson, Hardesty and Wilcox, 2019). ALDFG is, quite clearly, a global problem.

The specific impacts of ALDFG depend on the types of gear involved and the fisheries ecosystems in which such gear is abandoned, lost or otherwise discarded. Modern fishing gear – nets, traps, lines, etc. – is now generally made of plastic or plastic-based materials; it therefore degrades slowly, if at all. Apart from concerns about the impact of large quantities of plastic on marine ecosystems, another feature of ALDFG is the potential for some gears to continue fishing for many months or even years. This phenomenon – commonly known as "ghost fishing" – has both negative economic and ecological impacts, removing fish that could otherwise be caught (Macfadyen, Huntington and Cappell, 2009). ALDFG can also inadvertently trap and kill non-target species such as invertebrates, turtles, birds, and mammals (Bilkovic *et al.*, 2014).

The aim of this study is to examine legal responses to ALDFG in the context of marine fisheries.[1] More specifically, it asks how the law can or should be used to address the problem of ALDFG.

It is set out in seven parts, including this introduction. Part two discusses the nature of the problem of ALDFG and some of the reasons why fishing gear is abandoned, lost, or otherwise discarded. It also examines the different components of ALDFG as a concept and how these are to be understood.

As previously noted, ALDFG is a global problem. Part three, therefore, examines the response of the international community to the problem of ALDFG in terms of international law, as well as the actions of the international bodies and organizations concerned with both ALDFG and the broader question of marine litter.

Before examining how the issue of ALDFG is addressed in national and regional legislation, part four opens the notional 'regulatory toolbox' to examine, at a conceptual level, which legal/regulatory approaches may be most relevant.

[1] Of course, the problem of ALDFG can also arise in the context of inland fisheries, or where gear is lost from aquaculture facilities.

To date, relatively few jurisdictions have adopted specific provisions on ALDFG in their legislation. Part five contains an overview of the legal and institutional arrangements in three countries that have adopted provisions on ALDFG in their national laws, namely Australia, Norway and United States of America, as well as the European Union (EU). These three States and the EU are described as the 'case study jurisdictions'.

Part six examines the substantive provisions on ALDFG in the case-study jurisdictions, while part seven draws some conclusions on the role of the law in addressing the issue of ALDFG. 2.1

2. Understanding the problem

2.1 ALDFG

Before seeking to understand how the law can or should be used to address the problem of ALDFG, it is useful to understand the nature of the problem and break down the term itself into its component parts. After all, fishing gear is valuable, so why is it abandoned, lost or otherwise discarded? Why does the problem arise? And more importantly, is this a problem that is actually susceptible to a legal solution, whether in whole or in part?

Although the term "ALDFG" has become a shorthand expression used to describe the problem of derelict fishing gear, it is worth noting that it is not a legal term as such, insofar as it does not appear to have been used in any binding legal instrument. However, a definition of the elements of ALDFG does feature in the *Voluntary Guidelines on the Marking of Fishing Gear* (VGMFG; FAO, 2019), which were recently adopted under the auspices of the Food and Agriculture Organization of the United Nations (FAO).[2] To what extent do these definitions help in teasing out the legally important elements of ALDFG?

a) Fishing gear

"Fishing gear" is arguably the easiest element of ALDFG to understand. The term is commonly defined in national fisheries laws and it clearly has a broad scope, ranging from small fishing hooks to drift nets that may be several kilometres long.

Box A
Definitions of fishing gear

> Namibia's Marine Resources Act, 27 of 2000 has a simple yet effective definition of gear that does not refer to any gear type:
>
> > "fishing gear" means any net or other implement or means used or capable of being used for the harvesting of marine resources;
>
> Vanuatu's fisheries legislation, (Fisheries Act No. 10 of 2014) by contrast, includes several different types of gear within the overall definition:
>
> > fishing gear means any equipment, implement or other thing that can be used in the act of fishing, and includes any fishing net, rope, line, float, trap, hook, winch, or associated boat or aircraft.
>
> Listing different gear types within an overall definition can be useful for the non-specialist reader although the types of gears listed will inevitably vary from fishery to fishery. Artisanal fisheries may include baskets and traps, for example. The definition used in Tunisian fisheries law (Loi n° 94-13 du 31 Janvier 1994, relative a l 'exercice de la pêche) is broad in scope and yet concise:
>
> > 'Fishing gear: nets and devices that permit the fishing of aquatic species.'[3]

[2] The VGMFG were adopted at the conclusion of a Technical Consultation on the Marking of Fishing Gear held at FAO in Rome between 5 and 9 February 2018. They were subsequently endorsed at the Thirty-third Session of FAO's Committee on Fisheries in July 2018.
[3] *'Engin de pêche': les filets et les outils qui permettent la pêche des espèces aquatiques'*.

In between these extremes lie a wide range of different gear types including pots, traps, lines, various types of set gears (such as gillnets) as well as drift nets and active gears such as trawl and seine nets.[4] Legal definitions of fishing gear, as per the examples contained in Box A, are typically drafted in sufficiently broad terms to cover the variety of different gear types normally used in a given fishery. Definitions are also broad enough in scope to include equipment used to attract fish such as large free floating fish aggregating devices (FADs).

The importance of defining the term "fishing gear" was underscored during the technical consultation that led to the adoption of the VGMFG, which contains the following definition:

> The term 'fishing gear' to be marked refers to any physical device or part thereof or combination of items that may be placed on or in the water or on the seabed with the intended purpose of capturing or controlling for subsequent capture or harvesting, marine organisms, in accordance with MARPOL Annex V.

One very positive aspect of this definition is the specific reference to the parts of an item of fishing gear. The problem of fishing-related debris in the marine environment arises not only from the loss of whole units of fishing gear (such as nets or traps), but also from the routine loss of fragments of gear; these include gear attachments designed to protect against abrasion, such as the dolly ropes which protect the cod in trawl nets. In addition, rope and net cuttings from mending fishing gear may be routinely dumped at sea. While these lost parts of fishing gear do not (usually) cause ghost fishing, they contribute to the accumulation of plastics in the sea.

b) Abandoned

A basic rule of legal interpretation is that in the absence of any indication to the contrary, words should bear their ordinary meaning. So, what does the word "abandoned" mean?

It is a word that is commonly used in everyday language. We talk about "abandoning hope" even of "abandoning ship". In these usages, the notion of "abandoned" seems to imply a deliberate, albeit reluctant, letting go; a leaving behind or giving up control over something. So why might someone deliberately abandon fishing gear? After all, it is often both expensive to replace and economically useful.

One reason why fishing gear might be abandoned is when illegal, unreported and unregulated (IUU) fishing activities are interrupted by enforcement authorities, causing fishing vessels to flee and leave their nets in the water. Given that in this scenario the fishing activity is probably not legitimate in the first place, it is hard to believe that additional legislation would contribute much to combatting the problem of this type of abandoned gear.

[4] FAO Technical Paper 672 provides definitions and illustrations of the configuration and mode of operation of typical fishing gears in accordance with the International Standard Statistical Classification of Fishing Gear (ISSCFG). He, P., Chopin, F., Suuronen, P., Ferro, R.S.T and Lansley, J. 2021. Classification and illustrated definition of fishing gears. FAO Fisheries and Aquaculture Technical Paper No. 672. Rome, FAO. https://doi.org/10.4060/cb4966en

Alternatively, gear may be abandoned because it cannot be retrieved. This could be because the water is too deep, for example, or appropriate recovery equipment is unavailable. Gear might also be deliberately abandoned for safety reasons, such as when nets are cut before a sudden storm. When this happens, the intention may well be to recover the released gear later.

The VGMFG, however, define "abandoned fishing gear" as:

> fishing gear over which the operator/owner has control and that could be retrieved by owner/operator but that is deliberately left at sea due to force majeure or other unforeseen circumstances.

c) Lost

The word "lost" appears simpler to understand. Something is lost when it cannot be found or recovered (people and ships are also referred to as being "lost at sea").

The reasons why gear is lost may depend on the type of gear in question. Generally speaking, passive gear – gear that is left in the water to catch fish without active manipulation (such as gillnets, drift nets, pots, traps, fixed longlines) – seems more likely to be 'lost' than active gear simply because it is typically disconnected from a vessel. Such gear could be lost for a range of reasons. For example, it may have moved due to the wind or currents, or rough weather conditions. Or it may be lost due to the actions of a third party, as in cases where a trawl net is towed over pots or bottom set nets. Or the gear could be lost because it has been set too deep, or become snagged on larger boulders, a wreck or reef. It may also be lost as a result of deliberate third-party interference.[5]

Active gear such as trawls and seine nets usually remain attached to a fishing vessel. Such gear is more likely to be "lost" when it is deliberately cut loose. This could happen, for example, when a trawl net catches on a reef. Again, as such occurrences are essentially accidents, the possible role of legislation in preventing the loss is probably rather limited. It is difficult to legislate against accidents, except in terms of reducing risk – through, the spatial management of marine areas, for example, thus reducing the chances of accidental interference with set gear. However, there may be a potentially more promising role for the law with regard to specifying what should happen once an accident has taken place.

The VGMFG define the term "lost fishing gear" as, "fishing gear over which the owner/operator has accidentally lost control and that cannot be located and/or retrieved by that owner/operator."

[5] Third party interference in connection with ALDFG does not necessarily involve only humans: an unusual and unfortunate example of gear loss comes from the South Atlantic, where albatrosses have been known to steal bait from set longlines as well as the hooks to which the bait was attached.

d) Otherwise discarded

The final category, "otherwise discarded", would seem to include some degree of intention as regards the act of discarding. As such, it would appear to include the deliberate disposal of fishing gear at sea. This interpretation aligns with the definition of "discarded fishing gear" included in the VGMFG: "fishing gear that is released at sea without any attempt for further control or recovery by the owner/operator."

But why would anyone discard fishing gear at sea? One reason might be because the gear is old, worn out and beyond effective repair. In such circumstances, a decision to discard gear at sea can be regarded as both practical and economically rational by the person discarding it, either because there is nowhere else better to dispose of gear on land or because it is simply cheaper to dispose of it at sea. Another reason that emerges from the literature concerns cases where gear is disposed of towards the end of a long fishing voyage to make more room for the storage of catch: the case of the bottom set gillnet fishery in the North Atlantic reported by Hareide *et al.* (2005) is one such example.

This kind of activity, the deliberate discarding of fishing gear, is the one that seems most susceptible to a legal response. The deliberate disposal of fishing gear at sea can be prohibited and measures put in place to ensure that such a prohibition is complied with. Such activities could also be subject to provisions on recovery, although when nets are deliberately disposed of at sea they are usually bundled up so that they sink out of the way.

2.2 ALDFG as a working definition

While the acronym ALDFG works well as a kind of shorthand or colloquial term to deal with the problem of derelict fishing gear, it works less well as a legal definition. Moreover, although an attempt has clearly been made to tighten up the elements of ALDFG in the VGMFG, the definitions proposed raise their own questions.

As regards the definition of abandoned fishing gear, the phrase seems to imply that the operator/owner is not at fault. However, the term *force majeure* is often used in contracts to free a party from an obligation due to an extraordinary event beyond the control of the parties such as a war or natural disaster. In terms of international law, the International Law Commission, in its draft articles on the Responsibility of States for Internationally Wrongful Acts, defines force majeure as: "an occurrence of an irresistible force or of an unforeseen event beyond the control of the State, making it materially impossible in the circumstances to perform the obligation." (International Law Commission, 2001) Invoking force majeure in the context of the relatively routine event of fishing gear lost or abandoned at sea seems rather dramatic. What are the other unforeseen circumstances? Bad weather at sea is, after all, not uncommon.

The definition of lost gear also seems to imply that the owner/operator is not at fault because s/he has 'accidently lost control' of gear but cannot locate or recover it. But then what is the difference between lost gear and abandoned gear? Does it only relate to the scale of the 'accident', with one being unforeseen due to force majeure and the other not? Moreover, how can this definition be applied to passive

gear? In a very real sense, the owner or operator of passive gear deliberately loses or gives up control of, for instance, a set net or a lobster pot when s/he places it in the water. As discussed above, such gear can easily be "lost" if it cannot subsequently be located – but such a scenario would not seem to fall within the definition of lost gear proposed by the VGMFG.

Finally, the definition of 'otherwise discarded' would seem to cover the case of dumping or deliberate disposal at sea – if so, why is it not phrased accordingly? The term "released" sounds innocuous, but apart from passive gear – which in the ordinary course of events the owner/operator will seek to recover – the usage of this word seems inappropriate.

A further question arises: does the definition of ALDFG proposed in the VGMFG really matter? More specifically, is it really a legal definition or, as mentioned above, only a form of shorthand or colloquial term for derelict fishing gear? This issue will be considered in greater detail in part six.

3. International law and governance frameworks

As noted in the introduction, the issue of marine litter in general, and ALDFG in particular, is a global problem. What, therefore, has been the response of the international community in terms of international law, and the international bodies and organizations responsible for its implementation (hereinafter, "international governance frameworks")?

Marine fisheries take place against the background of the law of the sea, the branch of international law concerned with all uses and resources of the sea. However, one key issue to note at the outset is the fact that within the overall framework of the law of the sea, ALDFG is simultaneously a fisheries problem, a maritime transport problem (in terms of vessel source pollution) and an environmental problem. This has both legal and institutional implications as regards international governance frameworks.

3.1 The United Nations and the law of the sea

a) The United Nations Convention on the Law of the Sea

The cornerstone of the law of the sea is the United Nations Convention on the Law of the Sea (UNCLOS),[6] which was adopted in 1982. The basic objective of UNCLOS is to establish a universally accepted, just and equitable legal order, or "Constitution" for the oceans,[7] which lessens the risk of international conflict and enhances peace and stability in the international community.[8] Comprising 320 articles in 17 parts, as well as nine annexes, it is a substantial text. It was intended to be, as far as possible, comprehensive in scope and universal in participation (Boyle, A. in Freestone, D., Barnes, R., and Ong, D., 2006).

As regards marine fisheries, UNCLOS recognizes the rights of each coastal State to adopt and enforce fisheries legislation in the adjacent coastal waters under its sovereignty or jurisdiction – notably the territorial sea, which may extend up to 12 nautical miles from the baseline, usually the low water mark, and the Exclusive Economic Zone (EEZ), which may extend up to 200 nautical miles from the baseline. It also recognizes the freedom of fishing on the high seas, in other words the area beyond the jurisdiction of any coastal State, which is enjoyed by all States.

However, UNCLOS does not address the issue of fishing gear directly at all, let alone ALDFG, and its provisions on environmental protection are mostly concerned with pollution from land and vessel sources. Nevertheless, UNCLOS is relevant to ALDFG because it is UNCLOS that confers the right upon States to regulate the

[6] United Nations Convention on the Law of the Sea, Montego Bay, 10 December 1982, 1833 United Nations Treaty Series (UNTS), 3.
[7] Remarks by Tommy Koh, Chair of the Third United Nations Conference on the Law of the Sea.
[8] See the fifth preambular paragraph of UNCLOS.

issue of ALDFG within their national legislation; the latter then applies to all fishing vessels in areas under their sovereignty or jurisdiction, as well as to vessels that fly their flag on the high seas (or which are included in their vessel register).

b) The United Nations Fish Stocks Agreement

The United Nations Fish Stocks Agreement (UNFSA) is one of two implementing agreements adopted pursuant to UNCLOS,[9] and is concerned with the conservation and exploitation of highly migratory fish species and straddling stocks. UNFSA seeks to create a detailed framework for the management of "straddling stocks", i.e., fish stocks that occur over ("straddle") the boundary between an EEZ and the high seas, and "highly migratory fish stocks" that occur both on the high seas and within areas under national jurisdiction.[10]

To this end, coastal States and States fishing on the high seas for straddling fish stocks and highly migratory species must cooperate either directly or through appropriate subregional or regional fisheries management organizations or arrangements (RFMOs), taking into account the subregion or region's specific characteristics to ensure the effective conservation and management of such stocks (Art. 8).

UNFSA does in fact contain 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 (see Box B). Such States must minimize catch by lost or abandoned gear. However, although this obligation is cast in imperative terms it is, as the name of the article implies, little more than a statement of principle.

Box B
References to ALDFG in UNFSA

> Article 5
> **General principles**
>
> To conserve and manage straddling fish stocks and highly migratory fish stocks, coastal States and States fishing on the high seas shall, in giving effect to their duty to cooperate in accordance with the Convention:
> [...]
> f) minimize pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species, (hereinafter referred to as non-target species) and impacts on associated or dependent species, in particular endangered species, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost-effective fishing gear and techniques;
> [...]

Also related to the issue of lost or abandoned gear are the provisions of UNFSA on the duty of the flag State regarding, "the marking of fishing vessels and gear in accordance with uniform and internationally recognizable vessel and gear marking

[9] 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, New York, 4 August 1995, 2167 UNTS, 3. The other agreement, the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, New York, 28 July 1994, 1836 UNTS, 3, is concerned with the exploitation of the mineral resources of the seabed in areas beyond national jurisdiction and is not relevant to ALDFG.
[10] The agreement applies expressly to species of "fish". It does not therefore apply to the species of cetaceans that are also listed in Appendix 1 of UNCLOS.

systems" (Art. 18) as well as the flag State's duty to require the vessel flying its flag to give information to the investigating authority on the vessel's fishing gear (Art. 19).

c) UNGA Resolutions

United Nations General Assembly (UNGA) Resolutions play a significant role in encouraging and guiding actions by States on sustainable fisheries issues including ALDFG. The UNGA receives an annual report on sustainable fisheries from the UN Secretary-General on the implementation of UNCLOS and its instruments and has made a number of references to ALDFG and marine litter in its resolutions. Such resolutions are not legally binding except to the extent that they restate or reflect international law. They are recommendations which provide the impetus for action by States, including actions that are based on international law.

The call for States to deal with the issue of derelict fishing gear adversely affecting fish stocks and habitats began at the Fifty-seventh Session of the UNGA in 2002–2003, with UNGA Resolution 57/142. Thereafter, derelict fishing gear and its adverse effects started to feature as a recurring concern in UNGA's omnibus resolution on sustainable fisheries adopted during the Fifty-ninth Session of UNGA (2004–2005), with further detailed provisions contained in Resolution 60/31 adopted at the Sixtieth Session of the UNGA. All of the UNGA sessions thereafter, up until the Seventy-third Session, referred to paragraphs 77 to 81 of Resolution 60/31, which sets out the actions required of States to address the issue of ALDFG and related marine debris. Subsequent resolutions restated the need to address the issue and highlighted particular aspects of the problem or additional specific actions to address it.

The relevant paragraphs of Resolution 60/31 call upon States, FAO, the International Maritime Organization (IMO), the United Nations Environment Programme (UNEP), regional and subregional fisheries management organizations and arrangements, in addition to other appropriate intergovernmental organizations that have not yet done so, to take action to address the issue of lost or abandoned fishing gear and related marine debris. In addition to encouraging States to collect data on gear loss, economic costs to fisheries and other sectors, and the impact on marine ecosystems in paragraph 77, the resolution continues to elaborate on other specific initiatives and actions to address the problem of lost and discarded fishing gear and related marine debris in paragraphs 78 to 80. The specific initiatives and actions can be summarized as follows:

- collection of data on gear loss, economic costs to fisheries and other sectors, and the impact on marine ecosystems;
- analysis of the implementation and effectiveness of the existing measures relevant to the control and management of derelict fishing gear and related marine debris;
- the development and implementation of targeted studies to determine the socio-economic, technical and other factors that influence the accidental loss and deliberate disposal of fishing gear at sea;
- the assessment and implementation of preventive measures, incentives and/or disincentives relating to the loss and disposal of fishing gear at sea;
- the development of management best practices;
- the development and implementation of joint prevention and recovery programmes; and
- the establishment of a clearinghouse mechanism to facilitate the sharing of information between States on fishing net types and other fishing gear, as well as the regular,

long-term collection, collation and dissemination of information on derelict fishing gear, and national inventories of net types and other fishing gear, as appropriate.

3.2 FAO and fisheries

The Food and Agriculture Organization of the United Nations (FAO) is the main United Nations (UN) specialized agency concerned with fisheries matters. Under the auspices of FAO, a number of binding international fisheries agreements have been concluded including the FAO Compliance Agreement[11] and the Port State Measures Agreement.[12]

However, none of these binding instruments refer to ALDFG. To date, the issue of ALDFG has primarily been addressed in a series of soft law instruments.

a) The Code of Conduct for Responsible Fisheries

The Code of Conduct for Responsible Fisheries (FAO, 1995: hereafter 'Code of Conduct') is a voluntary international instrument, although many of its provisions reflect or are based on international law. It was unanimously adopted on 31 October 1995 by the FAO Conference and applies not only to States but also to:

> fishing entities, sub regional, regional and global organizations, whether governmental or non-governmental, [...] all persons concerned with the conservation of fishery resources or with the management and development of fisheries, such as fishers, those engaged in processing and marketing of fish and fishery products and to other users of the aquatic environment in relation to fisheries. (FAO, 1995)

The scope of the Code of Conduct is extremely broad. It encompasses almost all aspects of fisheries and aquaculture management, setting out generally agreed "principles and standards applicable to the conservation, management and development of all fisheries". It also covers "the capture, processing and trade of fish and fishery products", fishing operations, aquaculture, fisheries research and the "integration of fisheries into coastal area management." It also contains a number of references to ALDFG, as set out in Box C.

Box C
References to ALDFG in the Code of Conduct

> **7.2 Management objectives**
>
> 7.2.1 Recognizing that long-term sustainable use of fisheries resources is the overriding objective of conservation and management, States and subregional or regional fisheries management organizations and arrangements should, inter alia, adopt appropriate measures, based on the best scientific evidence available, which are designed to maintain or restore stocks at levels capable of producing maximum sustainable yield, as qualified by relevant environmental and economic factors, including the special requirements of developing countries.

[11] Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, Rome, 24 November 1993, 2221 UNTS, 120.
[12] Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, FAO Rome, 2016.

> 7.2.2 Such measures should provide *inter alia* that:
>
> [...]
>
> g) pollution, waste, discards, catch by lost or abandoned gear, catch of non- target species, both fish and non-fish species, and impacts on associated or dependent species are minimized, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost-effective fishing gear and techniques.
>
> [...]
>
> 7.6.9 States should take appropriate measures to minimize waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non-fish species, and negative impacts on associated or dependent species, in particular endangered species. Where appropriate, such measures may include technical measures related to fish size, mesh size or gear, discards, closed seasons and areas and zones reserved for selected fisheries, particularly artisanal fisheries. Such measures should be applied, where appropriate, to protect juveniles and spawners. States and sub-regional or regional fisheries management organizations and arrangements should promote, to the extent practicable, the development and use of selective, environmentally safe and cost-effective gear and techniques.
>
> 8.4.6 States should cooperate to develop and apply technologies, materials and operational methods that minimize the loss of fishing gear and the ghost fishing effects of lost or abandoned fishing gear.

The Code of Conduct is complemented with a series of technical guidelines that provide detailed policy, legal, management and operational guidance and implementation aspects of specific provisions of the Code. These technical guidelines assist States to make full use of the Code of Conduct as a toolbox.

b) Guidelines on bycatch management

The *International Guidelines on Bycatch Management and Reduction of Discards* (FAO,2011) contain a number of references to ghost fishing. These guidelines are intended to assist States and regional fisheries management organizations/ arrangements to implement the "ecosystem approach to fisheries", as called for by UNGAR A/RES/64/72. The guidelines also call on States and RFMOs to take account of the work conducted under the auspices of the International Maritime Organization in relation to reducing the impact of lost fishing gear.

Furthermore, paragraph 8.1 of these guidelines calls on States and RFMOs to consider measures to address the impact of pre-catch losses and ghost fishing on living aquatic resources through a series of possible actions to assess and mitigate such impacts, including:

- adopting objectives in fisheries management policies and plans to minimize mortalities as a result of pre-catch losses and ghost fishing;
- improving the scientific information on the magnitude and causes of pre-catch losses and effects of ghost fishing, so that they can be included in stock, fishery and ecosystem assessments; and
- developing technologies and measures that quantify and reduce the mortalities and impacts associated with pre-catch losses and ghost fishing. This may include:
    - methods for estimating pre-catch losses by various gear types;
    - the modification of gears and fishing methods;
    - the identification of gear ownership;
    - reduction of gear losses;

- the development of gear retrieval procedures and programmes; and
- reducing, and where possible eliminating, fishing power of lost gear (e.g. through the use of degradable materials).

c) Voluntary Guidelines on the Marking of Fishing Gear (VGMFG)

The issue of ALDFG has been a concern for FAO and its Members for a number of years. To that end, several studies on the topic have been published.[13] FAO has also been active in drawing attention to the topic in international fora in partnership with other international organizations, including non-governmental organizations.

In 2014, the Thirty-first Session of the FAO Committee on Fisheries (COFI) expressed concern over continued ghost fishing by ALDFG and urged that greater attention be paid to this matter. Subsequently, FAO convened an Expert Consultation on the Marking of Fishing Gear from 4 to 7 April 2016 at FAO headquarters, Rome, Italy, which produced draft guidelines on the marking of fishing gear. In 2016, COFI welcomed the work of the Expert Consultation and recommended its further development through a Technical Consultation. This led to the adoption of the VGMFG by a Technical Consultation held at FAO headquarters in February 2018 (as mentioned in part two of this study), together with the subsequent endorsement of the VGMFG by COFI at its Thirty-third Session in July 2018.

The VGMFG are voluntary and global in scope, and they apply to all types of fishing gear in all types of fishing activities, in all oceans and seas. They are intended as a tool to contribute to sustainable fisheries and to improve the state of the marine environment by combatting, minimizing and eliminating ALDFG, as well as facilitating the identification and recovery of such gear. To this end, their purpose is to help states and regional fishery bodies, including RFMOs, to develop and apply a system for the marking of fishing gear, as well as related measures that provide:

a) a practical means of locating and identifying the ownership of fishing gear;
b) a guiding text on the development of appropriate marking systems;
c) a framework for undertaking risk assessments to identify the appropriateness or otherwise of implementing a system for marking fishing gear; and
d) a basis for the preparation of recommendations and regulations designed to minimize the abandonment, loss and discarding of fishing gears, as well as to encourage the recovery of ALDFG.

Apart from the definitions of “fishing gear”, “abandoned fishing gear”, “lost fishing gear” and “discarded fishing gear” described in part two, the VGMFG also contain definitions of “fish aggregating device” (FAD) and “mark”. They go on to provide guidance as to the design and implementation of a gear-marking system, including: the use of a risk assessment; the reporting of ALDFG; the recovery of ALDFG; the commercial traceability of fish gear; specific provisions on FADs, including the use of satellite buoys; research and development; awareness raising, communication

[13] See for example, FAO. 2016. *Abandoned, lost and discarded gillnets and trammel nets: methods to estimate ghost fishing mortality, and the status of regional monitoring and management*, by Eric Gilman, Francis Chopin, Petri Suuronen and Blaise Kuemlangan. FAO Fisheries and Aquaculture Technical Paper No. 600. Rome. Italy. http://www.fao.org/3/a-i5051e.pdf

and capacity development; the special requirements of developing States and small-scale fisheries; and additional considerations relating to further steps to be taken by FAO with regard to the implementation of the VGMFG.

With regard to the elements that are specifically concerned with ALDFG, as opposed to the marking of gear, the VGMFG recommend the following in connection with the reporting of ALDFG: the inclusion of a requirement that ALDFG be reported to the relevant authority as a condition for fishing authorizations/licences; the establishment of appropriate reporting regimes; setting up a record/register of reported ALDFG containing specified information; and the provision of detailed information regarding ALDFG to regional fishery bodies including RFMOs.

In terms of the recovery of ALDFG, the VGMFG recommend, among other matters:

- that States encourage owners/operators of fishing gear to make every reasonable effort to retrieve ALDFG, failing which the situation should be reported to the relevant authority which should consider, where practicable and feasible, cost-effective arrangements for recovery of the ALDFG, taking account of human safety and the risk of further damage to the marine environment;
- that priority be given to the retrieval of ALDFG that presents navigational hazards, poses a significant adverse impact on critical, vulnerable or sensitive habits, or poses particular threats to wildlife, or causes ghost fishing;
- that States seek to identify ALDFG "hotspots" that pose particular hazards;
- that owners be encouraged to have adequate equipment and training available to facilitate the recovery of ALDFG;
- the recycling or responsible disposal on land of recovered ALDFG; and
- that adequate port reception facilities for the disposal of such fishing gear be provided, in accordance with MARPOL Annex V.

3.3 IMO and maritime transport

UNCLOS does not contain detailed rules regarding the safety of shipping or vessel source pollution. Instead, it refers to the rules made by the "competent international organization", namely the International Maritime Organization (IMO).14 Aspects of IMO's overall regulatory mandate include: (i) vessel source pollution, (ii) maritime safety, (iii) liability and responsibility, (iv) shipping facilitation, and (v) maritime security.

While the work of the IMO focuses on merchant shipping, certain instruments adopted by IMO may apply to fishing vessels. Where IMO has worked specifically on fisheries issues, this has always been in conjunction with FAO.[15]

A wide range of binding and non-binding instruments have been adopted under the auspices of IMO, as they relate to the Organization's mandate. Of most relevance to

[14] IMO is universally regarded as the body meant by this phrase if it is used in the singular. Many of the relevant IMO-sponsored instruments pre-date the entry into force of UNCLOS.

[15] Such as the Torremolinos International Convention for the Safety of Fishing Vessels, 1977, as amended in 1993 and the Cape Town Agreement of 2012. In addition, the 1995 STCW-F Convention sets the certification and minimum training requirements for crews of seagoing fishing vessels of 24 metres in length and above and other codes etc.

this study is the International Convention for the Prevention of Pollution from Ships, 1973, as modified and amended (MARPOL).[16]

a) International Convention for the Prevention of Pollution from Ships (MARPOL)

The basic objective of MARPOL is the prevention of pollution from ships. The convention has a global scope of application but also allows for the adoption of more stringent measures in specified oceanographical areas.

To fulfil this objective, MARPOL sets out a range of different types of standards including discharge and emission standards, as well as construction, design, equipment and manning standards. Additionally, a major practical focus of the implementation of MARPOL over recent years has been the removal of wastes from ships in port, and the construction of the waste reception facilities necessary for this.

A complex and lengthy legal instrument, the technical substance of MARPOL is set out in a series of annexes that contain the legal rules of the convention. These are described as "regulations". Annex V contains "Regulations for the Prevention of Pollution by Garbage from Ships". The annexes to MARPOL are regularly reviewed and amended or updated as necessary by one of various committees established for this purpose. To this end, IMO's Marine Environment Protection Committee adopted a set of amendments to Annex V of MARPOL 73/78 at its Sixty-second Session (July 2011), through resolution MEPC. 201(62).[17]

In accordance with the complex rules on the entry into force of MARPOL annexes, these amendments to Annex V came into force on 1 January 2013. The importance of Annex V resides in the fact that it is the only binding legal instrument of general international application that expressly addresses the problem of ALDFG.

Unless expressly provided otherwise, Annex V applies to all "ships". The broad definition of "ship" contained in MARPOL therefore means that it applies to all fishing vessels "operating in the marine environment".[18]

Regulation 3 of Annex V sets out a series of prohibitions. In particular, regulation 3.1 prohibits the discharge into the sea of all "garbage". This word is defined in regulation 1.9 of Annex V as follows:

> *Garbage* means all kinds of food wastes, domestic wastes and operational wastes, all plastics, cargo residues, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the

[16] 1340 UNTS, 62.

[17] See also the 2017 Guidelines for the Implementation of Marpol Annex V at https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/MEPC.295(71).pdf.

[18] Article 2.4 of MARPOL defines the word "ship" as follows: "'Ship' means a vessel of any type whatsoever operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms."

> present Convention. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities which involve the transport of fish including shellfish for placement in the aquaculture facility and the transport of harvested fish including shellfish from such facilities to shore for processing.

The term "fishing gear" is also defined in regulation 1.6 of MARPOL Annex V. The definition is as follows:

> any physical device or part thereof or combination of items that may be placed on or in the water or on the seabed with the intended purpose of capturing, or controlling for subsequent capture or harvesting, marine or freshwater organisms.

At the same time, the term "fishing gear" is explicitly included within the broader definition of garbage: regulation 3.1 states that garbage means fishing gear. However, the general prohibition on the disposal of garbage is subject to exceptions that are contained in regulations 4, 5, 6 and 7 of the Annex and section 5.2 of part II-A of the Polar Code,[19] as defined in regulation 13.1 of the Annex. Moreover, regulation 3.2 provides that:

> Except as provided in regulation 7 of this Annex, discharge into the sea of all plastics, **including but not limited to synthetic ropes, synthetic fishing nets**, plastic garbage bags and incinerator ashes from plastic products is prohibited (emphasis added).

In other words, regulation 3.2 contains a clear prohibition of the "discharge" of synthetic fishing nets and synthetic ropes. However, regulation 7 sets out several exceptions, as follows:

> Regulations 3, 4, 5 and 6 of this Annex and section 5.2 of chapter 5 of part II-A of the Polar Code shall not apply to:
>
> 1. The discharge of garbage from a ship necessary for the purpose of securing the safety of a ship and those on board or saving life at sea; or
> 2. The accidental loss of garbage resulting from damage to a ship or its equipment, provided that all reasonable precautions have been taken before and after the occurrence of the damage, to prevent or minimize the accidental loss; or
> 3. The accidental loss of fishing gear from a ship provided that all reasonable precautions have been taken to prevent such loss; or
> 4. The discharge of fishing gear from a ship for the protection of the marine environment or for the safety of that ship or its crew.

The discharge of fishing gear under the heading garbage and synthetic fishing nets therefore does not apply to accidental loss for reasons related to environmental protection or safety.

[19] MEPC 68/21/Add.1 Annex 10, page 3.

The next question is: what does the word "discharge" mean? Article 2.3 of MARPOL defines it as follows:

a) 'Discharge' in relation to harmful substances or effluents containing such substances, means any release howsoever caused from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying;
b) 'Discharge' does not include:

    i) dumping within the meaning of the (London Convention); or
    ii) releases of harmful substances directly arising from the exploration, exploitation and associated offshore processing of sea-bed mineral resources; or
    iii) release of harmful substances for purposes of legitimate scientific research into pollution abatement or control.

The term "harmful substance" is defined in article 2.2 as:

> 'Harmful substance' means any substance which, if introduced into the sea, is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea, and includes any substance subject to control by the present Convention.

In other words, as the term "discharge" is defined by reference to harmful substances in order to substantiate its prohibition. The effect is that fishing gear, if introduced into the sea, is defined in a similar manner. Like garbage, it is treated as a harmful substance even though the use of fishing gear, when it is not discharged, is clearly a legitimate use of the sea. Therefore, the disposal of a net overboard might be understood as a discharge.

Fishing gear is not *per se* an example of an "operational waste". While it may *become* garbage or waste when it is no longer fit for use that does not necessarily mean it is automatically to be disposed of overboard. Fishing gear may become damaged or worn out during a voyage; it may become in the eye of the master or the owner of the vessel something to be disposed of. However, MARPOL Annex V prohibits this.

A more significant concern with regard to the content of Annex V concerns the issue of enforcement. The prohibition of discharges at sea is of course vital, but the real issue is how to enforce such a rule? A prohibition applicable far out at sea without any form of implementation mechanism may not in itself be particularly effective.

To this end, Annex V contains a number of enforcement mechanisms. For example, regulation 10 (1) requires every ship of 12 m or more in length overall to display placards to notify the crew and passengers of the discharge requirements under regulations 3, 4, 5 and 6 of the Annex, while every ship of 100 gross tonnage and above – or which is certified to carry 15 or more persons – must have a mandatory "garbage management plan" based on IMO guidelines. Moreover, every ship of 400 gross tonnage (GT) and above (and every ship certified to carry 15 or more persons) engaged in international voyages must also have a "Garbage Record Book" in a specified format.

Another weakness of these provisions, as far as fishing vessels are concerned, is the fact that less than 2 percent of the world's fishing fleet is more than 24 m in

length, which roughly corresponds to 100 GT. The reality therefore is that detecting garbage discharges at sea in violation of Annex V is extremely difficult. In practice, a vessel must either be observed violating the regulations, or there must be some other type of clear evidence that can be attributed to that particular vessel to initiate enforcement proceedings (Koehler *et al.*, 2000). In other words, while Annex V represents an important step forward in terms of ALDFG – as the only binding legal instrument of general application under international law that addresses the problem – it is of limited scope in relation to the fishing vessels to which it applies, insofar as it does not provide a realistic enforcement mechanism. More stringent inspection regimes at ports may help, it is known that vessels engaged in IUU fishing are more likely to abandon or discard of fishing gear at sea.

b) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention/London Protocol)

The London Convention is concerned with the deliberate disposal of wastes at sea. It defines "Dumping" to mean, among others, any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea. It further defines "Wastes or other matter" to mean material and substance of any kind, form or description. Logically, therefore, it would appear that the deliberate disposal of fishing gear at sea falls within the purview the London Convention.

Notwithstanding, the London Convention created a system of categorization of waste and other matter into annexes and proceeded to prohibit the dumping of waste in Annex I including the dumping of persistent plastics and other persistent synthetic materials, such as, netting and ropes, which may float or may remain in suspension in the sea in such a manner as to interfere materially with fishing, navigation or other legitimate uses of the sea.

The 1996 London Protocol, as amended, has similar objectives to that of the Convention. Both seek to promote the effective control of all sources of marine pollution especially that Contracting Parties to take effective measures to protect and preserve the marine environment pollution caused by dumping at sea. However, the Protocol is more restrictive in approach in that it made precautionary approach a general obligation and adopted a "reverse list" approach. The latter prohibits all dumping unless explicitly permitted. The Protocol also prohibits incineration of wastes at sea and the export of wastes for dumping or incineration at sea. For these and other reasons, the London Protocol is seen as the modern version of the Convention.[20]

[20] For more information on the Convention and the Protocol, see, https://www.imo.org/en/OurWork/Environment/Pages/London-Convention-Protocol.aspx

3.4 UNEP and the protection of the marine environment

Within the UN system, the United Nations Environment Programme (UNEP) is the main body responsible for marine environmental issues. UNEP has sponsored and/or provides the secretariat for a number of international environmental conventions including the Convention on Biological Diversity (CBD),[21] adopted at the Earth Summit in Rio de Janeiro in June 1992, which lies at the heart of global international efforts to conserve biological diversity.

Participation in the CBD is almost universal, there are currently 196 parties to the Convention,[22] and its objectives are: (1) the conservation of biological diversity, (2) the sustainable use of its components, and (3) the fair and equitable sharing of the benefits arising out of the utilization of genetic resources (Art 1).

The contracting parties to the CBD must, as far as possible and as appropriate, cooperate directly or, where appropriate, through competent international organizations for the conservation and sustainable use of biological diversity (Art. 5). They are also required to develop national strategies for the conservation and sustainable use of biological diversity, and to integrate the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. To this end, they are required to undertake, as far as possible and appropriate, a series of measures to identify and monitor the "components of biological diversity" (Art. &) as well as *in situ* and *ex situ* conservation measures (Arts 8 and 9).

Although the question of ALDFG is relevant to biodiversity – particularly as regards the entanglement or ghost fishing of non-target endangered species, including invertebrates, turtles, birds and mammals – neither the CBD nor its protocols address ALDFG.

Nevertheless, UNEP has been at the forefront of international efforts to draw attention to the issue of marine debris, marine litter and marine pollution, including abandoned, lost or discarded fishing gear.[23] In particular, four United Nations Environment Assembly resolutions have been adopted on the topic: i. UNEP/EA.1/Res.6: Marine plastic debris and microplastics (2014); ii. UNEP/EA.2/Res.11: Marine plastic litter and microplastics (2016); iii. UNEP/EA.3/Res.7: Marine litter and microplastics (2017); and iv. UNEP/EA.4/Res.6: Marine plastic litter and microplastics (2019).[24]

The 2014 Resolution commissioned a study on marine debris and micro plastics, while the 2016 Resolution charged the Executive Director to assess the effectiveness of relevant international, regional and subregional governance strategies and approaches to combat marine litter and microplastics, including the regulatory

[21] Convention on Biological Diversity, Rio de Janeiro, 5 June 1992, 1760 UNTS, 79.
[22] See www.cbd.int/convention/parties/list/. Accessed 5 May 2021.
[23] United Nations Environment Programme, Marine Litter. https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/addressing-land-based-pollution/marine-litter-issue.
[24] United Nations Environment Programme, Compilation of United Nations Environment Assembly resolutions on marine litter and microplastics (2019). https://papersmart.unon.org/resolution/uploads/unep.aheg_.2019.3.inf_.2_compilation_of_resolutions.pdf.

frameworks, gaps, and regional cooperation and coordination. The 2017 resolution, meanwhile, convened an open-ended ad hoc expert group to examine the barriers to, and options for, combatting marine plastic litter and microplastics. Finally, the 2019 resolution extended the deadline of the report of the ad hoc expert group and expanded their work to include assessments of existing activity, available resources, and the effectiveness of those options. Nevertheless, in spite of these resolutions, UNEP has not implemented any binding resolutions to address ALDFG.

3.5 Regional agreements

In addition to international agreements of global application, a large number of agreements have been concluded at the regional level, often with their own institutional arrangements. Using these arrangements, States cooperate and act to protect the marine environment and establish measures for the conservation, management and utilization of living marine resources.

a) Regional fisheries management organizations/arrangements

As described above, all States enjoy the "freedom of fishing" on the high seas, although this freedom is subject to section 2 of Part VII (the part of UNCLOS concerning the high seas), which is entitled "Conservation and Management of the Living Resources of the High Seas".

Consequently, the freedom of States in connection with high seas fishing is subject to their international obligations (Art. 116(a), to the rights, duties and interests of coastal States (Art. 116(b)), as well as to the obligations of all States to cooperate in the conservation and management of the living resources of the high seas (Arts 117-119). Article 118 of UNCLOS provides that:

> States shall cooperate with each other in the conservation and management of living resources in the areas of the high seas. States whose nationals exploit [...] living resources in the same area, shall enter into negotiations with a view to taking the measures necessary for the conservation of the living resources concerned. They shall, as appropriate, cooperate to establish sub-regional or regional fisheries organizations to this end.

To this end numerous such agreements have been concluded to establish RFMOs. Such agreements are, however, as a matter of international law, only binding upon the States that are party to them. No State, or group of States, can unilaterally impose conservation measures in respect of high seas fish stocks on another State, or on any vessel flying the flag of such a State.

A number of RFMOs, have adopted substantive measures specifically on the issue of ALDFG. One example is the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLAR),[25] which in 2009 agreed to adopt reporting on lost fishing gear as part of its mandatory data forms for longline fisheries.

[25] Convention for the Conservation of Antarctic Marine Living Resources, 1980, 1338 UNTS, 47.

Similarly, the International Commission for the Conservation of Atlantic Tuna (ICCAT)[26] and the Western and Central Pacific Fisheries Commission (WCPFC)[27] have adopted conservation and management measures that recognize ALDFG as a contributor to marine pollution, target ALDFG directly, or target ALDFG via the broader category of marine pollution. For example, ICCAT Recommendation 19-1[28] prohibits the abandoning or discarding of fishing gear within the ICCAT convention area except for safety reasons. It also requires vessels of 12 m and over to have equipment on board to retrieve lost fishing gear, and for the master of a vessel that has lost fishing gear, whether wholly or in part, to make every reasonable attempt to retrieve it as soon as possible, to the extent possible. Finally, it sets out reporting requirements in cases where lost fishing gear cannot be retrieved and in cases where it can, which must be transmitted to the ICCAT secretariat.

The most far-reaching measures relating to ALDFG are found in the WCPFC coverage area. The Conservation and Management Measure on Marine Pollution 2017-04[29] provides that fishing nets found unattached to a vessel are to be treated as garbage. Moreover, the abandoning of fishing nets is considered to be dumping, which is prohibited. The measure also requires vessels, where possible, to retrieve lost, abandoned or discarded fishing gear or, alternatively, to report the location of the same, if retrieval is not possible.

b) Regional seas organizations

More than 140 countries participate in 14 Regional Seas Programmes established under the auspices of UNEP in the Caribbean Region, the East Asian Seas, the Eastern Africa Region, the Mediterranean Region, the North-West Pacific Region, the Western Africa Region, the Caspian Sea, the Black Sea Region, the North-East Pacific Region, the Red Sea and Gulf of Aden, the ROPME Sea Area, the South Asian Seas, the South-East Pacific Region, and the Pacific Region.. In addition, there are four independent programmes for the Antarctic, the Arctic Ocean, the Baltic Sea, and the North-East Atlantic (de La Fayette, L.A., 2009) which cooperate with the UNEP's Regional Seas Programme.

Over recent years, regional seas organizations have played an increasingly important role in developing programmes and action plans to combat marine litter, including ALDFG. For example, the Black Sea Marine Litter Regional Action Plan,[30] which was adopted at the 34th Meeting of the Commission on the Protection of the Black Sea against Pollution, calls upon the contracting parties to explore and implement, to the extent possible, gear marking and measures to reduce ghost fishing. It also calls upon them to implement "Fishing for Litter" practices to facilitate the clean-up

[26] Established pursuant to the International Convention for the Conservation of Atlantic Tunas, adopted and opened for signature by Conference of Plenipotentiaries on the Conservation of Atlantic Tunas, Rio de Janeiro, Brazil - May 2 to 14, 1966 (as subsequently amended)
[27] Established pursuant to the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean 2000, (2001) 45 LOSB, 79.
[28] ICCAT. Recommendation by ICCAT on Abandoned, Lost, or Otherwise Discarded Fishing Gear 19-11 (2019). https://www.iccat.int/Documents/Recs/compendiopdf-e/2019-11-e.pdf.
[29] Available at https://www.wcpfc.int/system/files/CMM%202017-04%20CMM%20to%20limit%20marine%20pollution%20from%20fishing%20vessels_0.pdf.
[30] http://www.blacksea-commission.org/Downloads/BS_Marine_Litter_RAP_adopted.pdf

of “floating litter and the seabed from marine litter caught incidentally and/or generated by fishing vessels in their regular activities including derelict fishing gears” (BSC, 2018).

A common challenge in terms of international efforts to address the issue of ALDFG is, of course, the fact that it is simultaneously a fisheries problem, a maritime transport (vessel source pollution) problem and an environmental problem, as noted above. This implies the need for careful coordination and effective collaboration at the international level, including regional coordination between RFMOs and regional seas organizations. In this regard, the Black Sea action plan referred to in the previous paragraph explicitly notes the need for measures relating to gear marking and ghost fishing, which should be implemented in consultation with the competent international and regional organizations in the fishing sector.

As will be seen in part five, this division of responsibilities is reflected at the national level where a separate ministry/department/agency (hereafter ‘agency’) is typically responsible for fisheries, vessel source pollution and environmental protection. In practice, the implementation of measures adopted at the international level becomes difficult if national focal points for regional seas programmes in environment agencies have limited/no contact with their fisheries agency counterparts. The effectiveness of measures taken at the international level to address the problem of ALDFG may thus be hindered if coordination and collaboration mechanisms, procedures and practices, are lacking at the national level.

4. Possible legal approaches to ALDFG: the regulatory toolbox

Before turning to the four case-study jurisdictions, it is worth considering first of all exactly how the law can or could be used to address the issue of ALDFG at a conceptual level. It is, in other words, useful to consider the various legal and regulatory options contained in the notional "regulatory toolbox".

4.1 Command-and-control regulation

"Command and control" is another name for the traditional regulatory approach that is a basic element of legislation in all sectors, including fisheries and environmental protection. The "command" part involves the setting of legally binding rules, either directly in legislation (in laws or regulations) or as conditions in licences or permits; the "control" part relates to the enforcement of such rules through the use of civil and/or criminal penalties to sanction non-compliance. Such rules can specify what cannot be done: the prohibitions contained in MARPOL Annex V are a good example in this regard. Or they can specify where an activity is to be undertaken, how an activity is to be undertaken and what tools or equipment should be used to undertake that activity. In short, the scope of rules or standards that can be set using command and control regulation is extremely broad.

To be effective, however, a command-and-control regime must seek to deter non-compliance with the relevant rule through an appropriate system of sanctions. For example, article 19(2) of UNFSA provides that:

> Sanctions applicable in respect of violations shall be adequate in severity to be effective in securing compliance and to discourage violations wherever they occur and shall deprive offenders of the benefits accruing from their illegal activities.

Apart from the severity of any sanctions that may be imposed to punish the breach of a rule, the issue of deterrence very much depends on the likelihood of getting caught. Indeed, both elements are equally important: a command-and-control regime with extremely onerous sanctions may not have much of a deterrent effect if the likelihood of getting caught is very low.

An effective enforcement mechanism is highly relevant to the issue of ALDFG given that the abandonment, loss or other disposal of fishing gear will very often take place at sea. As recognized in Annex V of MARPOL, specific enforcement mechanism may be needed in addition to the basic rule and the sanction. In the case of Annex V, which is primarily concerned with the disposal of garbage, this is achieved through the various enforcement mechanisms described above, such as the requirement for a garbage management plan on larger vessels.

However, a simple ban on a given activity, such as the deliberate disposal of fishing gear at sea, is not the only kind of command-and-control rule that can be imposed. Clearly, there would be little point in legislating against the accidental or unintentional loss of gear (and as seen, Annex V does not seek to do that),

but safeguards must exist in the legislation to prevent the use of accidental or unintentional loss of gear from becoming a loophole. In this respect, command-and-control legislation can also be used to require positive actions to be taken in specified circumstances.

For example, road traffic legislation typically requires anyone involved in a road accident to report that accident promptly to the police. Failure to report such an accident may be an offense in itself. The scope for using command-and-control regulation in the context of ALDFG may therefore be broader and more useful than first appears to be the case. For example, command-and-control regulation could be used to require the reporting of accidental and unintentional loss of gear (as provided for in the ICCAT Recommendation mentioned above) and sanction any failure to so. Making it a legal requirement to report ALDFG would provide more data about the scope and scale of the problem, as well as constitute initial support towards gear recovery efforts. Alternatively, following the accidental loss of gear, the law could be used to require reasonable attempts to secure its recovery.

Finally, legally binding standards can also be set to promote the recyclability of fishing gear, or to specify the types of material to be used in the components of fishing gear such as ropes, in order to facilitate recycling (for example by specifying the use of polymers that can be mixed and/or easily recycled) or even elements that are biodegradable.

4.2 Liability regimes

While ordinary civil liability regimes provide the basis for imposing responsibility for wrongful or accidental damage to a person's health, business or property (usually through the payment damages in the form of financial compensation) environmental liability regimes seek to impose financial liability upon those who cause harm to the environment and/or natural resources by, for example, causing pollution. The amount or quantum of financial damages that must be paid in this case is usually calculated by reference to the costs of remedying the environmental harm.

Specific liability regimes have been developed in a number of countries, particularly in respect of more environmentally harmful activities or those using hazardous substances. Such regimes can include the imposition of strict liability (under which it is not necessary to prove fault), relaxed rules on proving causation, and the development of statutory funds to cover any eventual clean-up costs, for example by requiring operators to provide bonds or other financial guarantees.

Could such a regime be applied to ALDFG? On one hand, in the case of a single item of ALDFG, it would be difficult to remedy the harm caused by, for instance, ghost fishing or the introduction of plastic waste into the environment, let alone to calculate the costs of doing so. On the other hand, however, the recovery of ALDFG clearly does have an economic cost. At the very least there is scope for seeking to recover some or part of that cost from the owner/operator, particularly if certain requirements are not met in terms of reporting lost gear, for example.

4.3 Impact assessment

An environmental impact assessment (EIA) is a decision-making support tool usually used to ensure that the potential environmental impacts of a project are taken into account during the authorization process, and to identify potential mitigation measures as necessary. A similar type of approach, sometimes called a strategic environmental assessment (SEA), can be used to evaluate the potential environmental impacts of new plans, policies and programmes.

As fishing activities are not usually classified as a 'project', it is difficult to see how an EIA could be particularly relevant to the issue of ALDFG except, perhaps, in connection with the development of a new fishing port that opens up new fishing grounds. The impacts of ALDFG on the affected ecosystem might be one of the issues to be taken into consideration.

However, as in cases where the development of a new fisheries policy, management plan or fisheries investment programme is subject to an SEA, the potential impacts of ALDFG should arguably be taken into consideration.

4.4 Market-based mechanisms

Market-based mechanisms seek to harness economic incentives to promote more efficient and more effective regulation of the activities impacting the environment and natural resources.

In the context of fisheries management, the discussion of market-based mechanisms has tended to focus on the notion of individual transferable quotas (ITQs), yet these have little obvious relevance as far as ALDFG is concerned.

However, as will be seen below, other types of market-based mechanism are potentially relevant to ALDFG, including deposit-refund schemes, extended producer responsibility and charging mechanisms, including for waste disposal (Ten Brink *et al.*, 2009).

Charging mechanisms typically seek to apply the well-known and widely accepted "polluter pays" principle. In connection with waste management, this principle is usually applied on the basis that a person who generates waste should be responsible for meeting the costs of treating/disposing of that waste. As regards ALDFG, however, if the costs of disposing of used fishing gear to a formal waste reception facility are high, the owner/operator may be tempted to simply dispose of the waste at sea. In other words, there is a potential tension between the polluter pays principle and the environmental imperative of preventing ALDFG.

4.5 Voluntary approaches

Voluntary approaches are a feature of many natural resource and environment sectors and include industry-sponsored codes of conduct, certification schemes and eco-labelling schemes. It can be argued that these are not regulatory tools at all. However, if a company chooses to participate in such a scheme it must comply

with the relevant body of rules. Such rules may or may not be set out in legislation. In the environmental management context, the ISO 14000 environmental standard does not have a statutory backing, whereas the European Union's eco-management and audit scheme (EMAS) does.[31] Under EMAS, the basic premise is that while a company does not have to follow the applicable rules, if it does choose to follow them then those must be followed strictly, or the accreditation is forfeited. The same approach is followed by most certification schemes.

As far as the fisheries sector is concerned, FAO has adopted eco-labelling guidelines (FAO, 2005), although these do not specifically refer to ALDFG. One of the best-known voluntary certification schemes in the fisheries sector is promoted by the Marine Stewardship Council (MSC).[32] The MSC Fisheries Standard has three core principles that every fishery must meet in order to be certified; these are:

1. the sustainability of fish stocks concerned;
2. the minimization of environmental impact such that the fishing activity must be managed carefully so that other species and habitats within the ecosystem remain healthy; and
3. effective fisheries management, which includes compliance with relevant laws.

Under the MSC regime, the issue of ALDFG implicitly factors elements to assess the sustainability of a fishery into the scoring, but it does not yet have its own separate scoring category. In response to concerns that the existing approach does not encourage fisheries to adopt effective strategies to prevent gear loss and ghost fishing, MSC is currently revising the Fisheries Standard to minimize gear loss and the impact of ghost gear.

4.6 Public participation and co-management

To encourage transparency and better decision-making, the importance of involving the public in decision-making through appropriate consultation is increasingly understood with respect to all natural resource and environment sectors, including fisheries.

Under co-management approaches, stakeholders are involved in making fisheries management decisions, the rationale being that that not only are such decisions likely to be better, but they are also more likely to be implemented and enforced. Nonetheless, aspects of regulating ALDFG (marking of gear, reporting losses, etc.) could be efficiently performed through co-management. A practical approach could use existing co-management systems, which often regulate gear and fishing practices over a geographic area, by expanding their enforcement scope and regulatory authority to include regulating those areas related to ALDFG, such as inspections to ensure gear marking, among others.

[31] See Regulation EC/761/2001 of the European Parliament and the Council of 19 March 2001 allowing voluntary participation by organizations in a community eco-management and audit scheme (EMAS) (OJ L, 24.4.2001, p 1).
[32] See www.msc.org.

5. Legal and institutional arrangements in the case-study jurisdictions

As noted in part three of this study, a number of different actors are directly, indirectly or potentially concerned with the issue of ALDFG at the international level. A similar pattern can be detected within the selected case-study jurisdictions: Australia, Norway, the United States of America and the European Union.

While States have the right to determine their own internal, institutional arrangements to address marine pollution/litter, including ALDFG, agencies responsible for the preparation and implementation of the legal frameworks that are relevant to ALDFG typically follow a basic division of competences that is similar to that found at the international level. Separate agencies are responsible for the implementation of legislation on fisheries, marine environmental protection, and maritime transport/vessel source pollution. This is not surprising, as these entities act as the main interlocutors for the relevant UN bodies described in part three. The relevant national agency responsible for fisheries tends to work with FAO and RFMOs, for example, the national agency responsible for maritime transport is the main point of contact for the IMO, and national environment agencies interact with UNEP, environmental convention secretariats concerned with different environmental issues and regional seas programmes. Of course, there are exceptions. States are free to organize their institutional arrangements such that, for example, the same agency is responsible for fisheries and environmental issues.

Before turning to the individual case studies, it is worth noting that the constitutional arrangements in the three States considered are somewhat different. Both Australia and the United States of America have federal systems of government, in which the competence for fisheries and other topics relevant to ALDFG are shared between the federal and state governments. Norway, on the other hand, is a unitary state with a single (national) government.

Finally, as regards the fourth case study, the European Union is obviously not a State at all. It is a unique body: neither a government nor an association of States, nor an international organization. Rather, the 27 European Union Member States, which remain independent and sovereign, have transferred a number of specific competences to the European Union in order to gain greater collective strength and influence in areas best addressed through cooperation.[33]

5.1 Australia

Australia's constitution provides that both the Commonwealth of Australia and the States have shared responsibility for the management of its fisheries resources.

[33] The 27 are: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Under section 51(x) of the Constitution, the Commonwealth has the power to legislate with respect to "fisheries in Australian waters beyond territorial limits".[34]

At the Commonwealth (federal) level, responsibility for fisheries management lies with the Australian Fisheries Management Authority (AFMA), which was established as a statutory body on the basis of the 1991 Fisheries Administration Act. Following the establishment, in 1979, of a 200 nautical mile "fishing zone",[35] the Commonwealth and the States concluded a political agreement known as the Offshore Constitutional Settlement (OCS), designed to settle contentious and complex offshore constitutional issues, including overarching jurisdictional arrangements for fisheries (Australian Government, 1980).

The OCS allowed the Commonwealth and the States to enact complementary legislation enabling them to assign the jurisdiction and the management of particular fisheries exclusively to one or the other, or alternatively, to joint management through a 'Joint Authority'. There are currently three joint authorities: the Queensland Fisheries Joint Authority, the Northern Territory Fisheries Joint Authority and the Western Australian Fisheries Joint Authority.

The legislative parts of the Commonwealth fisheries management framework are implemented by AFMA. This includes the regulation of fisheries, the preparation of fisheries management plans, the allocation and management of statutory fishing rights and other concessions, the determination of allowable catch, fish receival, compliance and foreign fishing controls, cooperation with States, and satisfying international obligations.

As regards maritime transport and vessel source pollution, the Australian Maritime Safety Authority (AMSA) enforces MARPOL regulations, as implemented through Australian law. To this end, AMSA is responsible for the implementation of a number of acts, including the Protection of the Sea (Prevention of Pollution from Ships) Act of 1983, Part IIIC of which, entitled "Prevention of Pollution by Garbage", deals specifically with the matter of waste disposal from vessels at sea. The implementation of the Navigation (Protection of the Sea Act) Act of 2012 is also the responsibility of AMSA; this Act implements MARPOL in Australian waters – including State waters – until such time as a State implements its own legislation applicable to those waters.[36]

In accordance with the requirements of MARPOL, the accidental loss and discharge of fishing nets within Australia's jurisdiction must be recorded in the Garbage Record Book, which all vessels of 400 GT and above must be provided with. Australian commercial fishing vessels are mostly under 400 GT however, and therefore not obliged to carry a record book. Nevertheless, fishing vessels operators are encouraged to record the loss of gear, nets etc. in the vessel's Official Logbook. Where such a loss occurs in Australian waters from an Australian vessel, the operators are required

[34] Commonwealth of Australia Constitution Act 1900.

[35] Australia subsequently declared an EEZ in 1994 through an amendment to the Sea and Submerged Lands Act, 1973.

[36] Amended regulations under MARPOL entered into force internationally on 1 January 2013. Amendments to the Commonwealth *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* to give effect to the regulations were passed through the Australian Parliament on 13 September 2012.

to report it to AMSA's Rescue Coordination Centre (RCC - Australia), along with its approximate position and the reason for its loss. This allows other vessels to avoid the lost gear or to recover it, if possible. However, the retrieval and/or monitoring (interception) of derelict gear identified by vessels at sea is not currently mandatory; moreover, the responsibility for responding to reports of potentially hazardous debris is currently unclear.

Australian Commonwealth fisheries legislation interacts with several other Commonwealth acts as well as with the legislation of the States. In this regard, the key legislation at the Commonwealth level is the Environment Protection and Biodiversity Conservation (EPBC) Act 1999. Of particular relevance are part 10 – *Strategic Assessments*, which involves the accreditation of a plan of management and risk assessment for a fishery under the EPBC Act – and part 13, which seeks to protect listed threatened species and ecological communities.

The principal item of Commonwealth fisheries legislation, the Fisheries Management Act 1991 does not specifically mention ALDFG other than by reference to UNFSA. Consequently, AFMA seems to have a restricted role in addressing ALDFG. This being said, pollution prevention and the protection of the marine environment are clearly part of AMSA's functions.

At the State level, the Northern Territory Fisheries Act 1988 prohibits any person from abandoning gear,[37] whereas under the Western Australia Fish Act fishery officers have the power to seize gear found at sea. In-person research has revealed that the Northern prawn trawl fisheries implement good practices on a voluntary basis and do not discard repaired nets at sea. Instead, operators return net fragments to land-based facilities for their proper disposal.

Compliance with MARPOL requirements is monitored by AMSA. Discharge from a fishing vessel, in contravention of MARPOL regulations, can lead to the imposition of significant fines on both the vessel owner and master. The Australian MARPOL regulations apply to Australian fishing vessels wherever they operate. Australian laws can also be applied against foreign fishing vessels operating anywhere within Australia's EEZ. All of Australia's States have adopted complementary legislation for the implementation of Annex V of MARPOL, and its implementing guidelines.[38]

As was highlighted in a 2003 report (Kiessling, 2003), the fisheries agencies still do not have a leading role in the prevention and management of marine debris because Commonwealth fisheries legislation does not currently allow for direct control of debris within the industry in either the commercial or recreational sectors. Instead, AFMA works collaboratively with the agencies responsible for marine debris (Australian Fisheries Management Authority, 2019).Finally, the exploitation

[37] This act (administered by the Northern Territories Fishery Agency under the Department of Business, Industry and Resource Development) includes provisions to control pollution of waters by any substance likely to affect aquatic life.

[38] Northern Territory: Marine Pollution Act, 1999; New South Wales: Marine Pollution Act, 2012 South Australia: Protection of Marine Waters Prevention of Pollution from Ships) Act, 1987; Tasmania: Pollution of Waters by Oil and Noxious Substances Act, 1987; Victoria: Pollution of Waters by Oil and Noxious Substances Act, 1986; Queensland: Transport Operations (Marine Pollution) Act, 1995; and Western Australia: Pollution of Waters by Oil and Noxious Substances Act, 1987 and Pollution of Waters by Oil and Noxious Substances Amendment Regulations. 2006.

of fisheries and fisheries related activities are required to be conducted in a manner consistent with the precautionary principle and the principles of ecologically sustainable development at both federal and state/territory levels.

5.2 The European Union and its Member States

The European Union institutions most relevant to the topic of ALDFG are the elected European Parliament, the Council of the European Union – comprised of representatives of the Member States – and the European Commission. The European Commission is the politically independent, executive arm of the European Union, the 'guardian' of the treaties responsible for enforcing European Union law and the sole institution with the right to introduce new legislation. The Commission has 27 members (one from each Member State) plus the President. The Commission services, most of which are based in Brussels, are organized as 'directorates-general'. Three directorates-general are responsible for legislation relevant to marine litter/ALDFG: the Directorate-General for Maritime Affairs and Fisheries (DG MARE), the Directorate-General for Mobility and Transport (DG MOVE) and the Directorate-General for the Environment (DG ENV).

At the same time, each Member State has its own national agencies responsible for fisheries, maritime transport and the environment, which in turn deal primarily with the relevant European Commission directorates-general in terms of European Union law.

A key feature of the European Union is its unique legal order. The European Union's right to adopt what is known as 'secondary legislation' is defined in its basic treaties (the treaties themselves are the primary legislation).[39] Generally speaking, such legislation is adopted by the 'co-legislators' – namely the European Parliament and the Council – although they may confer the necessary legal authority on the European Commission to adopt implementing or delegated measures,[40] similar to the way in which national laws typically confer the power on a minister to adopt subordinate legislation in the form of decrees or regulations.

Two types of secondary legislation are potentially relevant to the issue of ALDFG, namely regulations and directives. Both types of instrument are also unique to European Union law. Regulations are of a binding nature and directly effective. This means that once a regulation enters into force, following its publication in the European Union's Official Journal, it applies directly within the European Union Member States, within the waters under the jurisdiction of the Member States and, depending on the wording of the relevant instrument, on European Union nationals and vessels flying the flag of European Union Member States anywhere in the world.

Article 3 (1) of the Treaty on the Functioning of the European Union (TFEU) provides that the European Union has exclusive competence with regard to the conservation of marine biological resources in accordance with the Common Fisheries Policy. The overall framework for fisheries management in the European Union is contained

[39] Namely the Treaty on European Union and the Treaty on the Functioning of the European Union (OJ C 115 9.5.2008 page 1).
[40] Following separate procedures that both provide for an element of consultation.

in the so-called "Basic Regulation",[41] as supplemented by the Control Regulation,[42] which sets out a comprehensive monitoring, control and surveillance (MCS) regime for the European Union and is currently being revised. A large number of other regulations apply to European Union fisheries, but these are not relevant to the issue of ALDFG.

Directives, on the other hand, set out the basic objectives to be achieved while leaving it to each Member State to adopt its own legislation to give effect to those objectives. Directives are the main instruments used in European Union environmental law, including the Marine Strategy Framework Directive,[43] which seeks to protect the quality of Europe's marine waters, and more recently, the single-use plastics Directive[44] one of the objectives of which is to reduce the impact of plastic products, including fishing gear, on the aquatic environment.

A number of directives have also been adopted in connection with the maritime transport sector to ensure a uniform application of the obligations of the Member States with regard to the obligations under various IMO instruments. Of particular relevance in this respect is the amended Port Reception Facilities Directive[45], which transposes the obligations of Member States under MARPOL into European Union law.

5.3 Norway

In Norway, the Directorate of Fisheries in the Ministry of Trade, Industry and Fisheries is responsible for establishing long-term and sustainable conditions for the fishing industry, through sustainable and user-oriented management of marine resources and the marine environment. The main item of fisheries legislation is the Marine Living Resources Act 2008, which seeks to ensure a sustainable and economically profitable management of the resources, while simultaneously focusing on the conservation of biodiversity as an integral part of sustainable management.

The Coast Guard Central acts as the receiver of mandatory reports relating to the loss of fishing gear. Such reports must include details of the vessel, the time the gear was lost, its position at that time and the type of gear involved. However, the Norwegian Maritime Authority is responsible for the implementation and

[41] Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC (OJ L 354 28.12.2013, p 22).
[42] Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006 (OJ L 343, 22.12.2009, p. 1).
[43] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for Community action in the field of marine environmental policy OJ L 240, 10.7.2004, p. 17.
[44] Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment (OJ L 155, 12.6.2019, p. 1–19).
[45] Directive (EU) 2019/883 of the European Parliament and of the Council of 17 April 2019 on port reception facilities for the delivery of waste from ships, amending Directive 2010/65/EU and repealing Directive 2000/59/EC (OJ L 151, 7.6.2019, p. 116).

enforcement of Regulation No. 488, adopted on 30 May 2012 pursuant to the Ship Safety and Security Act,[46] which is concerned with the environmental safety of ships and mobile offshore units. Among other objectives, the regulations apply MARPOL Annex V to Norwegian registered vessels and foreign vessels in waters under Norwegian jurisdiction.

5.4 United States of America

The constitutional settlement of the United States of America divides authority between Federal and State levels. The authority and management autonomy of a State over coastal waters generally extends to three nautical miles offshore, beyond which Federal authority applies (National Research Council, 2009).[47] Since fish do not follow administrative boundaries, State and Federal fishery authorities coordinate their management approaches, and states may not undermine federal management of those fisheries that are considered federal resources.[48] When Federal and State laws exist on the same subject conflict, Federal laws have supremacy.

Only the United States Federal Government has the power to conclude treaties under international law (such as MARPOL) that facilitate international cooperation on ALDFG and other marine issues. Such treaties are then binding on State fisheries as well.

Fisheries in Federal waters are regulated by the Magnuson-Stevens Fishery Conservation and Management Act 1976 (FCMA), as amended. The FCMA establishes eight regional fishery management councils (RFMCs) and charges them with developing fishery management plans (FMPs) for their regions (16 U.S.C. § 1852).[49] FMPs are authorized to designate zones and periods for limited fishing (16 U.S.C. § 1853(b)(2)(A)) and to "prohibit, limit, condition or require the use of specified types and quantities of gear" (16 U.S.C. § 1853(b)(4). The RFMCs are the entities with the most direct regulatory control regarding fishing gear in the US legal system.

The RFMCs typically manage by fishery – usually by species group – such that an RFMC might have one fishery management plan for halibut, another for salmon, and a third for groundfish.[50] This approach may deprioritize concerns about ALDFG because the main negative impacts of ALDFG in a given area may be on non-target species. Although the FCMA does direct RFMCs to minimize bycatch and bycatch mortality (16 U.S.C. § 1853(a)(11), the focus is on active fishing rather than ghost fishing resulting from ALDFG.

[46] Regulations of 30 May 2012 No. 488 on environmental safety for ships and mobile offshore units.
[47] In some areas, State authority extends up to 9 miles from shore.
[48] "[With exceptions for international cooperation in fisheries management], the United States claims . . . sovereign rights and exclusive fishery management authority over all fish, and all Continental Shelf fishery resources, within the exclusive economic zone." 16 U.S.C. § 1811(a).
[49] The FMPs are then sent to the National Oceanic and Atmospheric Association, subject to public comment, and eventually sent to the Secretary of Commerce for approval. 16 U.S.C. § 1854(a).
[50] The Western Pacific RFMC is the exception; it manages by geographical area under what it calls a "Fishery Ecosystem Plan." This approach is likely to be more sensitive to the issue of ALDFG because of its concern with effects on the ecosystem in a particular area, rather than on a few fish species.

The main United States of America statutes addressing ALDFG are the Marine Debris Research, Prevention, and Reduction Act 2006 (MDRPRA, 33 U.S.C. §§ 1951 et seq) and the Act to Prevent Pollution from Ships 1980 (APPS, 33 U.S.C. § 1901 et seq), both of which address a broad scope of marine debris and pollution beyond derelict fishing gear. They are respectively implemented by the Department of Commerce's National Oceanic and Atmospheric Administration, and by the US Coast Guard under the Department of Homeland Security.

The MDRPRA, as amended, establishes the Marine Debris Program (MDP) within the National Oceanic and Atmospheric Administration (NOAA; 18 U.S.C. § 1952(a)). The MDP targets marine debris generally, but the Act specifically calls for the MDP to research and develop alternatives to fishing gear that pose threats to the marine environment, and to set methods for the marking of fishing gear to aid in the tracking, recovery and identification of lost or discarded gear (33 U.S.C. § 1952(b)(3)(A)). It also calls on the MDP to develop "effective non-regulatory measures and incentives to cooperatively reduce the volume of lost and discarded fishing gear and to aid in gear recovery" (33 U.S.C. § 1952(b)(3)(B)).

The APPS implements MARPOL and Annexes I and II thereof. It was subsequently amended by the Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA) (33 U.S.C. § 1901 et seq), which implements MARPOL Annex V. As amended, the Act prohibits foreign vessels from discharging fishing gear in the navigable waters or the EEZ of the United States of America (33 U.S.C. § 1902(a)–(b)). However, it permitted American fishing boats to jettison their gear, leaving a major source of ALDFG unregulated. Regarding the discharge of vessel-source garbage and fishing gear at sea, the APPS was specifically enacted to implement the relevant provisions of MARPOL, including an amendment to incorporate the application of Annex V when it entered into force. The APPS/MPPRCA applies to (1) a vessel flagged to the United States of America wherever it is located in the world's oceans, and (2) to *all* vessels while in the navigable waters or the EEZ of the United States of America. American regulations follow Annex V in that they require the person in charge of a vessel to keep a detailed log.

The Marine Protection, Research, and Sanctuaries Act 1972 (33 U.S.C. §§ 1401 et seq) – also referred to as the Ocean Dumping Act – implements the London Convention regarding the at-sea disposal of land-generated wastes. However, the Ocean Dumping Act narrows the exemptions of the London Convention, restricting them only to the discharge of effluents that are incidental to the propulsion or operation of motor-driven equipment or vessels, as opposed to matter that is incidental to the "normal operations of vessels".

A number of programmes have been adopted to address various aspects of marine debris. These include the creation of an Interagency Task Force on Persistent Marine Debris in 1988, the release of the Task Force's Report on Marine Debris (1988 Report of the Interagency Task Force on Persistent Marine Debris), and the passing of the MPPRCA in 1987. The MPPRCA created a Marine Debris Coordinating Committee, which met sporadically over the years as agencies moved forward to implement the Task Force report. Federal agencies implemented some of the 1988 Report's recommendations for additional marine debris research, monitoring and removal, as well as fostering stewardship of the ocean.

6. Provisions relevant to ALDFG in the case-study jurisdictions

This study has examined the types of legal tools theoretically available to legislators when addressing ALDFG, as well as the basic legal and institutional arrangements in the case-study jurisdictions; this part will now consider the *specific provisions* on ALDFG in the legislation of the case-study jurisdictions.

6.1 Definitions

The first point worthy of note is that while the legislation in all of the case-study jurisdictions usually contains a definition of fishing gear, none of the legislation actually seeks to define ALDFG as such, or even use the term ALDFG. The closest usage is contained in the European Union SUP Directive, which defines 'waste fishing gear' as any fishing gear covered by the definition of waste contained in the European Union's Waste Framework Directive,[51] "including all separate components, substances or materials that were part of or attached to such fishing gear when it was discarded, including when it was abandoned or lost" (Art. 3). Otherwise, the legislation refers generally to 'abandoned fishing gear', 'lost gear', and so on, without actually seeking to define what these terms mean.

Why is this and does it matter? These questions bring us back to the meaning of ALDFG, and the definitions proposed in the VGMFG, as discussed in part two. The first thing to note is that the law is primarily concerned with regulating human actions rather than with the status of objects. The precise reasons why ALDFG is in the sea or on a beach do not therefore tend to matter very much. It is not particularly important whether the gear has been abandoned, lost or otherwise discarded: it should not be there, and it needs to be removed and safely disposed of. What is important for the law is to specify how that should happen; what steps should be taken next.

At the same time, in the moment before fishing gear is abandoned, lost or otherwise discarded it is obviously not ALDFG. It is simply fishing gear – whether it is brand-new or old and worn doesn't really matter. What is more important from a legal perspective is what takes place immediately before that point, before the gear is abandoned, lost or otherwise discarded. Moreover, the law, legal systems and legal theory generally tend to distinguish, in terms of both criminal and civil liability, between deliberate actions and actions that are not intentional. The fact that something was an "accident", or even the result of force majeure, does not necessarily mean that there are no consequences for the person involved under criminal or civil law. Indeed, sometimes the law specifies that a person's intention is immaterial, and that liability is strict. In other words, the law may not need to investigate why fishing gear was thrown overboard or left at sea after the event. Rather, its focus should be on the event itself in terms of the state of mind of the person who deliberately or accidentally abandons, loses or otherwise discards fishing gear.

[51] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3). The directive defines 'waste' as, "any substance or object which the holder discards or intends or is required to discard" (article 3).

For this reason, it is this study's contention that it is neither desirable nor necessary to seek to define ALDFG in legislation or other legal documents.

6.2 Marking of fishing gear

The legislation of all four case-study jurisdictions contains provisions on the marking of gear. The purpose of marking gear may be considered to go beyond the question of ALDFG, yet its importance should be immediately apparent in terms of addressing the legal implications of the issue: if gear is not marked it is difficult, if not impossible, to determine its origin or link it to a specific fishing vessel or person. The marking of gear is also an important component in measures to manage fishing effort and a central requirement for effective MCS.[52]

Typically, the relevant item of primary legislation confers the necessary powers to enable the adoption of detailed subordinate legislation. Thus, for example, section 168 of the Australian Fisheries Management Act stipulates the following:

> **168 Regulations**
>
> 1. The Governor-General may make regulations, not inconsistent with this Act, prescribing all matters:
>
>   a) required or permitted by this Act to be prescribed; or
>   b) necessary or convenient to be prescribed in carrying out or giving effect to this Act.
>
> 2. Without limiting the generality of subsection (1), regulations may be made:
>   [...]
>   h) providing for the marking of boats engaged in commercial fishing in the AFZ and of nets, traps and other equipment used for taking fish; and
>
>   ha) providing for the marking of Australian-flagged boats in relation to which fishing concessions or scientific permits allowing fishing outside the AFZ are in force; ...

Similarly, section 16 of the Norwegian Marine Resources Act provides that the Minister may adopt regulations on the conduct of 'harvesting operations', which term is defined as the "harvesting and other utilization of wild living marine resources", including provisions on "the design, marking, use and tending of gear and other devices used in connection with harvesting".

As regards the European Union, article 8 of the Control Regulation, entitled "Marking of the fishing gear" provides that:

> 1. The master of a fishing vessel shall respect conditions and restrictions relating to the marking and identification of fishing vessels and their gear.
> 2. Detailed rules for the marking and identification of fishing vessels and their gear shall be adopted in accordance with the procedure referred to in Article 119.

[52] See p. 9 of the VGMFG in particular.

The second paragraph essentially confers the power to adopt implementing legislation upon the European Commission, in accordance with a specified consultation procedure.

Such legislation was adopted in 2011 in the form of Commission Implementing Regulation (EU) No 404/2011 ("the Implementing Regulation"), which contains relatively comprehensive provisions on gear marking.[53] Article 9 of the Implementing Regulation sets out a series of general rules for the marking of "passive gear" and beam trawls, as follows:

1. The provisions contained in Articles 9 to 12 of this Regulation shall apply to Union fishing vessels fishing in all Union waters and the provisions contained in Articles 13 to 17 of this Regulation to Union waters outside 12 nautical miles measured from the base lines of the coastal Member States.
2. It shall be prohibited in Union waters as set down in paragraph 1 to carry out fishing activities with passive gear, buoys, and beam trawls, which are not marked and identifiable in accordance with the provisions of Articles 10 to 17 of this Regulation.
3. It shall be prohibited in Union waters as set down in paragraph 1 to carry on board:

    a) beams of a beam trawl which do not display the external registration letters and numbers in accordance with Article 10 of this Regulation;
    b) passive gear which is not labelled in accordance with Article 11(2) of this Regulation;
    c) buoys which are not marked in accordance with Article 13(2) of this Regulation.

The term 'passive gear' is defined in article 2(6) of the Implementing Regulation to mean:

> any fishing gear the catch operation of which does not require an active movement of the gear, including:
>
> a) gillnets, entangling nets, trammel nets, and trap nets;
> b) drifting gillnets, and drifting trammel nets, any of which may be equipped with anchoring, floating and navigational gear;
> c) long lines, lines, pots and traps;

As can be seen, the approach of this provision is to require the marking of gear in accordance with the detailed provisions of the Implementing Regulation and, moreover, to prohibit the use of gear that is not appropriately marked within 'Union waters' – i.e. the waters under the sovereignty or jurisdiction of coastal European Union Member States (in other words, within their respective territorial seas or EEZs).

Moreover, sub-article 3 makes it an offence to carry any unmarked gear on board. This is a strict liability offence, which means that the intention of the perpetrator is not relevant; it is sufficient for there to be unmarked gear on board.

Subsequent articles go on to provide detailed provisions for the marking of beam trawls (Art. 10) and passive gear (Art. 11) as well as rules for labels (Art. 12), rules

[53] Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy (OJ L 112, 30.4.2011, p. 1) as amended.

for buoys (Art. 13), rules for cords (Art. 14), rules for end marker buoys (article 15), rules for fixing end marker buoys (Art. 16) and rules for intermediary marker buoys (Art. 17).[54]

In the United States of America, similar provisions in state fisheries legislation also require the marking of passive gear. In Washington State, for example, it is "illegal to place in the water, pull from the water, possess in the water, or transport on the water crab pots or buoys without the proper identification tags". In California, every trap and string of traps must be marked with a buoy,55 while Dungeness traps must be marked with a marked buoy (§ 9006). Moreover, "(a)ny trap that is used without a buoy, or with a buoy that is improperly marked, is considered a public nuisance which may be removed by any person authorized to enforce the California Fish and Game Code" (§ 9007).

The next question is how should gear be marked? There seem to be two approaches to this issue: either the number of the vessel used in connection with the gear or the number of the licence.

To return to the Californian legislation, "Dungeness traps must be marked with a buoy that is marked with the operator's commercial fishing license number". A slight variation is provided by the Washington State legislation, which also calls for tags to be marked with the telephone number of the operator. The relevant provision states that:

> (e)ach shellfish pot used in the coastal Dungeness crab fishery must bear a tag that identifies either the name of the vessel being used to operate the pot or the Dungeness crab fishery license number of the owner of the pot, and the telephone number of a contact person.[56]

In the case of the European Union legislation, passive fishing gear must, in accordance with article 11 of the Implementing Regulation, be marked with the "external registration letters and numbers displayed on the hull of the fishing vessel to which it belongs".

Provisions on the marking of fishing vessels are also contained in the Implementing Regulation, article 6 of which states:

An EU fishing vessel shall be marked as follows:

a) the letter(s) of the port or district in which the EU fishing vessel is registered and the number(s) under which it is registered shall be painted or displayed on both sides of the bow, as high above the water as possible so as to be clearly visible from the sea and the air, in a colour contrasting with the background on which they are painted;
b) for EU fishing vessels over 10 metres length overall and less than 17 metres length overall, the height of the letters and numbers shall be at least 25 centimetres with a line thickness of at least 4 centimetres. For EU fishing vessels of 17 metres length overall or more, the height of the letters and numbers shall be at least 45 centimetres, with a line thickness of at least 6 centimetres;

[54] Further details are provided in Annex.
[55] California Fish & Game Code § 9005.
[56] WAC § 220-52-040(7)(b).

c) the flag Member State may require the international radio call sign (IRCS) or the external registration letters and numbers to be painted on top of the wheelhouse, so as to be clearly visible from the air, in a colour contrasting with the ground on which it is painted;
d) the contrasting colours shall be white and black;
e) the external registration letters and numbers painted or displayed on the hull of the EU fishing vessel shall not be removable, effaced, altered, illegible, covered or concealed.

Interestingly, article 8 of the Implementing Regulation requires the marking not only of craft used on fishing vessels but also contains a specific reference to the marking of FADs:

> Any craft carried on board EU fishing vessels and fish aggregating devices shall be marked with external registration letters and numbers of the EU fishing vessel(s) which use them.

In other words, each of these separate and independent frameworks sets out its own provisions on the marking of fishing gear, as well as of vessels. Each jurisdiction is entitled to determine how its vessels and gear should be marked. Moreover, as is commonly the case, if gear is marked with the number of the relevant fishing vessel, the source of ALDFG may only be clear if found by someone from the same jurisdiction (or someone familiar with the relevant vessel marking system). This issue may be less relevant as far as enforcement is concerned, but what it could mean is that even if gear is marked it may be difficult, in the absence of a uniform system, to determine its provenance in the context of international fisheries.

Box D
IMO Ship Identification Numbering Scheme

> Partly due to the variable quality of national ship registers, the IMO ship identification number scheme was introduced in 1987, pursuant to IMO Resolution A.600(15). In 1996 it became mandatory for all propelled, seagoing merchant ships of 100 GT and over upon keel laying, excluding the following:
>
> - vessels solely engaged in fishing
> - vessels without mechanical means of propulsion
> - pleasure yachts
> - ships engaged on special service (e.g. lightships, SAR vessels)
> - hopper barges
> - hydrofoils and other air cushion vehicles
> - floating docks and other such structures
> - ships of war and troopships, and
> - wooden ships[57].
>
> In 2013, IMO adopted resolution A.1078(28) to allow the voluntary application of the IMO ship identification number scheme to fishing vessels of 100 GT and above. The IMO number is made up of the letters "IMO" and a unique seven-digit number assigned by IHS Maritime when the ship is constructed. This number must be permanently marked in a visible place on the ship's hull or superstructure, and internally. Passenger ships must also ensure the identification number is marked on a horizontal surface visible from the air. The number appears in the ship's certificates. The sole authority for assigning IMO identification numbers is IHS Maritime, which is also the sole authority for verifying numbers. An IMO identification number is never reused or reassigned: they therefore remain unique to the ship they were first issued to. It follows that two or more vessels cannot share the same number.

Unlike the merchant shipping sector (see Box D) there is as yet no single mandatory global fishing vessel marking regime. FAO has adopted Standard Specification and

[57] SOLAS Regulation XI-1/3;

Guidelines for the Marking and Identification of Fishing Vessels (FAO, 1989) and since 2005 has undertaken a series of steps towards the establishment of a Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels.[58] In the meantime, following the 2013 amendment to the IMO ship identification number scheme that allows the voluntary application of the scheme to fishing vessels of 100 GT and above, IMO Numbers have been allocated to more than 23 000 fishing vessels worldwide.

In this regard it should be noted that the VGMFG also stipulate that when fishing gear is associated with a registered fishing vessel, if applicable the mark allocated for the fishing gear should match the vessel registration details (e.g. the port letters and numbers or IMO number, if available).

6.3 Display marking of fixed gears

In order to prevent the accidental loss of fixed gears, legislation can also specify how gears should be marked so as to draw the attention of other seafarers. To this end, article 17 of the European Union Implementing Regulation sets out detailed requirements as follows:

> Article 17
> **Intermediary marker buoys**
>
> 1. Intermediary marker buoys shall be fixed to passive gear extending more than 5 nautical miles as follows:
>
>   a) intermediary marker buoys shall be deployed at distances of not more than 5 nautical miles so that no part of the gear extending 5 nautical miles or more shall be left unmarked;
>   b) intermediary marker buoys shall be fitted with a flashing light which shall be yellow and give one flash every 5 seconds (F1 Y 5s) and be visible from a minimum distance of 2 nautical miles. They shall have the same characteristics as those of the end marker buoy in the eastern sector, except that the flag shall be white.
>
> 2. By derogation from paragraph 1, in the Baltic Sea intermediary marker buoys shall be fixed to passive gear extending more than 1 nautical mile. Intermediary marker buoys shall be deployed at distances of not more than 1 nautical mile so that no part of the gear extending 1 nautical mile or more shall be left unmarked.
>
> Intermediary marker buoys shall have the same characteristics as those of the end marker buoy in the eastern sector except for the following:
>
> a) the flags shall be white;
> b) every fifth intermediary marker buoys shall be fitted with a radar reflector giving an echo of at least 2 nautical miles.

In other words, such provisions have the potential to prevent the accidental loss of fishing gear as a result of the activities of third parties.

[58] See www.fao.org/global-record/background/way-forward/en/

6.4 Conduct of fishing operations/spatial management

The use of spatial restrictions is a common approach in fisheries management. At the same time, an increased interest in marine spatial planning, which seeks to reconcile the spatial use of the sea by a range of activities beyond fishing could, in theory, reduce potential conflicts between the fisheries sector and other sectors – and thus the destruction or interference with fishing gear. However, combating the problem of ALDFG is only one of the potential benefits of marine spatial planning.[59]

Of the case-study jurisdictions, it seems that only Norway has specific provisions in its fisheries legislation on the prevention of accidental damage to, or interference with, fishing gear. Section 24 of the Marine Resources Act, entitled 'Rules on due care', provides that:

> Any person arriving at harvesting grounds where gear has been set shall acquaint himself with the location of such gear. All persons shall conduct themselves in such a way that fishing gear is not damaged or unnecessarily endangered.
> It is prohibited to impede harvesting or spoil harvesting opportunities by means of shooting, noise or other improper conduct.
> The Ministry may adopt further provisions on the manoeuvring of vessels and conduct on harvesting grounds.

The following article, article 25, goes on to establish the "first cast rule", whereby:

> [The] person who first begins to set gear and continues to do so without undue delay has the right to the stretch of water required by the gear or that will be encircled by it.

The article also provides that if two or more vessels set their gear at the same time, they have equal rights; on the other hand, a vessel that has no gear set must move if so requested, if its presence is hindering others that have begun harvesting operations or are in the process of doing so.

Next, article 26 contains a prohibition on fishing with

> trawls or Danish seines at a distance of less than one nautical mile from fishing or hunting gear that is already set, or markers for such gear, or vessels that are engaged in long-lining or drift netting.

The ministry can by regulation reduce this limit or provide that it does not apply. Similarly, these rules do not apply when a committee has been set up and the harvesting grounds have been shared out.

These provisions are backed up with a set of sanctions contained in section 61 of the act: a person who deliberately or negligently contravenes them is liable to fines or to a term of imprisonment not exceeding one year, unless more severe penal provisions apply.

[59] See for example EU Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning (OJ L 257, 28.8.2014, p. 135) which seeks to establish a framework for maritime spatial planning aimed at 'promoting the sustainable growth of

Moreover, irrespective of any administrative or criminal sanction(s), section 30 of the act provides that any person who damages gear set in the sea is liable to pay compensation irrespective of fault, "including any catch lost and losses resulting from any interruption in harvesting". The level of compensation may be reduced or remitted if the person causing the damage can establish that he was not at fault. In cases where the damage is caused to drifting or fixed gear, fishermen using trawls or Danish seines on the fishing ground at the same time have a duty to provide proof that they did not cause the damage in question.

Several American states also contain specific provisions in their legislation as to where fishing traps may be set in order to reduce damage to fishing gear. For example, Florida prohibits the use of traps in marked channels, while in Maryland, blue crab fishing is allowed only in the main stem of Chesapeake Bay (Arthur *et al*., 2014).

6.5 Duty to recover/report lost fishing gear

In cases where gear is accidentally lost at sea, the legislation in several of the case-study jurisdictions imposes a legal duty upon the master of the vessel involved to take steps to recover the lost gear.

For example, article 48(1) of the Control Regulation requires every European Union fishing vessel – meaning "any vessel equipped for commercial exploitation of living aquatic resources" – to have equipment onboard to retrieve lost gear. However, a European Union Member State may exempt fishing vessels from this requirement providing they are less than 12 m length overall, fly its flag, and either: operate exclusively within its territorial sea, or never spend more than 24 hours at sea.

Article 48(2) goes on to provide that: "(t)he master of a Union fishing vessel that has lost gear or part of it shall attempt to retrieve it as soon as possible."

A similar duty is imposed by section 17 of the Norwegian Marine Resources Act:

> Any person that loses gear or cuts it adrift has a duty to search for the gear. The Ministry may grant exemptions from the duty to search for gear.
> The Ministry may adopt regulations relating to reports of gear that is lost or found, including information on what gear was lost and where.

Indeed, the Norwegian act goes further by also imposing a duty to recover gear that has been illegally dumped at sea (contrary to section 26):

> Any person that acts in contravention of the prohibition set out in the first paragraph has a duty to clear up or remove the objects in question. The Directorate of Fisheries may order such clearing up or removal.
> In the event of failure to comply with orders issued under the second paragraph above, the Directorate of Fisheries may implement any necessary measures at the expense and risk of the party responsible. The costs of such measures are enforceable by execution proceedings.

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maritime economies, the sustainable development of marine areas and the sustainable use of marine resources' (art 1.).

In cases where it is not possible to recover lost gear, article 48(3) of the European Union Control Regulation stipulates that:

3. If the lost gear cannot be retrieved, the master of the vessel shall inform the competent authority of its flag Member State, which shall then inform the competent authority of the coastal Member State, within 24 hours of the following:

    a) the external identification number and the name of the fishing vessel;
    b) the type of lost gear;
    c) the time when the gear was lost;
    d) the position where the gear was lost;
    e) the measures undertaken to retrieve the gear.

Moreover, the European Union Control Regulation goes on to provide that in cases where gear retrieved by the competent authorities of a Member State has not been reported as lost, the authorities may recover the cost of retrieval from the master of vessel from which the loss took place. Obviously, this kind of provision can only be effective if gear-marking requirements are fully enforced. The effect is to create a kind of liability mechanism for failure to report but also (and again providing the markings have not been removed prior to disposal) to deter the illegal dumping of gear at sea.

However, as found by the impact assessment contained in the European Commission Staff Working Document that accompanied the proposal to revise the Control Regulation, the "current rules on reporting are burdensome and inefficient, and do not take advantage of other existing reporting tools. As a result, they are hardly used". The document also noted the possible exemption for vessels under 12 m length overall (European Commission, 2018). To that end, the revised Control Regulation, which is currently being considered by the European Parliament, provides for an easier and improved procedure for the reporting of lost fishing gear through the use of (electronic) logbooks. In addition, it also provides for the removal of the existing derogation applicable to smaller vessels regarding the carrying of equipment on board for the retrieval of lost gear.

As all of the jurisdictions are party to MARPOL, this imposes a duty to report the accidental loss or discharge of fishing gear to the relevant flag State, as outlined in regulations 7.1.3 and 7.1.3*bis* of Annex V – however, this only applies in cases which pose a "significant threat to the marine environment" and "where the loss or discharge occurs within waters subject to the jurisdiction of a coastal State, also to that coastal State". In general terms it is hard to see how one item of ALDFG alone could really cause such a threat to the marine environment.

In practice, therefore, while Australian commercial fishers are encouraged to record the loss of gear in vessel logbooks, it is currently only compulsory for vessels operating in the Southern Ocean under the management of CCAMLR to report gear loss (Australian Government, 2009).

6.6 Deliberate disposal of fishing gear at sea

The legislation in some, but not all, of the case-study jurisdictions, directly addresses the issue of the deliberate disposal of fishing gear at sea. For example, Regulation 31 of the (Australian) Northern Territory Fisheries Regulations of 2 June 2014 stipulates that:

> **Abandoned or unattended gear**
>
> A person must not abandon a net, fish-trap, fixed fish-trap, line or pot.
> A person is taken not to have abandoned fishing gear that is left unattended if:
>
> a) in the case of gear which may be used for the purposes of amateur fishing, it is left in a place where it is not capable or will not become capable of taking fish or aquatic life; or
> b) in the case of gear which may be used only under a licence, it is secured at an approved location or, if it is a net, in accordance with regulation 33.
>
> Sub-regulation (1) does not apply to the holder of a Mud Crab Fishery licence who abandons a pot in water.

This offence is punishable with four penalty units.[60] The regulations, however, do not define the word "abandon".

Section 28 of the Norwegian Marine Resources Act also contains a prohibition on dumping fishing gear in the sea:

> It is prohibited to dump gear, moorings and other objects in the sea or leave such objects unnecessarily in the sea or on the seabed if they may injure marine organisms, impede harvesting operations, damage harvesting gear or endanger vessels.

But this is not the only provision contained in Norwegian legislation. As already noted, MARPOL Annex V is implemented through Regulation No. 488. This regulation, adopted on 30 May 2012, concerns environmental safety for ships and mobile offshore units, which apply to Norwegian ships as well as foreign ships in Norwegian territorial waters, the Norwegian EEZ and on the Norwegian continental shelf. Similar legislation in the other case-study jurisdictions gives effect to the requirements of Annex V of MARPOL.

On the other hand, in terms of the Australian Commonwealth legislation, the Fisheries Management Act contains a general requirement that exploitation of fisheries resources and fisheries-related activities under Commonwealth jurisdiction are conducted in a manner consistent with the principles of ecologically sustainable development (ESD) and the precautionary principle. The management and/or prevention of marine debris, while arguably constituting an element of ESD, is not specifically mentioned in the Act and is not directly managed or controlled under that legislation. Instead, the requirements of MARPOL (including Annex V) are implemented in Commonwealth legislation on the basis of the Protection of the Sea (Prevention of Pollution from Ships) Act 1983 and the Navigation (Protection of the Sea) Amendment Act 1983.

[60] As per Schedule 6 of the Regulation.

Similarly, in the European Union, MARPOL is implemented through legislation relevant to shipping and not fisheries;[61] this means that the requirements of Annex V are set out at European Union level in directives which must in turn be transposed into national legislation by the Member States. In practice, this is done through national shipping legislation, which is implemented by the agency responsible for maritime transport.

6.7 Disposal at port

If fishing gear may not be lawfully disposed of at sea, then what does the legislation say about disposal on land, or more specifically, in port? As mentioned above, a key practical focus of the implementation of MARPOL over recent years has been on the construction of port reception facilities for the safe disposal of the wastes generated at sea.

To this end, Regulation 8 of MARPOL Annex V provides that:

1. Each Party undertakes to ensure the provision of adequate facilities at ports and terminals for the reception of garbage without causing undue delay to ships, and according to the needs of the ships using them.

Moreover, in accordance with Regulation 8(2), each party must notify IMO – for transmission to the Parties concerned – of all cases where the facilities provided under this regulation are alleged to be inadequate.

While this requirement should theoretically require the construction of reception facilities appropriate to deal with discarded fishing gear under international law, the reality is that not all fishing ports or fish landing sites are located within the commercial ports in which MARPOL primarily applies. Indeed, responsibility for infrastructure in small fishing ports and landing sites may well lie with local government authorities which have their own waste collection policies and procedures. In other words, such responsibility may lie beyond both merchant marine and fisheries sectors. In either case, funding may also be another relevant issue in the lack of disposal facilities.

In the context of the European Union, the regulation on the European Maritime and Fisheries Fund (EMFF),[62] the European Union's main funding mechanism for the fisheries sector, does explicitly include a provision for investment into "improving the infrastructure of fishing ports, auctions halls, landing sites and shelters, including investments in facilities for waste and marine litter collection".

Elsewhere, the responsibility for disposing of marine litter rests with the fishing activity/industry. For example, a background paper prepared by the Australian

[61] Directive 2005/35/EC of the European Parliament and of the Council of 7 September 2005 on ship-source pollution and on the introduction of penalties for infringements (OJ L 255, 30.9.2005, p. 11).
[62] Regulation (EU) No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund and repealing Council Regulations (EC) No 2328/2003, (EC) No 861/2006, (EC) No 1198/2006 and (EC) No 791/2007 and Regulation (EU) No 1255/2011 of the European Parliament and of the Council.

Government describes a wharf-side rubbish collection facility run by the Robe Professional Fisherman's Association for over a decade as having represented a "notable example of industry best practice" in mitigating the impacts of debris in the marine environment (Australian Government, 2009).

However, even if appropriate waste disposal facilities are available, a further question arises regarding the cost of using such a facility. As described in part four, environmental policy – and in particular the implementation of the polluter pays principle – generally requires a person disposing of waste to bear some or all of the costs of disposal. However, if the costs of lawful disposal are too high this may deter not only a person who needs to dispose of his/her own old and worn fishing gear from using an appropriate waste facility, but also someone who has retrieved ALDFG, or has passively fished other waste at sea.

To this end, the recently revised European Union Port Reception Facilities Directive requires that Member States not only make appropriate waste reception facilities available at ports (Art, 4), but also set up fee-recovery systems in their legislation that ensure there is no incentive for ships, including fishing vessels, to dispose of their waste at sea. Such systems must provide for the setting of an indirect fee for the provision of waste reception facility services at ports, irrespective of the actual delivery of waste from ships.

In order to enable the maximum incentive for the delivery of MARPOL Annex V waste (which includes fishing gear, as seen in part three), no direct fee may be charged for such waste. Nor can any additional charges be levied based on volume except where this exceeds the maximum dedicated storage capacity (Art. 8). European Union Member States are required to adopt the laws, regulations and administrative provisions necessary to comply with the Directive by 28 June 2021.

6.8 Extended producer responsibility

As described in part five, one of the objectives of the European Union single-use plastics (SUP) Directive is to reduce the impact of plastic products, including fishing gear, on the aquatic environment. The directive applies to all single-use plastic products, products made from oxo-degradable plastic and fishing gear containing plastic; it constitutes one of the key moves taken by the European Union to reduce marine litter and shift towards a sustainable circular economy (European Commission, 2020).

The Member States are required to establish extended producer responsibility (EPR) schemes for fishing gear containing plastic, in addition to a national minimum annual collection rate of waste fishing gear containing plastic, by 31 December 2024 (Art. 8). Such EPR schemes, in compliance with the relevant European Union Waste Framework Directive, can include the acceptance of returned products and of the waste that remains after those products have been used. They also include the subsequent management of the waste and financial responsibility for such activities, as well as the obligation to provide publicly available information describing the extent to which the product is reusable and recyclable.

The SUP Directive goes on to stipulate that the producers of fishing gear containing plastic must cover the costs of its separate collection, once said gear has been delivered to adequate port waste reception facilities in accordance with European Union Port Reception Facilities Directive, or to other equivalent collection systems that fall outside the scope of that Directive, in addition to the costs of its subsequent transport and treatment. Producers must also cover the costs of awareness-raising measures regarding fishing gear containing plastic. The SUP Directive does not specify exactly which type of EPR scheme should be adopted. Possible options include an EPR scheme with a deposit refund, without a deposit refund, with individual producers acting individually or through a trade association, or the setting of recycling targets for fishing gear.

The directive also requires Member States to monitor the type and quantities of fishing gear containing plastic on the market, as well as the quantities of waste fishing gear containing plastic collected. They are also required to report this information to the European Commission, with a view to the eventual establishment of binding, quantitative European Union collection targets on waste fishing gear collected, which would include abandoned or lost fishing gear (Art 10).

6.9 Recovery of ALDFG by state actors

In the three case-study countries the fisheries agency typically undertakes activities to recover ALDFG. For example, in Norway the Directorate of Fisheries conducts an annual retrieval programme that removes substantial amounts of lost gear and other fisheries-related litter from the sea, even though there is no explicit reference to this in the Marine Resources Act (Humborstad *et a*l., 2003).

In the United States of America, California does not have a formal regulatory programme for the removal of derelict fishing gear; however, as mentioned above, any trap that is used without a buoy or with a buoy that is improperly marked is considered a public nuisance, one which may be removed by any person authorized to enforce the California Fish and Game Code (§ 9007). If they believe that a trap poses a public safety hazard, publicly employed safety personnel including lifeguards, marine safety officers, harbour patrol officers and peace officers may, while engaged in the performance of their official duties, remove traps, buoys, or lines located in or near breaking surf, or adjacent to a public beach. Any marine life captured by the removed traps, buoys or lines must be immediately returned to the ocean (§ 9002(d)(1)).

There is probably no specific need to establish a legal basis for a fisheries agency's ability to recover ALDFG: in most cases the fisheries administration's powers will likely be sufficiently broad to permit this. What may be more important is to ensure that such activities can be funded. For example, in the United States of America the Marine Debris Reauthorization Act authorized the appropriation of USD 4.9 million annually, until end 2015, for the NOAA to carry out activities to reduce the amount of marine debris (such as plastic and lost fishing gear) in oceans and coastal areas (HR 1171). Another important aspect might be to empower fisheries administrations to charge the cost of recovery or disposal of ALDFG to the gear owner, if ownership can be determined.

At times, legislative requirements relating to marine litter may indeed act as a driver to encourage the recovery of ALDFG. In the context of the European Union, the Marine Strategy Framework Directive (MSFD) requires Member States to "take the necessary measures to achieve or maintain good environmental status in the marine environment by the year 2020 at the latest" (Art 1(1)). The definition of good environmental status is based on a list of generic qualitative descriptors contained in Annex I of the directive, which stipulates that "Properties and quantities of marine litter do not cause harm to the coastal and marine environment".[63] For the purpose of achieving good environmental status, the MSFD requires the development and implementation of marine strategies to protect and preserve the marine environment, prevent its deterioration or, where practicable, restore marine ecosystems in areas where they have been adversely affected. The directive also requires the prevention and reduction of inputs in the marine environment with a view to phasing out pollution so as to ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea (Art 1(2)).

6.10 Recovery of ALDFG by non-state actors

Efforts have been made in a number of jurisdictions to encourage civil society, including fishers themselves, to recover ALDFG. In the European Union, funding may be provided under the EMFF for "the collection of waste by fishermen from the sea such as the removal of lost fishing gear and marine litter" (Art 40(1)(1)). The European Union has also funded a number of projects relating to marine litter including under the LIFE programme.[64]

Such activities can, however, also have legal consequences. One impediment to the removal of ALDFG in the United States of America is that voluntary private removal may violate the provisions of other laws. For example, the legislation governing many static gear fisheries prohibit anyone but the owner from handling that gear.[65] Although intended to prevent theft, these measures also discourage those who discover lost or abandoned gear from removing it. In cases where a vessel is only authorized to use a certain type of fishing gear or have a single type on board, picking up derelict gear of a different type could violate the conditions of the applicable fishing permit (National Research Council, 2009).[66]

A more extreme legal impediment occurs in situations where transporting collected gear for compensation could change the legal character of a fishing or recreational vessel to that of a vessel carrying freight for hire, which creates its own legal obligations (National Research Council, 2009).[67] Finally, once ALDFG is removed

[63] These descriptors were further elaborated in Commission Decision 210/477/EU which set out criteria and methodological standards on GES of marine waters Commission Decision of 1 September 2010 on criteria and methodological standards on good environmental status of marine waters OJ L 232, 2.9.2010, p. 14.
[64] See https://ec.europa.eu/easme/en/life
[65] For example, the Washington Administrative Code (§ 220-52-040(9)), prohibits the handling of gear by anyone other than the owner.
[66] However, in practice, vessels are often able to avoid this situation by calling the Coast Guard and asking permission to transport the nonconforming gear type for disposal.
[67] See relevant US Code provisions: 46 U.S.C. § 2101(13) and 46 U.S.C. § 3301(1).

from the water, it becomes the property of whoever removed it, making that party liable for disposal costs which, as discussed, can be quite high.

Another curious legal consequence of the recovery of ALDFG that may arise in common law jurisdictions is the fact that such activities may be treated as acts of salvage; this is turn means that the complex rules of the law of salvage would be applicable. For example, section 255(2) of the United Kingdom Merchant Shipping Act 1995 provides that fishing gear lost or abandoned at sea within the waters of the United Kingdom of Great Britain and Northern Ireland, or which are brought within those waters, are to be treated as wrecks and thus subject to the rules of salvage. The precise implication of this status is not clear. For instance, a recent report by the Norwegian Ministry of the Environment describes an otherwise successful gear recovery pilot project in Hawaii that was limited by unresolved liability issues (Ten Brink *et al.,* 2009).

The most obvious solution is to make sure that such provisions are expressly addressed in fisheries legislation. For example, section 29 of the Norwegian Marine Resources Act sets out a relatively complete mechanism for addressing the issue of salvaging ALDFG. First of all, a person who salvages gear that has drifted away, been lost or abandoned, including dories and other equipment, must report this to the owner as soon as possible (and the act provides that regulations are be adopted on reporting of the salvage of such gear). Article 29 goes on to provide that any person who salvages gear is entitled to a "reasonable" reward, which may not exceed the value of what was salvaged. A salvaged catch accrues to the salvor. If the value of the catch considerably exceeds the reward payable, the latter may be wholly or partly remitted. The release of salvaged property may not be required before the reward and costs have been paid. When the reward and costs have been paid, the salvor has a duty to release the property that has been salvaged. The owner has a duty to accept the salvaged property if it is reasonable for the salvor to require this, after the salvaged articles have been secured. This mechanism potentially simplifies the otherwise complicated rules of salvage.

Another issue concerns the disposal of recovered ALDFG. In particular, how can such activities be encouraged if the party recovering ALDFG will face additional expense in terms of its final disposal? To this end, Norway's Management Plan for the North Sea and Skagerrak (Norwegian Ministry of the Environment, 2012) makes a number of recommendations for legislative measures including the provision of:

> a legal basis to ensure that fishing and other vessels do not incur extra costs when they deliver litter collected from the sea [and possible] [...] amendments to the legislation to allow municipalities to use waste management fees to fund clean-up of marine litter and prevent littering in selected public places.

The approach taken in the revised Port Reception Facilities Directive should also contribute to reducing this problem in the European Union.

6.11 Gear design standards

What measures can be taken in legislation to minimize the impact of ALDFG that is not/cannot be recovered? All of the legislation considered contains provisions

that enable the establishment of gear standards in connection with the sustainable exploitation of fisheries.

The legislation of the United States of America seems to have the most comprehensive provisions on minimizing the impact of ALDFG on marine ecosystems. For example, the fisheries legislation of Washington State requires mandatory escape mechanisms for shellfish pot gear in the Dungeness crab fishery. Such gear may not be operated unless it meets the following requirements:

- Pot gear must have at least two escape rings or ports not less than 4-1/4 inches inside diameter.
- Escape rings or ports must be located in the upper half of the trap. (Washington Administrative Code § 220-52-043(2)). It is unlawful to fish for or possess crab, shrimp, or crawfish taken for commercial purposes with shellfish pot gear unless the gear allows for escapement using at least one of the following methods:

    - attachment of pot lid hooks or tiedown straps with a single strand or loop of untreated cotton twine or other natural fiber no larger than thread size 120 so that the pot lid will open freely if the twine or fiber is broken;
    - an opening in the pot mesh no less than three inches by five inches which is laced or sewn closed with untreated cotton twine or other natural fiber no larger than thread size 120. The opening must be located within the top half of the pot and be unimpeded by the entry tunnels, bait boxes, or any other structures or materials. (Id. § 220-52-035(1)-(2)).

Similar provisions are found in the legislation of other American states for pots and traps.

Finally, as noted in part four, legally binding standards can also be set to promote the recyclability of fishing gear. Alternatively, they might specify the types of material to be used in the components of fishing gear, such as ropes, to facilitate recycling (for example by specifying the use of polymers that can be mixed and/or easily recycled) or create elements that are biodegradable. In this regard, the European Union SUP Directive requires the European Commission to request the European standardization organizations to develop harmonized technical standards relating to the circular design of fishing gear to encourage its re-use and facilitate its recyclability at the end of its life. Given that technical standards often provide the basis for subsequent legally binding standards there is no reason why legally binding European Union gear standards might not be adopted in due course.

7. Conclusions

ALDFG is a complex global problem that is simultaneously a fisheries issue, a maritime transport issue and an environmental issue. This intersectoral complexity is reflected in the different international governance bodies involved in addressing ALDFG including FAO, IMO, UNEP and the UNGA. As described in this study, a number of steps have been taken at the international level to address the issue: references to the issue can be found in a number of important international instruments, and it still features on the UNGA agenda. Moreover, several RFMOs have also started to address ALDFG.

In terms of binding international law, the main legal provision relating to ALDFG is contained in MARPOL Annex V, which basically prohibits the deliberate dumping or "discharge" of fishing gear in the marine environment. At a conceptual level Annex V raises a number of questions. First of all, it is arguably a misuse of language to talk about the "discharge" of fishing gear: fishing gear is solid rather than liquid. It is also questionable in both conceptual and practical terms whether the disposal of fishing gear at sea is properly to be regulated as a "garbage" issue rather than a waste disposal issue. Virtually all voyages at sea, however large the vessel, will routinely generate waste in the form of garbage. Most fishing trips do not result in the routine disposal of fishing gear overboard. A fundamental jurisdictional question therefore arises as to whether MARPOL, with its focus on routine pollution generation, is really the appropriate or correct legal source for seeking to regulate ALDFG under international law.

Moreover, the fact that this particular legal rule was negotiated and adopted in the specific context of garbage management has a number of important substantive implications. First, the fact that it was mainly designed for one purpose – namely the regulation of the disposal of garbage from larger ships – means that its mechanisms for enforcement are also designed for that purpose and largely ineffective for smaller fishing vessels in the context of ALDFG. Second, the fact that it is contained in a maritime transport convention means that it is usually applied on the basis of merchant shipping legislation (as the case studies clearly demonstrate) as opposed to fisheries legislation. Third, while Annex V does contain an implementation/enforcement mechanism regarding the disposal of garbage from ships, this does not apply to the vast majority of fishing vessels.

The other main recent development at the international level is the adoption of the VGMFG. Not only is the marking of a fishing gear an important element of measures to combat ALDFG, it also plays an important role in MCS more generally. The VGMFG contain a number of provisions relating to the specific issue of ALDFG. As time passes and States begin to implement the VGMFG, a body of practice will develop that will make it possible to evaluate the contribution of the guidelines to the resolution of the problem of ALDFG.

The four case-study jurisdictions clearly also reflect the intersectoral nature of ALDFG, suggesting the need for a collaborative and coordinated approach. In this regard, recent coordinated initiatives within the European Union relating to ALDFG, in terms of the adoption of the SUP Directive, as well as the revision of the Port Reception Facilities Directive and the Control Regulation, offer an encouraging example of coordinated action.

With ten individual measures identified, the case-study jurisdictions demonstrate that ALDFG is a problem that is susceptible to a legal response at the national or regional level. As has been shown, not all of the jurisdictions make use of every type of measure, but this study does suggest that legislation has an important role to play.

Another important, though perhaps surprising, finding is that although the term ALDFG has now become part of the accepted vocabulary in discussions concerning derelict gear, it is not a term that is in defined in any of the case jurisdictions, or one that is much used. This study's contention is that the law is more concerned with human action (or inaction) rather than the status of objects – or more specifically the reasons why fishing gear is abandoned lost or otherwise discarded.

In terms of the regulatory tools that are used in the legislation of the case-study jurisdictions, the analysis shows that command-and-control regulation constitutes the main legal approach adopted to date, not only in terms of the disposal of gear (including as regards the implementation of MARPOL Annex V) but also in connection with the conduct of fishing activities, the marking of gear and its display, and indeed the response to, and recovery of, fishing gear.

Reporting requirements in terms of logbook entries and the reporting of lost gear are also found (and there is obviously a cross over with command-and-control regulation here). As suspected, liability regimes play a minor role, although the cost liability that arises under the European Union legislation in the event of the recovery of non-notified ALDFG does provide a concrete example of the potential of this kind of approach.

Market-based mechanisms are also starting to play an important role, particularly within the European Union with the introduction of EPR under the SUP Directive, and the setting of indirect waste disposal fee recovery systems under the Port Reception Facilities Directive. The latter are expressly designed to ensure that there is no incentive for fishing vessels to discharge their waste, including worn and unwanted gear, at sea. This is an area that probably warrants further investigation, and many States will no doubt keep a close eye on how the European Union EPR scheme works in practice.

In terms of the design of a possible comprehensive legal framework for the issue of ALDFG, the following preliminary suggestions can be made.

The starting point has to be the issue of fishing gear marking. In the absence of a mandatory requirement for gear marking, the majority of fishers will most likely choose not to mark their fishing gears. Without appropriate marking it is virtually impossible to identify the owner of ALDFG. The adoption of the VGMFG is an important development in this regard, even though it is a voluntary instrument. It is to be hoped that the VGMFG will spur the introduction of mandatory gear-marking schemes at the level of national legislation and at the regional/RFMO level.

However, the marking of fishing gear is in a sense only part of the picture. If fishing gears are marked with the number of the vessel on which they are used, for instance, this at least identifies the source of lost or discarded gear. There is, however, no legal reason why gears should not be managed and marked individually, such that each individual gear has its own unique number, even if this includes the

relevant vessel number. Of course, such an approach would have its own costs and would only be appropriate for certain types of larger gear – but the idea of moving towards gear management in the context of controlling fishing effort would make it much easier to track gear. At the same time, given the international nature of marine fisheries, the completion of the FAO Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels should remain a priority so that gear numbers can be easily linked back to vessel numbers.

A legal requirement for the display marking of surface elements of fixed gear (such as buoys at the end of lines or nets), has an important role not only for the purposes of preventing ALDFG but also for navigational reasons, both within waters under national jurisdiction and on the high seas. Technology can play an important role here, particularly through the use of satellite tracking/transponders. The importance of using satellite buoys on FADs is also an important issue addressed by the VGMFG (although it does not yet feature in the legislation of the case-study jurisdictions).

Specific rules on the conduct of fishing operations, including zoning rules, have the potential to reduce the likelihood of gear conflict among fishers using similar gear types. At a broader level, the emerging legal and policy frameworks for marine spatial planning may contribute to reducing intersectoral conflicts over marine space, including the accidental disturbance or destruction of fishing gear.

If and when fishing gear is accidentally lost at sea, the legal requirements for the mandatory recording of such an event in the vessel logbook – as well as its subsequent reporting – are important not only in terms of prompting immediate recovery efforts, but also help build up a picture of the overall problem within a given fishery/marine area and facilitate eventual third-party recovery. Information requirements could also demand the recording of steps taken to recover lost gear. If a gear recovery obligation is imposed by law, as found in the legislation of certain of the case-study jurisdictions, this should ideally be accompanied by a related requirement to ensure that recovery gear is kept on board for this purpose.

Fishing gear inevitably degrades over time and needs replacing. Disposal at sea is often simply the cheapest way of doing this. A clear statement in fisheries legislation – rather than in merchant shipping laws – to the effect that disposal at sea is not a lawful option may play an important role in raising awareness, as well as making it more likely that fisheries administrations both monitor and enforce such requirements. At the same time, if degraded gear is to be safely disposed of on land this also implies the provision of the necessary mechanisms to achieve this in fishing ports. Legislation may also have a role to play in this instance, both in terms of ensuring that the necessary waste disposal infrastructure is put in place and that charging mechanisms are set to discourage waste disposal at sea, as provided for in the European Union Port Reception Facilities Directive. EPR schemes, of one form or another, may also have an important role to play in ensuring the safe and environmentally friendly management of old and worn fishing gear.

The law may also have an important role in terms of promoting the recovery of ALDFG by state and non-state actors. For instance, it might set targets and objectives for the removal of marine litter in general and ALDFG in particular, as well as providing the necessary funding and resolving tricky legal questions relating to ownership and salvage.

Legally binding gear design standards can not only promote the recyclability of old and worn gear: they can also include measures to reduce ghost fishing by ALDFG, and potentially encourage the use of biodegradable elements within fishing gear.

In conclusion, legal tools to address the problem of ALDFG clearly exist. The extent to which some or all of them are necessary or appropriate in a given context at the national, regional or global level is not ultimately a legal question but a political one. Nevertheless, this is undoubtedly an area in which the law has a potentially significant role to play.

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Washington State

Washington Administrative Code § 220-52-043(2).

Annex

Excerpt from COMMISSION IMPLEMENTING REGULATION (EU) No 404/2011

Article 8
Marking of crafts and fish aggregating devices

Any craft carried on board Union fishing vessels and fish aggregating devices shall be marked with external registration letters and numbers of the Union fishing vessel(s) which use them.

Article 9
General rules for passive gear and beam trawls

1. The provisions contained in Articles 9 to 12 of this Regulation shall apply to Union fishing vessels fishing in all Union waters and the provisions contained in Articles 13 to 17 of this Regulation to Union waters outside 12 nautical miles measured from the base lines of the coastal Member States.
2. It shall be prohibited in Union waters as set down in paragraph 1 to carry out fishing activities with passive gear, buoys, and beam trawls, which are not marked and identifiable in accordance with the provisions of Articles 10 to 17 of this Regulation.
3. It shall be prohibited in Union waters as set down in paragraph 1 to carry on board:

    a) beams of a beam trawl which do not display the external registration letters and numbers in accordance with Article 10 of this Regulation;
    b) passive gear which is not labelled in accordance with Article 11(2) of this Regulation;
    c) buoys which are not marked in accordance with Article 13(2) of this Regulation.

Article 10
Rules for beam trawls

The master of a Union fishing vessel or his representative shall ensure that each assembled beam trawl carried on board or used for fishing clearly displays the external registration letters and numbers of that fishing vessel on the beam of each beam trawl assembly.

Article 11
Rules for passive gear

1. The master of a Union fishing vessel or his representative shall ensure that each passive gear carried on board or used for fishing is clearly marked and identifiable in accordance with the provisions of this Article.
2. Each passive gear used for fishing shall permanently display the external registration letters and numbers displayed on the hull of the fishing vessel to which it belongs:

    a) for nets, on a label attached to the upper first row;
    b) for lines and long lines, on a label at the point of contact with the mooring buoy;
    c) for pots and traps, on a label attached to the ground rope;
    d) for passive gear extending more than 1 nautical mile, on labels attached in accordance with (a), (b) and (c) at regular intervals not exceeding 1 nautical mile so that no part of the passive gear extending more than 1 nautical mile shall be left unmarked.

Article 12
Rules for labels

1. Each label shall be:

   a) made of durable material;
   b) securely fitted to the gear;
   c) at least 65 millimetres broad;
   d) at least 75 millimetres long.

2. The label shall not be removable, effaced, altered, illegible, covered or concealed.

Article 13
Rules for buoys

1. The master of a Union fishing vessel or his representative shall ensure that two end marker buoys and intermediary marker buoys, rigged in accordance with Annex IV, are fixed to each passive gear used for fishing and are deployed in accordance with the provisions of this Section.
2. Each end marker buoy and intermediary buoy shall display the external registration letters and numbers displayed on the hull of the Union fishing vessel to which they belong and which has deployed such buoys as follows:

   a) letters and numbers shall be displayed as high above the water as possible so as to be clearly visible;
   b) in a colour contrasting with the surface on which they are displayed.

3. The letters and numbers displayed on the marker buoy shall not beeffaced, altered or allowed to become illegible.

Article 14
Rules for cords

1. The cords linking the buoys to the passive gear shall be of submersible material, or shall be weighted down.
2. The cords linking the end marker buoys to each gear shall be fixed at the ends of that gear.

Article 15
Rules for end marker buoys

1. End marker buoys shall be deployed so that each end of the gear may be determined at any time.
2. The mast of each end marker buoy shall have a height of at least 1 metre above the sea level measured from the top of the float to the lower edge of the bottom most flag.
3. End marker buoys shall be coloured, but may not be red or green.
4. Each end marker buoy shall include:

   a) one or two rectangular flag(s); where two flags are required on the same buoy, the distance between them shall be at least 20 centimetres flags indicating the extremities of the same gear shall be of the same colour and may not be white and shall be of the same size;

b) one or two light(s), which shall be yellow and give one flash each 5 seconds (F1 Y 5s), and be visible from a minimum distance of 2 nautical miles.

5. Each end marker buoy may include a top sign on the top of the buoy with one or two striped luminous bands which shall be neither red nor green and shall be at least 6 centimetres broad.

Article 16
Rules for fixing of end marker buoys

1. 1. End marker buoys shall be fixed to passive gear in the following way:

a) the buoy in the western sector (meaning the half compass circle from south through west to and including north) shall be rigged with two flags, two striped luminous bands, two lights and a label in accordance with Article 12 of this Regulation;
b) the buoy in the eastern sector (meaning the half compass circle from north through east to and including the south) shall be rigged with one flag one striped luminous band, one light and a label in accordance with Article 12 of this Regulation.

2. The label shall contain the information contained in Article 13(2) of this Regulation.

Article 17
Intermediary marker buoys

1. Intermediary marker buoys shall be fixed to passive gear extending more than 5 nautical miles as follows:

a) intermediary marker buoys shall be deployed at distances of not more than 5 nautical miles so that no part of the gear extending 5 nautical miles or more shall be left unmarked;
b) intermediary marker buoys shall be fitted with a flashing light which shall be yellow and give one flash every 5 seconds (F1 Y 5s) and be visible from a minimum distance of 2 nautical miles. They shall have the same characteristics as those of the end marker buoy in the eastern sector, except that the flag shall be white.

2. By derogation from paragraph 1, in the Baltic Sea intermediary marker buoys shall be fixed to passive gear extending more than 1 nautical mile. Intermediary marker buoys shall be deployed at distances of not more than 1 nautical mile so that no part of the gear extending 1 nautical mile or more shall be left unmarked.

Intermediary marker buoys shall have the same characteristics as those of the end marker buoy in the eastern sector except for the following:

a) the flags shall be white;
b) every fifth intermediary marker buoys shall be fitted with a radar reflector giving an echo of at least 2 nautical miles.

GloLitter partnerships

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