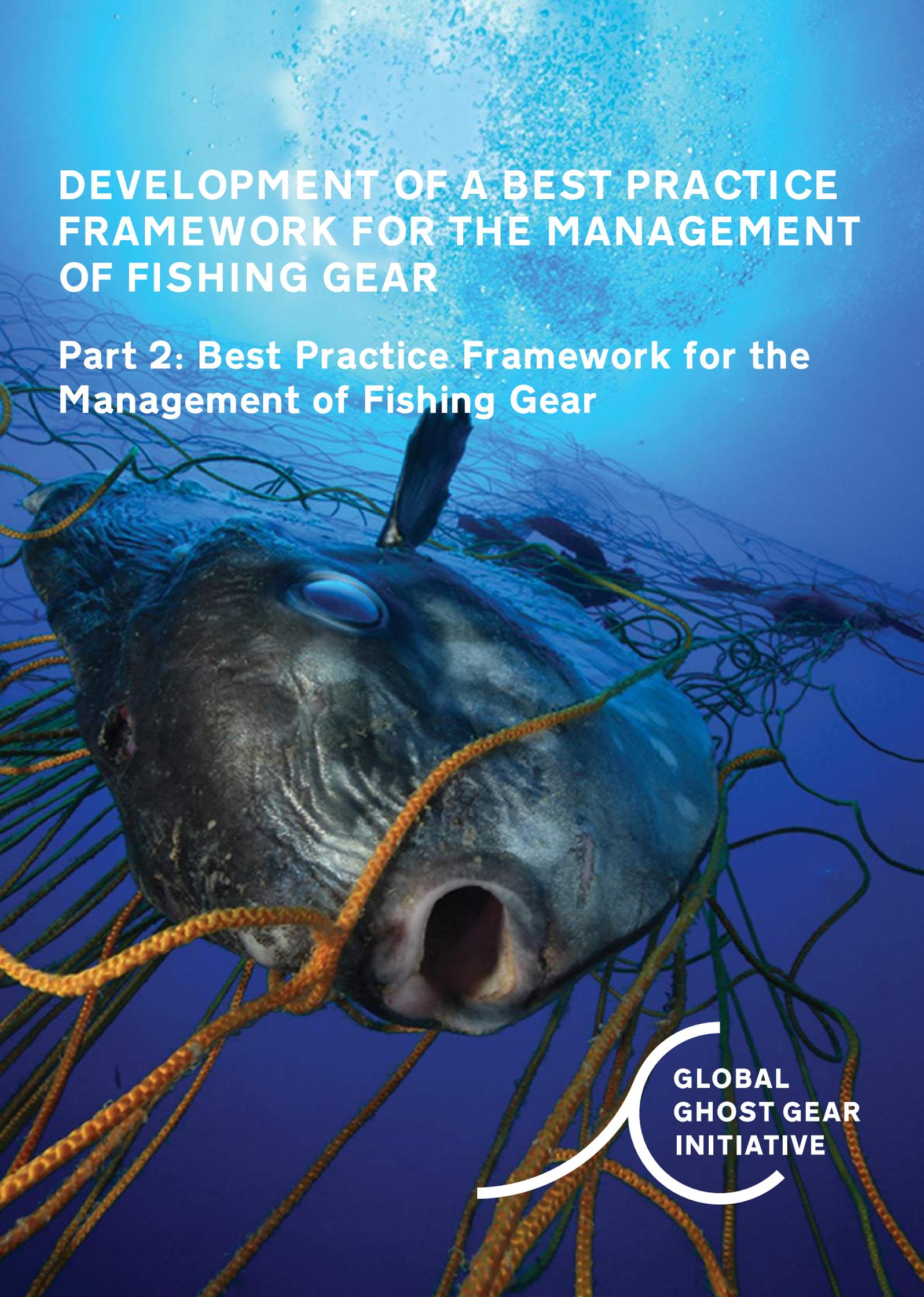


DEVELOPMENT OF A BEST PRACTICE FRAMEWORK FOR THE MANAGEMENT OF FISHING GEAR

Part 2: Best Practice Framework for the Management of Fishing Gear



GLOBAL
GHOST GEAR
INITIATIVE

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ABBREVIATIONS USED

AFMA	Australian Fisheries Management Authority
ALDFG	Abandoned, Lost or otherwise Discarded Fishing Gear
BIM	Bord Iascaigh Mhara or BIM (English: Irish Sea Fisheries Board)
DFO	Department of Fisheries and Oceans
EC	European Commission
ETP	Endangered, Threatened or Protected
EU	European Union
FAD	Fish Aggregating Device
FANTARED	Ghost net (in Spanish)
FAO	Food and Agriculture Organization of the United Nations
FIP	Fisheries Improvement Project
GGGI	Global Ghost Gear Initiative
GISIS	IMO Global Integrated Ship Information System
GPS	Global Positioning System
GRT	Gross Registered Tonnage
GT	Gross Tonnage
IFCA	Inshore Fisheries Conservation Authority
IMO	International Maritime Organisation
IUU	Illegal, unreported and unregulated (fishing)
MCS	Monitoring, Control and Surveillance
MMO	Marine Management Organisation
NPF	Northern Prawn Fishery
PHA	Polyhydroxyalkanoate
PRF	Port Reception Facility
VIMS	Virginia Institute of Marine Science

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World Animal Protection / Rob Trendiak

1. BACKGROUND AND PURPOSE

1.1 BACKGROUND

1.1.1 Abandoned, lost or otherwise discarded fishing gear and ghost fishing

Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG) has numerous negative impacts which are causing increasing concern. The ability of ALDFG to continue fishing (often referred to as 'ghost fishing') has detrimental effects on fish stocks and potential impacts on endangered species and benthic environments.

Fishing gear has been abandoned, lost or otherwise discarded since fishing began. However, increases in the scale of fishing operations and technologies used in recent decades mean the extent and impact of ALDFG debris have increased significantly. This is through the use of synthetic materials, increased fishing capacity and the targeting of more distant and deep water grounds.

The consequences of ALDFG are both environmental and economic and are summarised below.

- Continued catch of target and non-target species. Even when not controlled by fishers, fishing gear can continue to catch fish dependent on the gear's state when control is lost. Although most gear loses fishing efficiency over time, as it disintegrates or becomes incorporated into the bottom sediment it may continue to fish for many years. Abandoned traps may continue to entrap fish which in turn attract scavengers. This then results in cyclical catching by the fishing gear.
 - Interactions with marine wildlife. ALDFG, especially when made of persistent synthetic material, can cause marine fauna, including sea birds, turtles, seals and cetaceans, pain and suffering after entanglement and also if they ingest it.
 - Physical impacts on the benthos. Abandoned, lost or discarded net fragments, eg gillnet or trawl panels, may get dragged along the bottom by strong currents and winds. This can harm fragile organisms like sponges and corals. Nylon line, from both commercial and recreational hook and lines and longlines, may entangle around both marine animals and habitats, especially in complex inshore habitats such as reefs. And litter accumulating in offshore sinks may smother benthic communities on soft and hard seabed substrates.
 - Introduction of synthetic material into the marine food web. Modern plastics can last up to 600 years in the marine environment. This depends upon water conditions, ultraviolet light penetration and the level of physical abrasion. Much of the abraded material exists for many years as microscopic plastic fragments and fibres. These can join the food chain and may adsorb, release or transport chemicals and their toxic effects.
- ALDFG also results in both economic and social costs that can be significant. When ALDFG fouls the marine environment, clean-up and gear removal costs can be significant. Estimating the costs associated with compliance, rescue, and/or research costs associated with ALDFG is complex, and does not seem to have been attempted to date.
- In particular, it is difficult to rate or compare the magnitude of the wide range of the socio-economic costs of ALDFG. This could be, for example, the financial impact on other sea users due to the navigation and other risks from ALDFG. This is because literature is very scarce and there are particular problems in quantifying and comparing costs across different stakeholders.
- ALDFG can act as a navigation hazard. Ropes and nylon line can foul propellers, drive shafts, jet drives and water intakes, affecting a vessel's propulsion and ability to manoeuvre. This can lead to operational delays and, in extreme cases, injury and loss of life.



Projeto Tamar Brazil / Marine Photobank

1.1.2 Global Ghost Gear Initiative

The Global Ghost Gear Initiative (GGGI) is a cross-sectoral alliance committed to driving solutions to the problem of lost and abandoned fishing gear (ghost gear) worldwide. The GGGI aims to improve the health of marine ecosystems, protect marine animals, and safeguard human health and livelihoods.

Founded on the best available science and technology, the GGGI is the first initiative dedicated to tackling the problem of ghost fishing gear on a global scale. The GGGI's strength lies in the diversity of its participants who include members of the fishing industry, the private sector, academia, governments, intergovernmental and non-governmental organisations. Every participant has a critical role to play to mitigate ghost gear locally, regionally and globally.

The GGGI was founded by World Animal Protection who will host the Secretariat until 2018. Further information on the GGGI can be found at www.ghostgear.org.

Three GGGI working groups have been established. This publication is under the remit of the 'Define best practices and inform policies' working group. This working group aims to:

- develop a suite of best practices to guide stakeholders in their development of policies and protocols to address ghost gear
- encourage changes in industry practice and influence supply chains and/consumers
- catalyse action, supported by government policy, to mitigate ghost gear

Throughout 2016, the GGGI developed best practice guidance on managing fishing gear at the different stages of its life. This guidance will be used to influence government and industry policy and practice to ensure enhanced mitigation of the ghost gear problem globally.

1.2 PURPOSE OF THIS FRAMEWORK

In May 2016, World Animal Protection appointed fisheries consultants Poseidon Aquatic Resource Management Ltd (Poseidon) of the UK to undertake a series of work packages. The objective was to support the GGGI's 'Define best practices and inform policies' working group in developing best practice guidance on the management of fishing gear.

Output 1

The first output was a brief scoping study to provide:

- a working quantification of the main fishing gears used on a global basis
- a brief summary of the main characteristics of these gears regarding user type, geographical usage and contribution to ALDFG.

This first part of the work was submitted to World Animal Protection on 16 May 2016.

Output 2

The second output was the identification of management options and mechanisms for responsible fishing gear use. It was also to include recommendations on how this could be developed into a best practice framework for managing fishing gear.

This second activity examined two main elements. First, it looked at the current management options for fishing gear. This included the use of tags and other identification of fishing gear, gear marking, gear storage to and from fishing grounds and gear retrieval in case of loss or temporary abandonment. It then examined how these are implemented – for example through legislation, codes of conduct or inclusion in third party and other certification schemes. This part of the study was the basis for the framework (see next) and has been issued as a standalone document, entitled 'Part 1: Overview and Current Status'.

Output 3

The purpose of this third and final output of the study was to develop a 'best practice' framework for the management of fishing gear. Its scope is defined in Part 1 of document, is global in nature, and covers a wide range of fishing gears and users.

As a framework, it focuses on the most commonly used gear types, both in industrial and artisanal fisheries. The framework is relevant to a broad spectrum of stakeholders. These include gear manufacturers, fishers, port authorities, fisheries management authorities, seafood companies and other interested parties.

This framework will be adopted by the GGGI, developed further and targeted at specific stakeholders.



Crispin Zeeman / Marine Photobank

2. SCOPE AND STRUCTURE OF THE FRAMEWORK

2.1 SCOPE

A brief analysis of fishing gear usage in Part 1 of the study examined two key elements.

1. The extent of their global use
2. The overall risk they pose in terms of ghost fishing and other ALDFG impacts

The review of global fishing gear use indicated that seine nets, mid-water and bottom trawls account for most fish catches by volume. When calculated by effort, the results are similar – trawls (both bottom and mid-water) rank highest, but hook and line (including longlines) also feature highly, as do gillnets. Traps and pots are used less frequently, but are still globally significant.

When considering the risk of ghost fishing, gillnets have the highest risk; with traps and pots second and Fish Aggregating Devices (FADs) third.

The conclusion of this combined analysis is that the best management framework should consider all these gear

types. Although seine nets and trawls have the lower risk of ghost fishing they still need to be considered. This is because they have the highest volume of global catches and their losses are concentrated in relatively small areas.

Conversely, while traps and pots and FADs account for lower volumes of fish capture, they have a relatively higher risk of ghost fishing, and must also be considered.

Global issue

Ghost fishing is a global phenomenon and this is reflected in the framework. Both gillnets and traps and pots – the two main fishing gears with a high risk of ghost fishing – are used both in temperate and tropical waters. The framework emphasises shallower coastal waters where they are mainly deployed. Mid-water trawls and purse / ring seines are more often deployed in deeper pelagic waters, mainly by larger-scale fisheries – this is also considered.

2.2 STRUCTURE OF THE FRAMEWORK

As proposed by Macfadyen et al (2009), interventions can be broadly divided between measures that:

prevent (avoiding the occurrence of ALDFG in the environment)

mitigate (reducing the impact of ALDFG in the environment)

cure (removing ALDFG from the environment).

1.	Spatial and / or temporal measures	PREVENTION
2.	Gear design to reduce whole or partial loss of the fishing gear	
3.	Vessel design to reduce gear and other marine litter discarding	
4.	Better marking and identification of fishing gear	
5.	Improved redundant fishing gear disposal facilities	
6.	Education and awareness	
7.	Improved fisheries management regime	
8.	Good practice for avoidance, mitigation and response	
9.	Gear design to reduce the incidence and duration of ghost fishing	MITIGATION
10.	Lost gear reporting, location and recovery initiatives	CURE

The framework recognises the diverse roles and responsibilities of different stakeholders (see overleaf for more details) in managing fishing gear and identifies best practice approaches for each stakeholder type. For each type the following structure is used.

- **Principles of best practice:** includes a brief statement about the role of the stakeholder in gear and ALDFG management and provides a brief set of basic principles.

- **Key best practice actions and approaches:** advocates as set of best practices against the principles and identified main collaborating partners.
- **Case study:** a brief case study to illustrate current best practice in this stakeholder group.

2.3 STAKEHOLDERS ADDRESSED BY THESE GUIDELINES

STAKEHOLDER GROUP	ROLE	BEST PRACTICE AREAS
Gear designers and manufacturers	Design, production and sale of fishing gear	Embedded traceability; research into, and use of / integration of biodegradable materials for use in the marine environment; incentives to return redundant / used gear.
Fishers	Individuals and crew catching seafood at sea	Reduced soak times; gear use limits in high-risk areas and during high-risk times; marking and identification of fishing gear; responsible storage of gear; reporting of lost gear, guidance on lost / abandoned gear location and retrieval.
Fisheries organisations	Non-statutory organisations representing fishers	Code of practices specific to fisheries; spatio-temporal agreements with other metiers; monitoring of fishing gear losses; communication protocols.
Port operators	Bodies operating and managing fishing ports	Accessible, low-cost gear and litter disposal facilities; integration into recycling initiatives; better awareness of responsible disposal opportunities; implement 'check out-check in' gear inventories where appropriate.
Fisheries managers and regulators	Management bodies setting policy, plans and regulations for fishing activities	Designation of spatio-temporal restrictions in high risk areas; development of appropriate gear marking and identification regulations; development of technical regulations to reduced ghost fishing potential in high risk areas; conducting impact assessment to gauge unintended consequences of management actions on gear loss and ghost fishing.
Fisheries control agencies	Body or agency responsible for enforcing fisheries regulations	Establish registry and database of lost / abandoned gear; enforcement of gear marking and identification regulations.
Fisheries and marine environment research	Research and development	Development of biodegradable materials acceptable to fishers, but effective at reducing gear-catching ability after control is lost.
Seafood ecolabel standard and certificate holders	Setting and maintaining standards for responsible sourcing of seafood	Gear loss and its consequences (eg ghost fishing) need to be included in all seafood sustainability standards, with supporting guidance provided where necessary.
Seafood companies	Fleet operators, processors, wholesalers and retailers	Encouraged to ensure that their seafood sourcing avoids high risk fisheries and that they participate in relevant initiatives eg gear recycling (see case study in Section 3.9.3) where possible.
NGOs	Advocates for sustainability and good practices	Coordination of advocacy, actions and information gathering; contributing to a centralised ALDFG / ghost fishing information hub / forums; organising ALDFG recovery in vulnerable areas.



Cecile Leveil / Marine Photobank

3. THE BEST PRACTICE FRAMEWORK

3.1 GEAR DESIGNERS, MANUFACTURERS AND RETAILERS

3.1.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>There is an important role at the beginning of the fishing gear life cycle recognised by responsible gear manufacturers. This is to ensure that gear is well designed and sensitive to its potential impact if lost, and that traceability is built in to the materials and gear components.</p> <p>Cost-effective identification of gear origin and ownership at different points in the life cycle then become possible.</p> <p>Corporate environmental responsibilities and tools, including life cycle analysis, mean gear manufacturers have some responsibility in facilitating the responsible use and disposal of their products. This should be through a number of different ways including:</p> <p>i. buy-back of old gear for reconditioning or recycling into new fishing gear (possibly allied to deposit schemes for returned gear)</p> <p>ii. sponsorship and / or implementation of responsible gear disposal schemes.</p>	<p>Prevention</p>	<ul style="list-style-type: none"> • Gear components should have built-in traceability, where practical, based on an industry-wide code of practice. • These gear traceability systems should be linked to standard record-keeping practices of commercial transactions. • Retailers of fishing gear, if different from the manufacturer, should include these batch numbers in their record keeping. • Fishing gear batch number should enable traceability throughout the full life cycle of the gear (eg to landfill or recycling). • Fishing gear recycling and responsible disposal should be promoted and facilitated. • Gear manufacturers should design gear with end-of-life solutions in mind, such as recycling. To facilitate the recycling process, manufacturers should particularly endeavour to use only one type of material (eg nylon, high-density polyethylene) in the construction of a net.
	<p>Mitigation</p>	<ul style="list-style-type: none"> • Research and development of both materials and gear design to disable fishing gear after control is lost. These should retain the catching effectiveness of traditional equipment and be both practical and cost-effective. • Collaboration with fishers, fishery organisations and researchers to test and improve gear design and materials.
	<p>Cure</p>	<ul style="list-style-type: none"> • Collaboration with management authorities to assist in tracing the origin and ownership of recovered fishing gear.

3.1.2 Key best practice actions and approaches: gear designers, manufacturers and retailers

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Gear components should have built-in traceability, where practical, based on an industry-wide code of practice.	<ul style="list-style-type: none"> Development and promotion of low cost and durable means of identifying the manufacturer name, year of manufacture, type of product and production batch of key gear components – eg ropes, net panels, traps etc. 	<ul style="list-style-type: none"> Fishing industry Research and development
	Gear traceability systems linked to record-keeping practices of commercial transactions. Retailers of fishing gear, if different from the manufacturer, should include these batch numbers in their record keeping.	<ul style="list-style-type: none"> Implementation of a traceability system that allows the recording of ownership transfer at the main transaction points in the supply chain. 	<ul style="list-style-type: none"> Fishing gear sales Fishing industry
	Facilitate and promote fishing gear recycling and responsible disposal.	<ul style="list-style-type: none"> Facilitate the buy-back of old gear for reconditioning or recycling into new fishing gear. Support the implementation of responsible gear disposal schemes. 	<ul style="list-style-type: none"> Port operators Recycling companies (eg Aquafil)
MITIGATION	Research and development of both materials and gear design to disable fishing gear after control is lost. These should retain the catching effectiveness of traditional equipment and be both practical and cost-effective.	<ul style="list-style-type: none"> Reduced use of persistent materials eg mixed polymer materials in fishing gear. Research into biodegradable materials that have predictable and controllable rates of degradation. Application of new biodegradable material technologies to different fishing gears and accessories eg bait bands. 	<ul style="list-style-type: none"> Research and development Bait producers
	Collaboration with fishers and fishery organisations to test and improve gear design and materials.	<ul style="list-style-type: none"> Testing of biodegradable materials and designs with fishers to improve their effectiveness and acceptability. 	<ul style="list-style-type: none"> Research and development Fishing industry
CURE	Collaboration with management authorities to assist in tracing the origin and ownership of recovered fishing gear and to locate lost gear for recovery/retrieval.	<ul style="list-style-type: none"> Industry-wide agreement of data embedding, coding and other practices. Recording of fishing gear / component production and transaction points to be made available to management authorities upon request. 	<ul style="list-style-type: none"> Fisheries management authorities Fishing industry

3.1.3 Case study: gear designers, manufacturers and retailers

A forensic case – tangling of humpback whales in Western Australia

AS Fiskevegn, a major Norwegian fishing gear manufacturer, was contacted by the department of parks and wildlife, nature protection branch, Western Australia in late March 2016. The company was asked to try to trace the origin of abandoned fishing gear that had caused the death of humpback whales.

They reported that: “While we have made significant progress with mitigation measures with the Western Australian Fishing Industry jointly with WA Fisheries, cases of very compromised entangled humpbacks have slowly been increasing. We needed to identify who/what/when/where and why we were having to deal with such challenging cases.”

During the 2015 humpback migrations, nine cases of entangled whales were observed. The same types of ropes were involved repeatedly in some cases. Images from the field were sent to Fiskevegn for review. (all images courtesy: dept of parks and wildlife) (see two images, top left)

A close-up of the ropes involved in these cases is shown on the bottom right-hand side. This is a Danline rope (PP fishing rope) made from a mix of polyethylene and polypropylene. Some 7,450 suppliers of such ropes are listed on Alibaba.com. While Fiskevegn was able to make assumptions about the origin of these particular ropes, it was not possible to prepare a full legal case against the possible perpetrators.

This is a relevant example of environmental risk that could be better managed by using industry-driven product traceability. By using identification marking tape, the manufacturer, product, year of manufacture and batch number, could have been conclusively identified in an instant. With this information investigators can follow the supply chain to the IUU vessels.

Source: Fiskevegn (courtesy of Trond-Inge Kvernevik)



Ropes recovered from deceased humpback whale in Western Australia (bottom left)

Rope samples from a major fishing rope manufacturer (bottom right)

3.2 FISHERS

3.2.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>Fishers are probably the key stakeholder in these guidelines. No fisher wants to lose expensive fishing gear, but sea conditions, equipment failure, the actions of others and safety considerations can lead to loss or abandonment of gear.</p> <p>Fishers need to take a risk-based approach to gear loss. They can reduce both the likelihood of initial loss and its subsequent impact in a number of ways. These include: investment in gear marking, good practice in gear rigging and setting, and a responsible approach to fishing and overall marine stewardship. The actions and best practice demanded of fishers should be simple, pragmatic and affordable and proportional to the risks and consequences of gear loss.</p>	<p>Prevention</p>	<ul style="list-style-type: none"> • Reduce risk of gear loss or abandonment through the avoidance of high-risk areas / situations, the use of well-maintained and set fishing gear, and minimising the amount of gear set. • Adjust fishing methods to prevailing conditions to reduce the risk of gear loss eg shorter soak time, etc. • Training and awareness-building of crew in good practice and responsible fishing. • The clear marking and identification of fishing gear and its main components. • The responsible disposal of redundant fishing gear and other potential marine litter.
	<p>Mitigation</p>	<ul style="list-style-type: none"> • Use of fishing gear designed to stop fishing after control is irretrievably lost eg through the use of biodegradable materials. • Reporting of lost or abandoned fishing gear.
	<p>Cure</p>	<ul style="list-style-type: none"> • Recovery and subsequent reporting of ALDFG, its transport to shore and its subsequent responsible disposal. • Best practical recovery of fishing gear after it has been lost or abandoned.

3.2.2 Key best practice actions and approaches: fishers

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Reduce risk of gear loss or abandonment through the avoidance of high-risk areas / situations and the use of well-maintained fishing gear.	<ul style="list-style-type: none"> • Encourage and participate in gear zoning initiatives to reduce conflicts with other fishers. • Communication between different fishing fleets operating over the same ground to make others aware of set static gear (location, marking, spatial extent, when it will be retrieved, etc). 	<ul style="list-style-type: none"> • Fisheries organisations • Fisheries management authorities • Fisheries control authorities
	Adjusting fishing methods to prevailing conditions to reduce the risk of gear loss – eg shorter soak time, etc.	<ul style="list-style-type: none"> • Gear use limits – eg limited lengths and depths of gillnet fleets, trap strings, etc to increase control of fishing gear and reduce the risk of damage or loss. • Soak time limits for static gear such as gillnets and traps. Longer soak times increase the risk of gear loss, so fishers will aim at a balance of achieving a catch and retrieving gear quickly. • Rigging options that minimise gear loss, even if it compromises catch levels. If necessary, the use of alternative gears as dictated by prevailing weather and other conditions. • Use and sharing of seabed and local current mapping data to reduce risk of snagging and subsequent gear loss. 	<ul style="list-style-type: none"> • Fisheries organisations • Fisheries research organisations
	Training and awareness-building of crew in good practice and responsible fishing.	<ul style="list-style-type: none"> • Crew members are aware of the potential impact of lost gear and other marine litter and the main pathways that lead to their loss. • Allowing for the adequate handling and storage space on vessels for both usable and redundant fishing gear (and other marine litter) to minimise accidental loss and the need to discard unwanted gear. 	<ul style="list-style-type: none"> • Fisheries organisations • NGOs
	The clear marking and identification of fishing gear and its main components.	<ul style="list-style-type: none"> • Marking of static fishing gear to make it clearly visible to others, including lighting if necessary. • Where appropriate, the nature (eg gear type), orientation and spatial extent of the gear should be indicated. • Identification of fishing gear and components with a vessel's ownership details eg vessel registration number. This should be readily visible to control authorities at a safe distance from the gear. • Where used FADs should be marked and identified appropriately. Unattended FADs should have some means of providing real-time information on their locations. An electronic transponder, where practicable, should be provided. Location information should be provided in near real-time to the relevant authority for monitoring purposes. 	<ul style="list-style-type: none"> • Fisheries organisations • Maritime management authorities • Fisheries control authorities
	The responsible disposal of redundant fishing gear and other potential marine litter.	<ul style="list-style-type: none"> • Maintenance of a garbage management plans and record book¹. • Every practical effort made to recycle and reuse fishing gear components. • Responsible on-shore disposal of redundant fishing gear and other garbage, preferably in official onshore port reception facilities (see also MARPOL Annex V). 	<ul style="list-style-type: none"> • Port authorities • Fisher organisations

1. Mandatory for all vessels >100 grt (MARPOL , Annex V)

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
MITIGATION	Use of fishing gear designed to stop fishing after control is irretrievably lost.	<ul style="list-style-type: none"> Fishers are encouraged to trial and, where appropriate, adopt gear incorporating escape mechanisms, biodegradable components and other technologies that disable gear after control is lost. 	<ul style="list-style-type: none"> Gear manufacturers Research organisations
	Reporting of lost or abandoned fishing gear.	<ul style="list-style-type: none"> After any major loss or abandonment of fishing gear, the nature, last known time, date and position should be reported promptly to relevant authorities (see fisheries managers and regulators). Where FADs are used, the last-known time, date and position of lost or abandoned FADs should be reported promptly to the relevant authorities. 	<ul style="list-style-type: none"> Port authorities Fisher organisations
CURE	Recovery and subsequent reporting of ALDFG, its transport to shore and responsible disposal.	<ul style="list-style-type: none"> After conflict with fishing gear, every effort should be made to report details of the incident to the relevant authorities. Where damaged gear is a significant navigation, environmental or animal welfare risk, efforts should be made to recover it. It should then be returned to shore for the attention of the relevant authorities. Fishers should be encouraged to report gear loss without fear of recrimination. 	<ul style="list-style-type: none"> Maritime management authorities
	Best practical recovery of fishing gear after it has been lost or abandoned.	<ul style="list-style-type: none"> Fishing operators should be prepared, equipped and given incentives to recover their gear if lost or abandoned. Preparations may include the carrying of retrieval tools and advance training of crew of their use. If gear is lost or abandoned, every reasonable effort should be made to recover the gear either immediately or later. Priority should be given to gear that represents a navigation hazard or one that presents a real threat to the marine environment. The recovery of lost, abandoned or otherwise discarded fishing gears should be undertaken with due regard to human safety. The subsequent damage such retrieval may have on the aquatic environment and habitat should also be considered. If the gear cannot be recovered, it should be reported through the agreed channels to the relevant authority giving details of the gear and its last known position. The relevant authority should give an effective, general warning to other vessels. This is especially important if the gear presents a specific navigation risk. If necessary, a trained removal team should be dispatched. 	<ul style="list-style-type: none"> Maritime management authorities NGOS

3.2.3 Case study: fishers

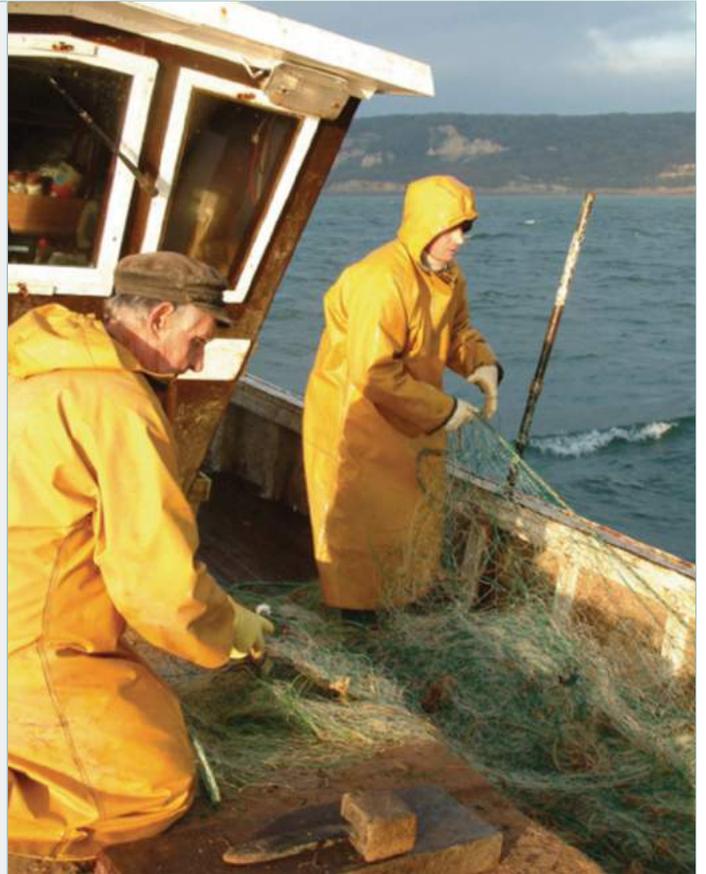
Code of good practice to minimise gear conflict and gear loss in gillnet fisheries

THE FANTARED² project included the development of a netting code of good practice. Its aim was to minimise gear conflict and loss and to agree measures to mitigate the impact of lost gear on commercially important stocks. The gillnet fishing fleets of the UK, Spain, Portugal, France, Sweden and Norway agreed the following main points:

- only setting the amount of gear that can be handled regularly and efficiently
- marking gear properly and including the identity of the vessel
- paying close attention to weather patterns and not setting gear when poor weather is expected
- ensuring that gear is set to avoid conflict with other users, and taking appropriate precautions when fishing in areas of high marine traffic
- always carrying net retrieval gear aboard and
- always attempting to retrieve lost gear and reporting its loss where possible.

Regional additions include using radar reflectors, using certain surface buoy combinations for strong current conditions, tagging nets and specifying minimum standards for gear construction.

From Brown et al, 2005



Fishermen pulling in their nets in East Sussex, UK. World Animal Protection's ghost gear campaign aims to reduce the discarded fishing nets and lobster pots that entangle marine animals (photo, right)
Photo credit: Marnie Bammert For MSC / Marine Photobank

3.3 FISHERIES ORGANISATIONS

3.3.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>Many actions can be effectively taken at individual vessel level to mitigate ghost gear problems. However, fishing organisations representing certain fisheries, fleets or geographic areas can also address common issues with their members. They can also encourage and influence cooperation and assistance from other parts of the sector.</p> <p>Fisheries organisations can work on behalf of their members to ensure that their knowledge and concerns are incorporated into both voluntary and mandatory management measures.</p>	<p>Prevention</p>	<ul style="list-style-type: none"> • Development of codes of practice on behalf of their members to facilitate and encourage responsible fishing. • Development of means and mechanisms to comply with MARPOL’s Annex V, with regulatory bodies and fisheries managers where appropriate. • Work on behalf of their members to liaise with the fishing and other competent authorities in establishing marine spatial planning tools to minimise gear conflict. • Where fishing organisations procure goods or services on behalf of their members, they should require their suppliers to conform with best practice where applicable (eg codes of practice). • Liaise with third party seafood certification bodies to address management and information requirements for reducing ghost fishing and the impacts of ALDFG on marine fauna, flora and habitats.
	<p>Mitigation</p>	<ul style="list-style-type: none"> • Development of lost and abandoned fishing gear reporting protocols, procedures and avenues on behalf of their members.
	<p>Cure</p>	<ul style="list-style-type: none"> • Identification and clearance of lost gear ‘hotspots’ representing: either an operation or navigation hazard to their members or a significant economic loss through ghost fishing and subsequent mortality of their target species or a risk of entangling marine mammals, birds or turtles occupying the region.

3.3.2 Key best practice actions and approaches: fisher organisations

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Development of codes of practice / good conduct on behalf of their members to facilitate and encourage responsible fishing.	<ul style="list-style-type: none"> • Identification of common issues and management needs across the membership (and with other similar organisations where appropriate). Deciding whether a code of practice might provide a set of standards and best practices to address these. • Participatory development of a code of practice, identifying minimum, good and best practice levels. • Agree how these might be implemented eg voluntary, self-certification by the fisheries organisation, or third party certified. 	<ul style="list-style-type: none"> • Fishers
	Development of means and mechanisms to comply with MARPOL's Annex V.	<ul style="list-style-type: none"> • Fisher organisations should encourage their members to comply with MARPOL Annex V regulations on waste management at sea. If necessary (and as recognised by Art 6.4.1 in Annex V), assistance might be sought from government in “developing resolutions, bylaws and other internal mechanisms” (IMO, 2012). 	<ul style="list-style-type: none"> • Fisheries management authorities
	Work on behalf of their members to liaise with fishing and other competent authorities in establishing marine spatial planning tools to minimise gear conflict.	<ul style="list-style-type: none"> • Work with members to review the advantages, disadvantages and mitigation options of marine spatial planning approaches (eg gear zoning) to the membership. • Work with the statutory authorities involved in marine spatial planning to develop optimal working solutions that minimise potential gear conflict. 	<ul style="list-style-type: none"> • Fisheries management authorities
	Where fishing organisations procure goods or services on behalf of their members, they should require their suppliers to conform with best practice where applicable.	<ul style="list-style-type: none"> • Fishing organisations involved in procurement on behalf of their members should consider developing a responsible procurement strategy. This should require suppliers to conform to certain standards of design, quality and traceability. This strategy could aim to fulfil this gear management best practice framework, but could also include other considerations, such as social and ethical procurement. 	<ul style="list-style-type: none"> • Gear manufacturers • Certification bodies
	Liaise with third party seafood certification bodies to address management and information requirements for reducing ghost fishing and the impacts of ALDFG on marine fauna, flora and habitats.	<ul style="list-style-type: none"> • Related to the other preventative measures mentioned above, fishing organisations might work with Fisheries Improvement Project (FIPs) and third party certification bodies. This would be to ensure their members adhere to benchmarks and standards to which they are party. • A key focus will be the operational management and information requirements for best practice in ecosystem management – eg bycatch, Endangered, Threatened and Protected (ETP) interactions and habitat impacts. 	<ul style="list-style-type: none"> • Fishers • Certification bodies
MITIGATION	Development of lost and abandoned fishing gear reporting protocols, procedures and avenues on behalf of their members.	<ul style="list-style-type: none"> • Through liaison with the relevant fisheries management and control authorities, development of protocols and procedures for the reporting of the loss or abandonment of fishing gear. The nature and scope of this reporting system would reflect both the scale of fishing involved, and the specific circumstances of the member vessel operations eg the gear used, etc. 	<ul style="list-style-type: none"> • Fisheries management and control authorities
CURE	<p>Identification and clearance of lost gear ‘hotspots’ that represent:</p> <ol style="list-style-type: none"> 1) An operation or navigation hazard to their members 2) A significant economic loss through the ghost fishing and subsequent mortality of their member’ target species or 3) A risk of entangling marine mammals, birds or turtles occupying the region 	<ul style="list-style-type: none"> • Fishing organisations should periodically consult their members to understand the effects of ALDFG on their fishing activities and the marine environment. ALDFG could represent either an operational or safety hazard to their members, negatively affect marine animals or their habitat, or target harvestable stocks through ghost fishing. • If these detrimental impacts exist, fisheries organisations would engage with the public, private and NGO sectors to investigate cost-effective methods of recovering ALDFG (and other marine litter, if appropriate). 	<ul style="list-style-type: none"> • Fisheries management authorities • Fishing industry

3.3.3 Case study: fisher organisations

Fundy North Fisherman’s Association – Lost at sea: a ghost gear retrieval manual

For fishers in the Canadian Bay of Fundy, the ghost gear problem has been on their radar for many years. The Fundy North Fishermen’s Association produced a practical manual, providing detailed descriptions on their retrieval and prevention processes, and their rationale for embarking on such a project.

The manual (see table of contents, right) was aimed specifically at fishers and fishermen’s organisations, but is of interest to the general public.

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What causes Ghost Gear and how to prevent it

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Conflict with the Shipping Industry

Part II: Ghost Gear Retrieval (If you are a fisherman - this is the part you want to read!)

Vessel and Gear Preparation

Our Study Areas: How to retrieve gear in different depths and bottom types

Ghost Gear Disposal

Conclusion

Source: www.fundynorth.org

3.4 PORT OPERATORS

3.4.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>It is important that it is convenient, safe and relatively inexpensive to dispose of redundant fishing gear and marine litter in port. Ports, and in particular Port Reception Facilities (PRFs), should work with fishing operators and organisations to ensure that adequate facilities are provided.</p> <p>Given their relationships with local government, businesses and other local interests, ports could catalyse the development of the downstream recycling and disposal of received material responsibly and cost-effectively.</p>	Prevention	<ul style="list-style-type: none"> • Provision of adequate port reception facilities for the disposal of fishing gear in accordance with MARPOL Annex V. • Inclusion of redundant fishing gear into port waste management plans where appropriate. • Development of agreements with both local gear manufacturers and recycling businesses to maximise opportunities for the cost-effective and environmental responsible disposal of landed waste. • Information exchange with IMO's PRF database to ensure that specialist reception facilities are easily located.
	Mitigation	<ul style="list-style-type: none"> • Not applicable.
	Cure	<ul style="list-style-type: none"> • Not applicable.

World Animal Protection / Kristian Whipple



3.4.2 Key best practice actions and approaches: port operators

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Provision of adequate port reception facilities for the disposal of fishing gear in accordance with MARPOL Annex V.	<ul style="list-style-type: none"> As required by IMO's MARPOL Annex V, signatory states should provide "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" (IMO, 2012). 	
	Inclusion of redundant fishing gear into Port Waste Management Plans where appropriate.	<ul style="list-style-type: none"> Recognising the above, where fisheries are a significant part of port operations, specialist collection facilities might be developed for handling certain fishing gear and its components. 	<ul style="list-style-type: none"> Fisher organisations
	Development of agreements with both local gear manufacturers and recycling businesses to maximise opportunities for the cost-effective and environmental responsible disposal of landed waste.	<ul style="list-style-type: none"> Ports should assist fishing vessel operators, companies and organisations to: "work with national and local government officials, regional administrators, commercial interests, and local waste disposal infrastructure managers to develop landside waste disposal strategies, including waste segregation, that encourage reduction, reuse, and recycling of ship-generated wastes landed ashore at PRFs" (IMO, 2009). 	<ul style="list-style-type: none"> Fisher organisations Local government Seafood businesses
	Information exchange with IMO's PRF database to ensure that specialist reception facilities are easily located.	<ul style="list-style-type: none"> Port authorities or PRF providers are urged to communicate to their country contacts accurate and up-to-date information about fishing gear and other garbage reception facilities available at the port. This information can then be communicated to the fishing industry via the IMO's PRF database, accessible through the IMO Global Integrated Ship Information System (GISIS) website. 	

3.4.3 Case study: port operators

Steveston Harbour Net Recycling Initiative in British Columbia, Canada

The problem – In the past Steveston Harbour resorted to burying old nets in landfill, but with global synthetic fibre manufacturer Aquafil Group and global carpet tile manufacturer Interface Inc, it is working towards a solution.

The solution – Interface and Aquafil started their collaboration with the very successful Net-Works™ project, where fishing communities in the Danajon Bank in the Philippines recover discarded fishing nets. The nets are then shipped to Aquafil's ECONYL® plant in Slovenia to be regenerated into nylon 6 fibre, which is then used by Interface in their carpet tiles. The project has been extremely successful. One of the outcomes is an alternative income for local fishing communities in the Danajon Bank; they sell nets to Aquafil and prevent waste nets from polluting the marine environment.

With Interface and Aquafil seeking to expand their operations to include more markets, Steveston Harbour participated in an 18-month pilot project to establish a similar project on the west coast of British Columbia.

The outcomes – During the pilot project 18 tonnes of old nylon fishing net were collected and shipped to Aquafil to be recycled into ECONYL® nylon yarn. While this has been a great start, much more nylon 6 fishing net is required to sustain the momentum. Steveston Harbour continues to collect nets in preparation for a second shipment to Slovenia. Work is underway to expand the project into other harbours in British Columbia.

The lessons – The pilot has provided good insight into logistical and financial challenges associated with collecting, preparing and shipping nets, and streamlining the process making it efficient and sustainable for everyone. The following key information has been gathered.

- how much nylon 6 can be recovered from a full seine net
- how much labour is required to strip the net from its other parts (cork line, bunt, lead line)
- how a container can be efficiently loaded to maximise the amount of net that can be sent to Aquafil's regeneration plant in Slovenia in a single trip.

All of this information has helped to adapt the regeneration model started with Net-Works™ to fit Steveston Harbour.

One limitation is that the current technology allows for the sole use of nylon 6. This means other parts of the net, such as the polyethylene based border web and the polypropylene ropes, cannot be recycled as a part of the project. Work is underway to find recycling options for polyethylene and polypropylene as well.

Source: <http://www.ghostgear.org/solutions/gwr-polymers-newlyn-harbour-net-recycling>



Photo credit: Joel Baziuk

3.5 FISHERIES MANAGERS AND REGULATORS

3.5.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>These best practice guidelines emphasise voluntary mechanisms, possibly allied with third party certification initiatives. However, fisheries management authorities and other statutory regulators have a distinct role to play in managing fishing practices at regional³, national and local levels.</p> <p>This may be by establishing minimum standards and requirements through legislative means, or by assisting fisher organisations and other business groups in maintaining voluntary best practice.</p>	Prevention	<ul style="list-style-type: none"> • Policy, management and regulatory authorities should, using the draft FAO guidelines⁴, consider need, scope, implementation and coordination procedures for a fishing gear marking system in their waters. • Constraints to the effective implementation of a system for gear marking should be identified. Adequate education, training and other forms of capacity development should be provided to fishers, relevant authorities and other interested parties to facilitate the implementation of the gear marking system. The adoption of voluntary best practice by fishery organisations for preventing gear loss (such as those practices outlined in other sections of this report) should be supported. • Mandatory gear retrieval for FADs and other lost gear should be required where practical. • The use of biodegradable material for certain gears and escape panels for pots and traps should be required. • Restricting or zoning the use of certain gears, in areas with a high risk of their loss due to local conditions or gear conflict, should be considered.
	Mitigation	<ul style="list-style-type: none"> • Relevant authorities should establish appropriate reporting regimes, such as those stipulated by MARPOL and the London Convention⁵ • Reporting gear loss within log books should be required.
	Cure	<ul style="list-style-type: none"> • Policy, management and regulatory authorities should partner or collaborate with appropriate organisations, NGOs, commercial entities or other national governments to fully benefit from the gear marking system, including the monitoring and retrieving of ALDFG.

3. Includes Regional Fisheries Management Organisations (RFMOs)

4. FAO (2016). Report of the Expert Consultation on the Marking of Fishing Gear, Rome, Italy, 4–7 April 2016. FAO Fisheries and Aquaculture Report No. 1157. Rome, Italy

5. London Convention: “Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972”. See <http://www.imo.org/en/OurWork/Environment/LCLP/Pages/default.aspx> for more details.

3.5.2 Key best practice actions and approaches: fisheries managers and regulators

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Policy, management and regulatory authorities should consider the need, scope, implementation and coordination procedures for a fishing gear marking system in waters under their jurisdiction.	<ul style="list-style-type: none"> Systems and minimum standards for the marking and identification of fishing gear should be developed at relevant regional, national and local levels. The relevant policy-making authorities, with the participation of interested parties, should decide: <ol style="list-style-type: none"> on the use of a system, if applicable, for the marking of fishing gear the fisheries, fishing gears, vessels or areas to which the system applies to, and conditions for implementation, or the grant of exemptions from, the agreed system the reporting procedures, data storage, retrieval and information exchange. These systems should reflect the recently published draft guidelines for the ‘application of a system for the marking of fishing gear’ (FAO, 2016). Where appropriate, policy, management and regulatory authorities should consider the use of a risk assessment process to identify the priorities and scope of such systems. This is to ensure they are both necessary and practical in the context of different fisheries under their jurisdiction. 	<ul style="list-style-type: none"> Fishers Fisher organisations Gear manufacturers Fisheries control authorities NGOs
	Constraints to the effective implementation of a system for gear marking should be identified. Adequate education, training and other forms of capacity development should be provided to fishers, relevant authorities and other interested parties to facilitate the implementation of the gear marking system.	<ul style="list-style-type: none"> Policy, management and regulatory authorities should raise awareness of the problems caused by ALDFG. They should provide relevant stakeholders and the general public a clear purpose and rationale why it is necessary and beneficial to properly mark fishing gear. Policy, management and regulatory authorities and other interested parties should cooperate to identify and share best practices, collate and share information, and coordinate effective communication and training. 	<ul style="list-style-type: none"> Fishers Fisher organisations Gear manufacturers Fisheries control authorities
MITIGATION	Relevant authorities should establish appropriate reporting regimes.	<ul style="list-style-type: none"> Policy, management and regulatory authorities should ensure that there is a practical and robust lost and abandoned fishing gear reporting system. It should be consistent with the context of different fisheries under their jurisdiction. Reporting protocols and pathways should be developed and implemented in cooperation with: gear manufacturers; vessel operators; fishing companies; fishing organisations, and with other fisheries administrations. A record/register of fishing gear reported as being found, lost, abandoned, or otherwise disposed of should be maintained by the relevant authority. This record/register should include details of: <ol style="list-style-type: none"> type and characteristics of the fishing gear any fishing gear mark(s) and other identifiers date, time, position of loss or retrieval, depth of water, etc reason for loss (if known) weather conditions and any other relevant information including entrapment of endangered, threatened or protected species. Registers of gear loss should be harmonised and connected where possible with other registers at regional, RFMO and other levels. Over time such registers could be merged where appropriate. 	<ul style="list-style-type: none"> Fishers Fisher organisations Gear manufacturers Fisheries control authorities

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
CURE	<p>Policy, management and regulatory authorities should partner or collaborate with appropriate organisations, NGOs, commercial entities or other national governments to fully benefit from the gear marking system. Such partnerships and collaborations should also include the monitoring and retrieving of ALDFG when appropriate.</p>	<ul style="list-style-type: none"> • States are encouraged to develop communication frameworks to record and share information on fishing gear loss to reduce loss and facilitate recovery of fishing gear. • States are also encouraged to develop frameworks to assist fishing vessels in reporting gear loss to the flag State, and where appropriate, to the coastal State in whose jurisdiction the loss occurred. Such frameworks should consider implementation challenges in small scale and artisanal fisheries and recreational operations. • The relevant authority and the fishing industry should encourage owners of the fishing gear to have adequate equipment and training available to facilitate the recovery of ALDFG. Where possible, the owner and the relevant authority should collaborate to enhance recovery efforts. Owners (national or foreign) should be informed of gear recovered (where appropriately marked) so that they can collect it for re-use or safe disposal. 	<ul style="list-style-type: none"> • Fishers • Fisher organisations • Gear manufacturers • Fisheries control authorities • NGOs



World Animal Protection / Rob Trendiak

3.5.3 Case study: fisheries managers and regulators

Statutory guidance on the marking of fishing gear, retrieval and notification of lost gear in the UK

The UK's Marine Management Organisation (MMO) recently released guidance on how different types of fishing gear must be marked, what must be done if fishing gear is lost, and how to report lost fishing gear. This is summarised briefly below.

	Gear type	Marking	Distance from shore (nautical miles)		
			0 - 12 nm	6 - 12 nm	12 - 200 nm
Marking of fishing gear You must mark passive gear and beam trawls with the Port Letters and Numbers (PLN) of your vessel. This applies to the gear in use and gear you are carrying on board your vessel.	Beam trawl	PLN	Yes		Yes
	Set nets: Gillnets, entangling nets, trammel nets and trap nets Drift nets: Drifting gillnets and drifting trammel nets Lines and pots: Longlines, lines, pots and traps.	Label	Yes		Yes
		Marker buoy	Recommended		Yes
		Contact (IFCA)	Yes		
Labels	In all EU waters passive gear that is used or carried on board must have a permanent label showing the vessel PLN. Each label must be: (i) at least 75mm x 65mm in size (ii) made of durable material and (iii) securely fixed to the gear and not removable.				
Retrieval of lost gear	The guidance states: "If you lose all or part of your fishing gear you must attempt to retrieve it as soon as possible. You must carry equipment on board your vessel to retrieve lost gear unless you operate exclusively within the territorial waters (12 nautical mile limit), or you never spend more than 24 hours at sea from departing to returning to port."				
Notification of lost gear	If lost gear cannot be retrieved, the fisher must inform the UK fisheries authorities within 24 hours of the following: <ul style="list-style-type: none"> • PLN and name of the fishing vessel • type of gear lost • time when the gear was lost • position where the gear was lost • measures taken to retrieve the gear. If an electronic logbook is used, lost gear can be reported using the Lost Gear Declaration (GLS) when submitting the daily Fishing Activity Report (FAR). If the vessel does not have an electronic logbook, the fisher must report lost gear to the UK Fisheries Monitoring Centre (UKFMC). Source: MMO (https://www.gov.uk/guidance/marking-of-fishing-gear-retrieval-and-notification-of-lost-gear).				

3.6 FISHERIES CONTROL AGENCIES

3.6.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>Fisheries control agencies are those mandated with the Monitoring, Control and Surveillance (MCS) of fishing activities. MCS functions are normally a combination of aerial (including drone and satellite) surveillance, at-sea inspections and port inspections. The main function of MCS is to prevent and deter Illegal, Unreported and Unregulated (IUU) fishing.</p> <p>Gear marking is an important mechanism for assisting regulate fisheries. If gear is well marked and has sufficient identification linked to vessel or gear registers, this is evidently a useful tool for enforcement agencies checking on gear set in certain areas.</p> <p>Conversely if a fisheries patrol picks up unidentified fishing gear in a location where all gear must be marked and linked to a vessel / gear registry, it can be assumed it is illegally operated. Appropriate action can then be taken.</p>	<p>Prevention</p>	<ul style="list-style-type: none"> • Where the marking of fishing gear is necessary or required, it should be a condition of any authorisation to fish. • Fisheries management bodies should ensure that control and enforcement of a system for marking fishing gear is integral to the monitoring, control and surveillance of fisheries. • Inspections should be carried out by the relevant authority to verify that owners and operators mark their fishing gear as required and take necessary action. • The relevant authority should consider fair and reasonable penalties or sanctions for non-compliance with the various requirements of fishing gear marking and identification systems.
	<p>Mitigation</p>	<ul style="list-style-type: none"> • Not applicable.
	<p>Cure</p>	<ul style="list-style-type: none"> • Not applicable.

3.6.2 Key best practice actions and approaches: fisheries control agencies

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
	Where the marking of fishing gear is required, it should be a condition of any authorisation to fish.	<ul style="list-style-type: none"> Fish licensing conditions should explicitly include the prevailing requirements to mark and identify fishing gear as a condition to fish, including reporting and other management requirements. 	<ul style="list-style-type: none"> Fisheries management authorities
	Fisheries management bodies should ensure that control and enforcement of a system for the marking of fishing gear is an integral part of arrangements for the monitoring, control and surveillance of fisheries.	<ul style="list-style-type: none"> The marking of fishing gear, together with other aspects of fishing gear management required by law, eg spatial or temporal gear zones, should be included in MCS planning and operations. This includes in risk-based prioritisation processes. 	<ul style="list-style-type: none"> Fisheries management authorities Fishing organisations
PREVENTION	Inspections should be carried out by the relevant authority to verify that owners and operators mark their fishing gear as required and take action as necessary.	<ul style="list-style-type: none"> Inspections should be conducted, both at sea and at port, to ensure that gear marking and other requirements are being complied with. During inspections at sea, due consideration for the health and safety of both inspection and fishing industry personnel should be paramount. In particular, care must be taken not to become entangled with fishing gear, especially in poor sea conditions. Deployed gear found without required marks should be reported to the relevant authority. Port State inspection of fishing gear should be conducted in accordance with the procedures set out in Annex B, paragraph e) of the FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. This includes conditions relating to marking of the fishing gear. 	<ul style="list-style-type: none"> Fisheries management authorities Fishing organisations
	The relevant authority should consider fair and reasonable penalties or sanctions for non-compliance with the various requirements of fishing gear marking and identification systems.	<ul style="list-style-type: none"> An appropriate penalty or other sanction framework should be developed to prevent and deter non-compliance with fishing gear marking and other regulations relevant to this framework. It is important that these penalties or sanctions are proportionate to the non-compliance involved. These should be clearly communicated to the fishing industry, and appropriate consultation and appeal systems put in place. 	<ul style="list-style-type: none"> Fisheries management authorities Fishing organisations



3.6.3 Case study: fisheries control agencies

Consideration of health and safety issues when retrieving lost or abandoned fishing gear

On 18 May 2015, the twin rig prawn trawler Kairos capsized in very rough seas and sank 70nm west of the Isles of Scilly. The vessel had been creeping for a lost net when the creeper snagged. The vessel was effectively anchored by the stern, which was then exposed to waves up to 9m high. As a result, the aft net drum space was swamped frequently. The vessel soon started to list significantly to port and within an hour floodwater about 1m deep was found in the cabin space below the aft main deck.

The skipper repeatedly tried to turn the vessel into wind, but he was unsuccessful. Also, although the crew used an electric submersible pump to remove the floodwater from the cabin space, the water level continued to rise. The port list also increased beyond 35°.

Eventually, the skipper recognised the seriousness of the situation and instructed the crew to don abandon ship lifejackets and to prepare the life rafts. He also informed a nearby vessel that Kairos was in danger. Shortly after the skipper told the crew to launch the life rafts, Kairos capsized. Fortunately, he and the crew were able to scramble from the water into a life raft. They were rescued by the Irish fishing vessel Cu Na Mara about 90 minutes later.

As Kairos's skipper, who was cold and wet, climbed from the life raft to Cu Na Mara's deck, he fell from the ladder into the sea. One of Cu Na Mara's crew donned an immersion suit and lifejacket and attached a safety line. He then jumped into the sea and secured a rope around the skipper, who was then hoisted by derrick to safety. The actions of Cu Na Mara's crew in manoeuvring the vessel alongside the life raft and recovering the skipper from the water in very rough seas were commendable.

A stability assessment conducted following the accident indicated that the port list was primarily caused by the load on the creeper wire. It also indicated that the floodwater in the cabin space was probably due to down flooding through an air vent in the net drum space. Once the list reached an angle of 48°, the engine room would also have started to flood through its air vents.

Safety lessons

- Fishing vessels engaged in creeping and the recovery of nets caught on fasteners significantly increase their exposure to the risks of excessive rolling, dangerous lists and capsize, particularly when operating in heavy swells or rough seas. The effects of powerful winches, snagged trawl wires and heavy sea conditions, when working in unison, should never be underestimated. No vessel is unsinkable. If in doubt, it is safer to release snagged gear and recover it later, when conditions are more favourable.
- All external doors, vents and portholes are potential sources of flooding. Knowing where they are located is part and parcel of vessel familiarisation. Always ensure that they are properly maintained and check they are closed during periods of heavy weather or when engaged in operations during which lists may be experienced.
- Further guidance on the hazards associated with the recovery of lost fishing gear can be found in MGN 415 (F).

Source: UK marine accident investigation branch (<https://www.gov.uk/government/publications/safety-lessons-hazards-of-recovering-lost-fishing-gear>)

3.7 FISHERIES AND MARINE ENVIRONMENT RESEARCH

3.7.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>The concept of integrated ‘blue growth’ is resulting in a more collaborative institutional environment for marine research. Diverse areas such as fisheries, ecosystem monitoring, robotics and remote sensing are all exploring common opportunities. Advances in material science, information technology and maritime engineering, mean there are real opportunities to improve fishing gear management. These opportunities centre on preventing its loss, disabling lost gear and aiding gear recovery through innovative research and development.</p>	<p>Prevention</p>	<ul style="list-style-type: none"> • Research and development of low-cost gear marking, identification and traceability technologies. • Development of improved low carbon power generation technologies and energy efficient lighting and communication solutions for fishing gear and gear marking systems. • Provision of better information on the drivers, extent, impact and costs of ALDFG.
	<p>Mitigation</p>	<ul style="list-style-type: none"> • Further development of (i) biodegradable materials for use in the marine environment and (ii) fishing gear-disabling systems. • Research and evaluation of ghost fishing efficiency and mortality rates of different fishing gear designs.
	<p>Cure</p>	<ul style="list-style-type: none"> • Research into the cost-effectiveness of different gear location and retrieval methods.

3.7.2 Key best practice actions and approaches: fisheries and marine environment research

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Research and development of improved gear marking, identification and traceability technologies.	<ul style="list-style-type: none"> The development of innovative solutions to fishing gear marking, identification and traceability, including the integration of identification tags and other markers to key gear components. A key consideration of such research should be the cost-effectiveness, practicality and acceptability of such systems to ensure their subsequent adoption by gear manufacturers and the fishing industry. 	<ul style="list-style-type: none"> Government (funding) Gear manufacturers Fishing industry
	Development of improved low carbon power generation technologies and energy efficient lighting and communication solutions for fishing gear and gear marking systems.	<ul style="list-style-type: none"> Further investigation into low carbon power independent power provision at sea, including photovoltaic, wind and wave-powered electrical generation, and improved power storage through improved power cell storage solutions. Application of LED and other low draw lighting systems for fishing gear. Development of remote communication and locator beacon systems that improve both the control of fishing gear and will aid its recovery if lost. 	<ul style="list-style-type: none"> Government (funding) Fishing industry (eg piloting and/or adopting new technologies)
	Provision of better information on the drivers, extent, impact and costs of ALDFG.	<ul style="list-style-type: none"> Provision of information to policy makers, industry and other stakeholders on why fishing gear is lost, its contribution to marine litter, the impact on the marine environment and its quantifiable and non-quantifiable costs. 	<ul style="list-style-type: none"> Government Gear manufacturers Fishing industry
MITIGATION	Further development of biodegradable materials and fishing gear disabling systems.	<ul style="list-style-type: none"> Build on recent advances in biodegradable material science and applying this to practical, cost-effective and acceptable solutions for disabling ALDFG. Investigation into new materials for fishing gear that have a lower environmental cost. 	<ul style="list-style-type: none"> Gear manufacturers Fishing industry
	Research and evaluation of ghost fishing efficiency and mortality rates of different fishing gear designs.	<ul style="list-style-type: none"> Researchers should collaborate with gear manufacturers and the fishing industry to develop and test different fishing gear technologies to assess ghost fishing efficiency, mortality and other elements. These elements should include the longevity of ghost fishing, environmental variables and the subsequent fate of ALDFG. This will help contribute to improved gear design and more effective disabling systems. 	<ul style="list-style-type: none"> Gear manufacturers Fishing industry
CURE	Research into the cost-effectiveness of different gear location and retrieval methods.	<ul style="list-style-type: none"> Assist the development of cost effective ALDFG survey systems that can locate and quantify the amount of lost gear of different types. This will help assess the likely threat and cost to both anthropogenic activities (eg navigation, fishing, etc) and the marine environment. Assist the development of cost-effective ALDFG recovery techniques that can be subsequently adopted by industry, the government and NGOs. 	<ul style="list-style-type: none"> Government Fishing industry NGOs

3.7.3 Case study: fisheries and marine environment research

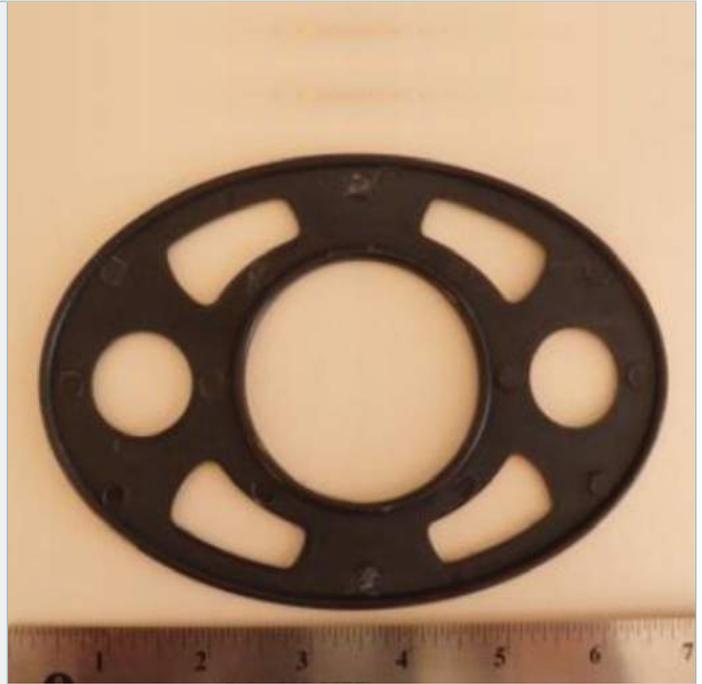
Polyhydroxyalkanoate (PHA) use as a biodegradable plastic in fisheries

Polyhydroxyalkanoates (PHAs) are a family of naturally occurring biopolyesters produced by bacteria and are completely biodegradable by microbes typically found in the marine environment. PHA meets the American Society of Testing and Materials certification and European Standards for biodegradation in the marine environment (Chanprateep, 2010). PHA has physical characteristics similar to non-degradable plastics and can be formulated for extrusion into moulded forms. The rate of biodegradation can be controlled by adjusting the thickness of the polymer.

Researchers at the Virginia Institute of Marine Science (VIMS) tested PHA as the material of choice for use in developing escape panels for crab, lobster, and fish traps (VIMS, undated). Earlier methods of providing escape vents for animals captured in lost traps were prone to failure either by degrading too quickly or not at all.

Because PHA is consumed by bacteria, panels constructed of PHA have a high level of certainty of dissolving and providing an avenue for escape. Since PHA is consumed by bacteria naturally occurring in water, the biopanel will last longer if regularly fished.

This is because microbes feeding on the PHA have inhibited or delayed growth when exposed to UV light during trap retrieval requiring constant regrowth of bacteria on biopanel of active traps. Lost traps however, remain on the bottom out of UV light exposure and populations of bacteria can proliferate and more quickly consume the PHA.



PHA biodegradable escape panel for blue crab traps

Source: VIMS (undated)

3.8 SEAFOOD ECOLABEL STANDARD AND CERTIFICATE HOLDERS

3.8.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>The ecolabelling of seafood, mainly through the third-party certification and assessments of individual fisheries and vessel units is an important market driver for responsible fishing.</p> <p>Good management and information for reducing bycatch, preventing the loss of gear and subsequent habitat damage and unaccountable fishing mortality, and impacts on ETP species are all potentially covered by such ecolabels. However, coverage of ALDFG in certification schemes is currently limited or absent altogether.</p>	Prevention	<ul style="list-style-type: none"> Assessing the degree to which fisheries manage and prevent, through measures, strategies or other means, the abandonment, loss and discard of fishing gear.
	Mitigation	<ul style="list-style-type: none"> Specific recognition of, and guidance on, recognising and managing the consequences of ALDFG on the status of the marine environment. Assessing the degree to which fisheries have sufficient information to both assess and manage the consequences of ALDFG on the status of the marine environment.
	Cure	<ul style="list-style-type: none"> Recognition of best practice by fisheries that recover fishing gear lost or abandoned by the fleet under assessment. Recognition of fisheries that participate in programmes that recover ALDFG and other marine litter.

Harvey Spears / Marine Photobank



3.8.2 Key best practice actions and approaches: Seafood ecolabel standard and certificate holders

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Assessing the degree to which fisheries manage and prevent, through measures, strategies or other means, the abandonment, loss and discard of fishing gear.	<ul style="list-style-type: none"> Inclusion of benchmarks, scoring guidelines or scoring guidance implicitly recognising best practice for preventative measures, strategies or other means to reduce the loss or abandonment of fishing gear. These include: spatial/temporal segregation; lower-risk fishing methods; training and awareness of skippers and crew; gear marking systems deployed and responsible disposal of redundant fishing gear (see Section 3.2.2). 	<ul style="list-style-type: none"> Fisheries under assessment or in a Fisheries improvement project NGOs
	Specific recognition of, and guidance on, recognising and managing the consequences of ALDFG on the status of the marine environment.	<ul style="list-style-type: none"> Inclusion of benchmarks, scoring guidelines or scoring guidance implicitly recognising best practice in preventative measures. Strategies or other means to reduce the risk of: unaccounted fishing mortality of target and non-target species. Impacts on the status of habitats and marine communities, and impacts on the status of ETP species. 	<ul style="list-style-type: none"> Fisheries under assessment or in a fisheries improvement project NGOs
MITIGATION	Assessing the degree to which fisheries have sufficient information to both assess and manage the consequences of ALDFG on the status of the marine environment.	<ul style="list-style-type: none"> Inclusion of benchmarks, scoring guidelines or scoring guidance. These should implicitly assess the degree to which fisheries have sufficient information to: (i) assess the impact of, and (ii) base measures, strategies or other means to reduce the likelihood of unaccounted fishing mortality of target and non-target species. They should also assess impacts on habitats and marine communities and impacts on the status of ETP species resulting from ALDFG. 	<ul style="list-style-type: none"> Fisheries under assessment or in a fisheries improvement project Researchers
	Recognition of best practice by fisheries that recover fishing gear lost or abandoned by the fleet under assessment.	<ul style="list-style-type: none"> Inclusion of benchmarks, scoring guidelines or scoring guidance that recognise and acknowledge best practice. This is in terms of measures, strategies or other means, for fisheries to recover where possible and safe to do so, fishing gear that is lost or abandoned by the fleet under assessment. 	<ul style="list-style-type: none"> Fisheries under assessment or in a Fisheries Improvement Project
CURE	Recognition of fisheries that participate in programmes recovering ALDFG and other marine litter.	<ul style="list-style-type: none"> Inclusion of benchmarks, scoring guidelines or scoring guidance recognising and acknowledging best practice in fisheries participating in programmes recovering ALDFG and other marine litter. 	<ul style="list-style-type: none"> Fisheries under assessment or in a fisheries improvement project

3.8.3 Case study: Seafood ecolabel standard and certificate holders

MSC Intent: 'ghost fishing' and impacts from gear loss

The MSC Principles and Criteria for Sustainable Fishing include criteria that relate to ghost fishing and gear loss, including that the fishing operation shall:

- make use of fishing gear and practices designed to avoid the capture of non-target species and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive
- implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas
- minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.

These criteria are implemented in the MSC standard throughout Principle 2. For example, when determining the fishing operation's impact on primary, secondary and ETP species, assessment teams are required to consider both unobserved and observed fishing mortality and impacts. The guidance associated with this clause stipulates that unobserved fishing mortality can include (but is not limited to) ghost fishing.

In version 2.0 of the Fisheries Certification Requirements (FCR), assessment teams are required to consider whether fisheries review measures to minimise mortality of unwanted catch. This also includes consideration of unobserved mortality, such as that caused by ghost fishing.

The impacts of gear loss on habitats are considered under the Habitats components. In particular, there is Guidance on the Habitats Management PI (2.4.2) that indicates that for a fishery to score a 100, a management strategy should be in place. This is even for gears that do not regularly contact benthic habitats since gear loss or unexpected seafloor impacts could occur. In addition, in the Ecosystem PIs, the team needs to consider how the fishery affects the wider ecosystem structure and function. Indirect effects of lost gear and other operational waste that are not considered directly under the primary, secondary and ETP PIs are considered here.

Source: MSC Fisheries Certification Requirements Version 2

Monterey Bay's Seafood Watch Program's Standard for Fisheries

Ghost fishing is included in the scoring of Criteria 1, 2 and 3 as follows.

Criterion 1: Factor 1.2 – Fishing mortality: Conservation concern: Low if (among other requirements) it is “Probable (>50% chance) that fishing mortality from all sources (including commercial, recreational, subsistence, and ghost fishing, if applicable) is at or below a sustainable level that is appropriate given the species' ecological role (ie a level that will allow a population to maintain abundance at or rebuild to BMSY or a suitable proxy)”.

Conservation concern: High if (among other requirements) it is “Probable (>50% chance) or suspected that fishing mortality from all sources (including commercial, recreational, subsistence, and ghost fishing, if applicable) is above a sustainable level that is appropriate given the species' ecological role (ie a level that will allow a population to maintain abundance at or rebuild to BMSY or a suitable proxy) (eg overfishing is occurring).”

Criterion 2: Factor 1.2 – Fishing mortality: Guiding principles: Minimise bycatch. Seafood Watch® defines bycatch as all fisheries-related mortality or injury other than the retained catch.

Criterion 3: Factor 3.2 – Bycatch strategy: Strategy: Highly effective if (among other requirements) “A fishery has a demonstrated concern with or a significant likelihood of ghost fishing (of target or non-target species), there is a comprehensive strategy to address ghost fishing.

Criterion 3: Factor 3.3 – Scientific research and monitoring: Strategy: Highly effective if (among other requirements) “Fisheries, especially those using pots/traps and gillnets (and other fisheries employing gears which have demonstrated ghost gear impacts), must collect data on lost gear or otherwise demonstrate a method to include ghost fishing impacts in the assessment of fishing mortality”.

Source: Monterey Bay's Seafood Watch Program's Standard for Fisheries

NB: Ocean Wise and SeaChoice follow the Seafood Watch standards

3.9 SEAFOOD BUSINESSES

3.9.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>Seafood businesses involved in the purchase, processing and value adding, distribution and sale of seafood have a considerable role in ensuring that their raw material is procured from responsible and well-managed fisheries that minimise the potential for – and consequences of – ALDFG. While the predominant sustainability strategy of seafood businesses is to source from fisheries that fall under a certification schemes, seafood companies are increasingly involved in encouraging fisheries to enter Fisheries Improvement Projects (FIPs). They are also funding and participating in research and providing consumer information and awareness-building.</p>	Prevention	<ul style="list-style-type: none"> Seafood businesses should require their suppliers to conform with best practice as promoted through these guidelines or applicable local legislation to the same effect. Businesses should, where possible, provide an alternate, less costly means of redundant fishing gear disposal to incentivise the retrieval of lost nets and their proper disposal. For example, this could be by supporting harbours/ports by providing disposal facilities, buy-back schemes or re-use/recycling initiatives through their supply chain).
	Mitigation	<ul style="list-style-type: none"> Likewise, seafood businesses whose strategy is to source from third-party certified fisheries, should ensure that these recognise the impacts of ALDFG on the marine environment and ensure they are managed effectively (see best practice guidelines for third party certification in Section 3.8).
	Cure	<ul style="list-style-type: none"> Likewise, seafood businesses whose strategy is to source from third-party certified fisheries, should ensure that these recognise the efforts of fisheries to recover their gear if lost or abandoned. Where they have their own sustainable sourcing guidelines, they should favour those fisheries that participate in recovery programmes for fishing gear (see best practice guidelines for third party certification in Section 3.8).

Joey Brookhart / Marine Photobank



3.9.2 Key best practice actions and approaches: seafood businesses

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Seafood businesses should require their suppliers to conform with best practice as promoted through these guidelines or applicable local legislation to the same effect.	<ul style="list-style-type: none"> To this end, seafood businesses should ensure that best practices recognise the risks of fishing gear loss and ensure that these are managed effectively. This should be either through sourcing raw material from certified fisheries (see best practice guidelines for third party certification in Section 3.8) or developing specific procurement guidelines and audit / verification systems. Seafood retailers in particular should consider measures to reduce sourcing from high risk fisheries that, directly or indirectly, may lead to gear loss or disposal at sea. 	<ul style="list-style-type: none"> Certification bodies Fisheries improvement projects
	Liaise with third party seafood certification bodies to address management and information requirements for reducing ghost fishing and the impacts of ALDFG on marine fauna, flora and habitats.	<ul style="list-style-type: none"> Related to the other preventative measures mentioned above, seafood businesses might work with FIPs and third party certification bodies to ensure their raw material supply chain avoids fisheries with unacceptable levels of ghost fishing. 	<ul style="list-style-type: none"> Fishers Certification bodies
MITIGATION	As above.	<ul style="list-style-type: none"> Likewise, seafood businesses should ensure that these best practices recognise the impacts of ALDFG on the marine environment and that such impacts are managed effectively. (See best practice guidelines for third party certification in Section 3.8.) 	<ul style="list-style-type: none"> Certification bodies FIPs
CURE	As above.	<ul style="list-style-type: none"> Likewise, seafood businesses should ensure that these best practices recognise the efforts of fisheries to recover their gear if lost or abandoned, and that they participate in recovery programmes for fishing gear rather than their own (see best practice guidelines for third party certification in Section 3.8). 	<ul style="list-style-type: none"> Certification bodies FIPs

3.9.3 Case study: Seafood businesses

USA: A public-private partnership was established with a recycler in Washington State, United States. The Washington ports, an hour or so away from the recycler, benefited from providing a service to their fishers and from the free hauling and pickup they received when a recycling container was full. This reduced their extremely high waste disposal costs.

The local communities, which were dealing with quickly filling landfills, heavy equipment entanglement problems and difficulties in burying nets, benefited from the removal of this bulky, troublesome material. Some communities sent baled nets or well-cleaned containers of well-compacted loose net. These could generate revenue or be used for other commodities (such as baled cardboard or metals), to help defray the costs of transport.

In some cases, communities arranged to have transport donated mainly by freight companies hauling empty barges southward at the end of the fishing season. However, such an initiative needs to be financially sustainable from an average collection volume of 46 tonnes between 1991 and 1999, collected volumes have been halved as funds for coordination and promotion of the programme have been reduced (Recht and Hendrickson, 2004; from Macfadyen et al, 2009).

UK: UK seafood company MCB Seafoods is working with Danish recycling company, Plastix, to collect and recycle waste netting. Unlike other recycling companies, Plastix is willing to take every type of old fishing gear so there is very little time spent sorting at the quayside and nothing has to go to landfill.

Key lessons learned to date include:

- i. removing financial barriers and making the process as simple and easy as possible are key to getting the ball rolling and the industry on board
- ii. communication on the ground is very important in spreading the word and helping to gather support
- iii. the facilities available and the layout of every harbour is different so it is important to have flexibility and not expect everything to run with precision straight away. From <http://www.ghostgear.org/solutions/mcb-seafoods-plastix-net-recycling-sussex>



Photo credit: MCB Seafoods

3.10 NON-GOVERNMENTAL ORGANISATIONS

3.10.1 Principles of best practice

	APPROACH	PRINCIPLES
<p>NGOs are proven to key advocates of good practice and responsible fishing. They participate in a wide variety of activities, ranging from research, managing FIPs to providing seafood consumers and other stakeholders with valuable information and opinion. With regard to fishing gear management and addressing the consequences of ALDFG, NGOs have a particular role in capacity building, research, developing codes of practice and awareness-raising.</p>	<p>Prevention</p>	<ul style="list-style-type: none"> • Advocates for change, being able to focus on a wide range of actors, including policy-makers, seafood businesses and fishers. • Acting as catalytic partners, with a particular focus on small-scale fishers, developing and facilitating local groupings, assisting with consensus-building and programme planning. • Providing direct capacity building and training, again mainly to small-scale fishers, to improve practical skills and ensuring both environmental and financially sustainable businesses. • Raising public awareness in emerging or under-reported issues related to the loss of fishing gear and the subsequent impact on the marine environment. • Acting as an independent intermediary and auditor.
	<p>Mitigation</p>	<ul style="list-style-type: none"> • Providing research and survey support to mitigating actions that either reduce the ability of ghost fishing gear to continue to fish or to directly address the impacts on marine animals and birds, habitats and other key components of the marine ecosystem.
	<p>Cure</p>	<ul style="list-style-type: none"> • Identify, catalyse funding for and, where appropriate, manage and implement curative projects for redundant fishing gear removal and fisheries-related marine litter recycling.

Olive Ridley Project



3.10.2 Key best practice actions and approaches: non-governmental organisations

	APPROACH AND PRINCIPLE	APPROACH	OTHER PARTICIPANTS
PREVENTION	Advocates for change, being able to focus on a wide range of actors, including policy-makers, seafood producers and fishers.	<ul style="list-style-type: none"> Through objective, evidence-based analysis, NGOs should identify opportunities for reducing levels of ALDFG and mitigating their impacts. This will then inform the development of carefully defined advocacy campaigns targeted at the relevant actors throughout the supply chain and governance framework. 	<ul style="list-style-type: none"> Interaction with all other stakeholders
	Acting as catalytic partners, possibly with a particular focus on small-scale fishers, developing and facilitating local groups, assisting with consensus-building and programme planning.	<ul style="list-style-type: none"> Many small-scale fisheries or less well-represented fisher groups lack the ability to mobilise their resources or gain sufficient consensus to join forces. NGOs can provide a pivotal role in developing local groups and building consensus over common issues of concern. NGOs can then help united groups develop a coordinated approach to addressing common problems. This could be through a unified code of practice or a 'memorandum of understanding', and other approaches as appropriate. 	<ul style="list-style-type: none"> Small-scale fisher communities and potential groupings
	Providing direct capacity building and training, again probably mainly to small-scale fishers, to improve practical skills and ensuring both environmental and financially sustainable businesses.	<ul style="list-style-type: none"> Contribute to skills development through a combination of direct training, group training workshops, mentoring or e-learning. This is to address skill gaps in fisheries or related business management, especially when related to the use of low-impact fishing gears and fishing techniques. Particular roles can include training needs analysis, curriculum development and the provision of training as required. 	<ul style="list-style-type: none"> Small-scale fisher communities and other established groupings
	Raising public awareness about emerging or under-reported issues related to the loss of fishing gear and the subsequent impact on the marine environment.	<ul style="list-style-type: none"> Identification of issues relevant to ghost fishing and its impacts that could benefit from increased public (and other stakeholder) awareness. Development of targeted awareness-building resources and the preparation and making available of supporting information. 	<ul style="list-style-type: none"> Other relevant stakeholders
	Acting as an independent Intermediary and auditor.	<ul style="list-style-type: none"> Address gaps in the commercial third-party certification industry through the provision of inspection or other auditing services to provide independent evidence of compliance levels in fishing gear-related management frameworks. 	<ul style="list-style-type: none"> Fisher organisations Port operators
MITIGATION	Providing research and survey support to mitigating actions. These should either reduce the ability of fishing gear to continue to fish, or address the impacts on marine animals and birds, habitats and other key marine ecosystem components.	<ul style="list-style-type: none"> NGOs potentially have a role in supporting research and other actions to reduce the impact of ALDFG in the marine environment. This can include developing survey methodologies to identify ALDFG hotspots, especially in coastal waters. It can also include conducting research to estimate the economic value of the ecosystem benefits resulting from ALDFG removal / reduction. In particular they can assist with assessing the cost of ghost fishing on target and non-target species, and the impacts on ETP species and vulnerable marine ecosystems. 	<ul style="list-style-type: none"> Research organisations
CURE	Identify, catalyse funding for and where appropriate manage and implement curative projects for redundant fishing gear removal and fisheries-related marine litter recycling.	<ul style="list-style-type: none"> Some NGOs specialise in organising and coordinating practical responses to marine environmental issues, such as removing redundant ALDFG in coastal waters. Such NGOs can assist local stakeholders in identifying ALDFG impact hotspots, developing and assessing gear removal options, raising funding and organising gear removal and responsible disposal. 	<ul style="list-style-type: none"> Maritime management authorities Fishing organisations Port authorities

3.10.3 Case study: non-governmental organisations

Northern Prawn Fishery – cleaning up ghost nets in Northern Australia

The problem: The Gulf of Carpentaria in northern Australia has been identified as a global hotspot for ghost nets. More than 2,400 tonnes drift from South East Asia into Australian waters each year. This is higher than any other area in Oceania and South East Asia. These nets vary in size from a football to a Mack truck (6 tonnes or 6km long). Sea turtles make up 80% of the marine life found entangled in these nets and many of these are dead or dying.



In the last 10 years GhostNets Australia, working with indigenous rangers, has removed more than 300 entangled turtles from 13,000 ghost nets. Recent estimates suggest this is just the tip of the iceberg. The estimated number of turtles caught by a sample of 8,690 ghost nets was between 4,866 and 14,600 turtles, assuming nets drift for one year. Net identification work indicates that fewer than 10% of ghost nets are coming from Australian fisheries.

The Northern Prawn Fishery Industry Pty Ltd (NPF) is a large trawl fishery operating across northern Australia. The NPF has been a willing partner and leader of many significant initiatives to improve prawn stocks, reduce bycatch and foster research to improve their overall sustainability. The NPF is considered the gold standard of trawl fisheries globally by the FAO and is MSC certified. NPF fishers encounter ghost nets from time to time, mainly when they become entangled in their propellers or active nets. NPF operators are not contributors to this problem and do everything they can to avoid losing gear while fishing. They also retrieve ghost nets where possible.

The solution: The NPF and World Animal Protection are working as partners to reduce ghost nets found in the NPF, in particular in the Gulf of Carpentaria. This partnership will contribute to existing clean-up efforts in the Gulf, specifically by GhostNets Australia working with indigenous rangers. This is an excellent example of different sectors collaborating to address a global ghost gear hotspot.

In 2015 the NPF formally included ghost gear management, retrieval and data collection within their Operations manual to encourage operators to assist with mitigating the ghost net problem. Fishers are voluntarily helping to remove ghost nets by:

- i. removal – eg retrieving ghost nets from the water where feasible. Raptis, a key operator in the industry provides disposal facilities at their Karumba site for vessels to offload ghost nets retrieved. Where collection is not possible, for example during peak fishing times, nets are buoyed to enable coordination of a later retrieval
- ii. reporting – eg fishers log the position of ghost nets encountered, and provide information and a photo of the net(s) to World Animal Protection. The project is self-funded by the industry.

The NPF is considering ‘clean-up’ days at locations that are difficult to access without a boat, working with GhostNets Australia and World Animal Protection.

The lessons: The NPF has been actively involved in working with indigenous groups and NGOs to reduce the impacts of ghost nets for many years. This important partnership with World Animal Protection is another step in the NPF’s journey towards sustainability and an example of how success can be achieved through collaboration across sectors.

Source: <http://www.ghostgear.org/solutions/northern-prawn-fishery-industry-cleaning-ghost-nets>



Gabriel Nordyke / Marine Photobank

4. NEXT STEPS

This framework is the result of considerable consultation and review, including regular appraisal by the 'Define best practices and inform policies working group', other GGGI participants, and discussion at the GGGI Annual Meeting in Miami over 13-14 October 2016. The next

stage was to involve all stakeholders included in this report through a feedback consultation process with the aim of inspiring its adoption. The consultation took place from March to July, 2017.

4.1 OPTIONS FOR ENGAGEMENT

This framework's structure is deliberately stakeholder-focused. It recognises that the solution to better management of fishing gear lies not only with fishers, but also with those involved in the entire life cycle of the gear itself. This means from manufacture through to end-of-life disposal.

It also recognises the role of wider sector management. This is both in terms of policy development, its subsequent implementation, and the influence of the downstream seafood value chain in driving better practices. Therefore, it is important that any engagement strategy recognises this diversity of actors and addresses the particular interests involved.

A second consideration is the multiplicity of fishing practices and their value chains around the world, which vary in terms of scale (for example, from small-scale artisanal level fishing to the industrial catching and processing of feed fisheries). The value chains themselves also differ, from simple subsistence-based consumption through to complex supply and value-adding chains that often span over continents. The catching technology too varies, from basic hand lines through to multi-vessel approaches. All these have a bearing on how this framework is viewed and the ways in which it is adopted. This again needs to be reflected in the engagement strategy.



Eleanor Partridge / Marine Photobank

4.2 STAKEHOLDER AWARENESS-BUILDING AND ENGAGEMENT

The consultation period from March to July 2017 provided an opportunity for external stakeholders to give input into the framework. The consultation resulted in only minor revisions to this document. Most of the feedback focused on suggestions for the framework's rollout and implementation. The results will be summarised in a supplement to Parts 1 and 2 of the BPF.

Despite the progress made in stakeholder engagement during the consultation process, wider engagement within the main stakeholder groups will be necessary to ensure the framework's adoption. The various engagement options are outlined below.

- *Direct advocacy* – GGGI is a well-connected organisation. It could use its influence to promote

the framework to strategic partners around the world and in different parts of the seafood supply chain. Reflecting the sentiments expressed earlier in this section, this should consider both the wide range of actors involved in seafood production, and the differing scales involved. It could include the following:

- *Sector policy makers and managers*: in the first instance, it would be worth approaching the main policy-makers and their implementation partners, especially in the more developed nations. This might include National Oceanic and Atmospheric Administration (NOAA) (USA), Department of Fisheries and Oceans (DFO) (Canada), Directorate-General for Maritime Affairs and Fisheries (DG Mare)

- (EU) and the Australian Fisheries Management Authority (AFMA) (Australia). This could then be extended to the major fishing nations, with Indonesia, China, Korea and Taiwan high on the agenda. While the initial focus will be on policy makers, this should be extended to the main management authorities, including their fisheries control branches.
- *The catching sector:* at this initial stage, it might be best to focus on fishing organisations that represent some of the higher risk gears such as gill nets and FADs (see Part 1 report for an outline risk analysis). The emphasis should be on awareness-building and engagement to test and fine tune the framework so that it is seen as both robust and practical before it is rolled out further.
 - *Processing and retail sector:* the downstream value chain is an important driver of good practice. Increasing numbers of consumers are insisting on a traceable and sustainable seafood supply, often supported by third party certification. This suggests direct engagement with the larger seafood businesses and retailers would prove useful, especially if these guidelines can be integrated into existing sustainability and traceability systems.
 - *Fishing gear life cycle actors:* excluding fishers (considered separately above), the main life cycle actors are: the gear designers (including their research providers), manufacturers, distributors at the equipment supply stage, and the port operators, waste disposal specialist and recycling initiatives at the end of life stage. It is necessary to identify ‘champions for change’ within this group who might be prepared to test, develop and roll out this framework.
 - *Other interested parties:* there are a number of other organisations that would be interested in this framework. This includes the FAO, the IMO, the different seafood certification standard bodies, etc.
- Promotion of the framework at key industry meetings and events – this second approach sees the GGGI promoting and explaining the framework at major seafood shows and other industry meetings. This might take the form of including the framework as an agenda item in formal proceedings, or providing a side event, either via a panel, ‘brown bag’ lunch session or simply poster displays.

4.3 PILOT PROJECTS

A more focused and in-depth approach might be the development of pilot projects that assist certain stakeholders to formally incorporate the framework into their activities. This could be targeted at a number of the stakeholder groups: (i) the catching sector, (ii) fishing gear manufacturers and (iii) port operators / recycling opportunities.

Again, the selection process might focus upon opportunities where there is already a ‘champion for change’ who will increase the likelihood of project success. The pilot projects could see an agreement formed between an interested stakeholder party and the GGGI to jointly develop the pilot project design. This could involve focusing on the objectives, expected

outcomes, activities and budget and agree on the relative roles that GGGI and the stakeholder will play in its implementation.

The benefit to GGGI is that the framework will be tested and rolled out in the field, and can then provide a highly visible model for replication elsewhere. To facilitate this, the GGGI could provide some level of technical and possibly financial assistance to the stakeholder. It could help with setting up the pilot project, monitoring and evaluating the outputs and impacts, and publicising the results and lessons learned.

4.4 COORDINATION WITH OTHER GGGI WORKING GROUPS

This framework is a product of the ‘Define best practices and inform policies’ working group of GGGI. There is an evident role for the other two working groups – ‘Build evidence’ and ‘Catalyse and replicate solutions’ in rolling out and developing the framework.

- *Build evidence:* this working group can support the ongoing development of the framework by (i) refining the preliminary risk assessment of fishing gears being lost and subsequently affecting the marine environment and (ii) assisting in the monitoring and evaluation of the impact of better management implemented through the framework.
- *Catalyse and replicate solutions:* this working group has an important role in the roll-out and wider adoption of the framework. As such, it should become increasingly involved in the pilot projects, working to establish approaches to replicate emerging solutions and best practice as they appear.



Valerie Craig / Marine Photobank

4.5 MAPPING OUT THE PROCESS

4.5.1 Roles

The roles of the other two working groups in developing this framework has been explored in the previous section. The ‘Define best practices and inform policies’ working group also has a series of actions as outlined below.

- *Identifying opportunities for direct advocacy.* This should include developing a strategic approach that includes the wide range of stakeholder types and fisheries identified in Section 4.1.1. It then involves developing an engagement plan with a consistent yet evolving message as the framework develops.
- *Document existing projects that successfully implement selected best practices.* The key will be to identify the route for promotion and replication. These can be used as case studies to show other fishers how ALDFG problems like their own have been resolved.
- *Establishing panels of experts and specific agendas* for the promotion of the framework at key industry meetings and events.
- *Developing a suite of pilot projects across the wide range of stakeholder types and fisheries.* The working group role will include agreeing a common set of terms of reference for these pilot projects, and then assisting pilot projects to develop project-specific designs. As mentioned above, the GGGI could contribute both technical and financial assistance over the course of the pilot project. There should, however, be strong ownership of the project by the stakeholder group from the beginning.
- *Coordination and engagement with the other working groups* will be essential to ensure that their strengths and membership combine to maximise the GGGI’s ongoing support to the framework.

4.5.2 Timeline

Finalisation of the best practice framework

As agreed at the GGGI's 3rd Annual Meeting in Miami during 13-14 October 2016, the best practice framework is being developed in the following ways.

1. Finalisation of the 'Zero Draft': This consultant draft was sent out to the GGGI community for finalisation into a 'Zero Draft'. This process took approximately six weeks and was undertaken by the GGGI secretariat. On completion of the consultation period, the document was updated in line with the comments received by the end of 2016. This stage is complete.
2. Hand over to GGGI: The reviewed consultant report was handed over the GGGI secretariat to be developed into a GGGI product for finalisation.
3. Finalisation and launch of the penultimate version of the best practice framework: the final, GGGI-owned product will go through one further round of consultation, this time with targeted, external stakeholders. Prospective users of the framework should be selected to review the document. A reasonably wide range of individuals and organisations should be selected across the stakeholder spectrum (see Section 2.3) from both the private and public sectors. Around two months could be allocated to this process. This will allow the secretariat and the 'Define best practices and inform policies' to revise the document, improve the graphic design and format, and then publish the final Version 1 of the framework. This can then be formally launched at a major seafood conference, such as the SeaWeb Seafood Summit in Seattle over 5–7 June, 2017.

Rolling out the final best practice framework

The timeline for rolling out the framework is at the discretion of the GGGI, so we will not make firm

recommendations on this subject. However, it is presumed that the process will be along the following lines.

- **Stage 1: Stakeholder awareness-building and engagement.** Will take place immediately the framework is agreed, both in terms of the direct advocacy with stakeholder groups and the promotion of the framework at key industry meetings and events. This phase is likely to last at least a year, and might gradually evolve to a reporting approach, where the emphasis will be on the results of the pilot projects and their replication.
- **Stage 2: Pilot projects.** The pilot projects might start to be progressed once the first stage is fully underway. This said, discussions on pilot project selection should start immediately. The pilot project phase should be completed within three to five years, after which it is hoped that wide scale adoption will be well underway.
- **On-going: Coordination with other GGGI working groups.** Coordination and joint planning with the other working groups will be required immediately and is expected to be continuous.

4.1.3 On-going development of the framework

The best practice framework for the management of fishing gear is the first major product of the 'Define best practices and inform policies' working group. Despite the wide degree of consultation that has gone into its design, it is relatively un-tested and will no doubt require further refinement to ensure that it is fully robust and practical.

Consequently, the framework could be considered a 'living document', and that the working group review it on a recurrent basis and where necessary make suitable adjustments. In particular, it is important that feedback from the awareness-building exercise, as well as the pilot projects, is incorporated into the framework as it develops.

APPENDIX A: BIBLIOGRAPHY AND FURTHER READING

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