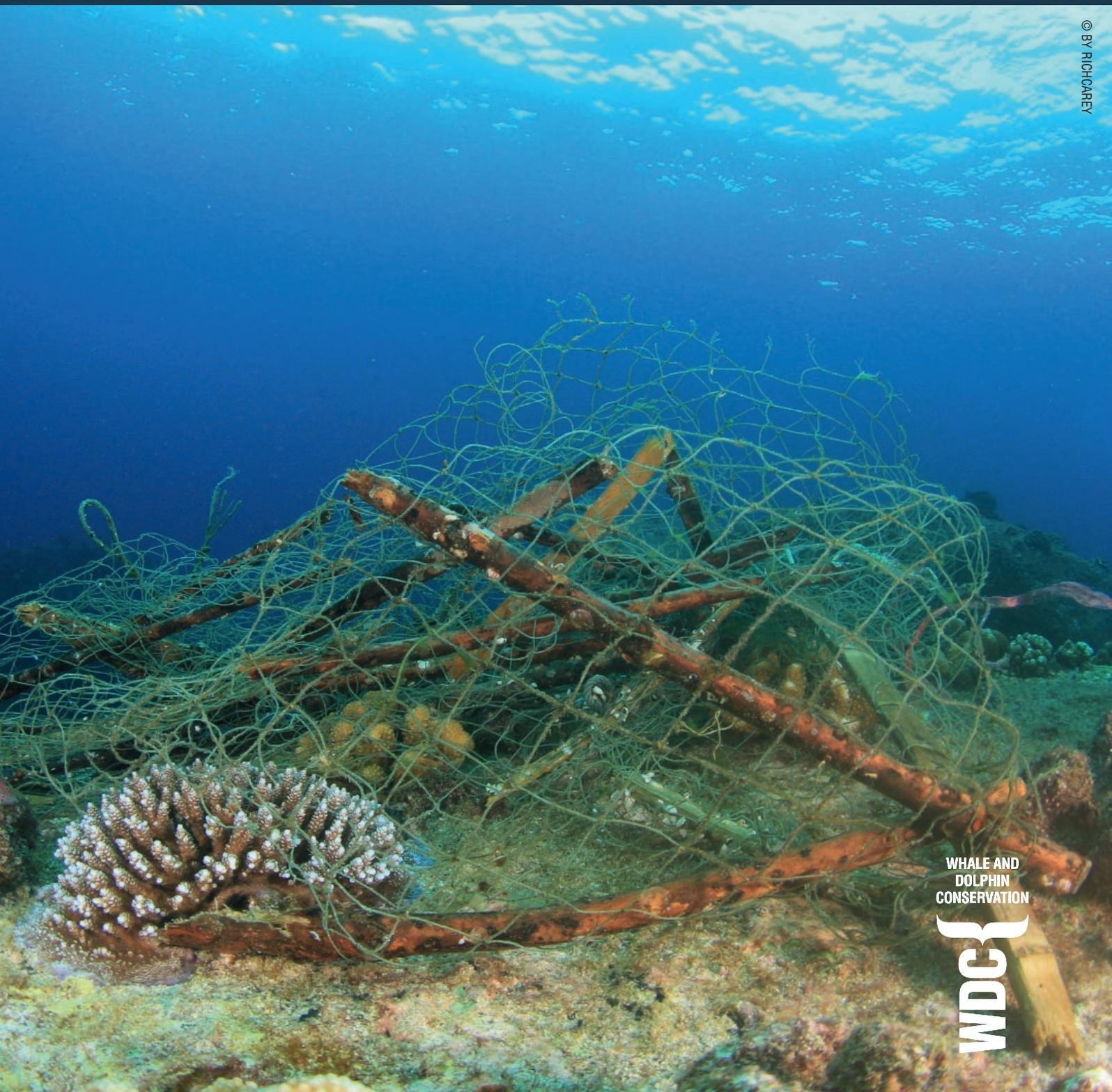


TACKLING GHOST GEAR:

RESEARCH ON AND SOLUTIONS FOR THE STATE OF HARBOUR WASTE MANAGEMENT IN THE UK



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WHALE AND
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EXECUTIVE SUMMARY

Plastic pollution in the ocean is a global environmental threat, with widespread impacts on marine life and ecosystems. Fishing related items are a major contributor, and the burden of abandoned, lost, or otherwise discarded fishing gear (ALDFG) in UK waters and wider European seas is significant. End of life (EOL) gear disposal also presents challenges for marine pollution due to inadequate waste management plans, leading to environmental hazards and economic losses.

While the UK Government has previously expressed intentions to match or exceed the EU's ambitions to address plastic pollution, including waste fishing gear, the UK's Port Waste Reception Regime falls short in incentivising fishing gear return, resulting in continued waste discharges at sea and associated harms to the ocean.

This study surveyed 41% of the 464 UK harbours¹ associated with fishing to assess their waste reception facilities and fishing gear management practices. Our findings reveal that significant variation exists in waste fishing gear management practices, influenced by harbour size, resources, governance, and the presence of external collection initiatives. Most harbours (93%) provide waste reception facilities (primarily utilising wheelie bins), but huge variation occurs around whether waste disposal is free and the gear types accepted. Some harbours classify EOL gear as commercial waste, imposing disposal fees or expecting disposal to occur at municipal recycling facilities. Waste management of fishing gear is widely perceived as a problem by those surveyed, and those responsible for the waste (i.e. harbour masters/managers) questioned whether waste was recycled.

Effective management of ALDFG and EOL gear requires coordinated efforts at local, national and international levels to reverse current impacts of this ocean pollution. This involves adopting comprehensive strategies, investing in infrastructure, engaging stakeholders and implementing coordinated actions to address marine plastic pollution and promote sustainable fishing practices. Efforts should be aligned with global initiatives, such as those led by the International Maritime Organisation (IMO), Regional Fisheries Management Organisations (RFMOs), and the UN Global Plastics Treaty.

Key recommendations to improve fishing gear waste management include:

- 1. Ensuring the disposal of ALDFG and EOL gear is free across the UK;**
- 2. Enhancing and standardising collection and disposal infrastructure;**
- 3. Modifying gear and boat design to reduce the likelihood of gear loss;**
- 4. Implementing recovery measures: including mandatory reporting of lost gear, gear marking, and funding for targeted removals;**
- 5. Fisher education to raise awareness of the issue and encourage action;**
- 6. Improving waste management for retrieved and EOL gear: including improving recycling capacity and introducing Extended Producer Responsibility (EPR) schemes.**

¹ For ease of reference, this number includes 23 harbours in the British Crown Dependencies.

INTRODUCTION

Plastic pollution in the marine environment is a global environmental threat that has a significant impact on our ocean, where the breakdown of plastics takes a long time [1], it harms wildlife [2,3] and options for its removal are limited [4].

Fishing related items are a major contributor to marine litter, with an estimated 5.7% of all fishing nets, 8.6% of traps, and 29% of lines lost at sea around the world each year [5]. In European seas, abandoned, lost or otherwise discarded fishing gear (ALDFG) accounts for roughly a third of marine litter found, estimated to be over 11,000 tonnes per year². Whilst regional differences exist, fishing gear has been estimated to comprise 27% of beach litter in Europe² and 49% on Scottish Islands³.

Adequately addressing end-of-life (EOL) gear is also a significant issue. Across the UK, an estimated 60,000 tonnes of fishing gear is in use, and 4,500 tonnes of this becomes waste annually [6]. A lack of disposal facilities for EOL gear may discourage old gear from being brought back to shore, leading to increased ocean pollution. On shore, unusable gear is often left in piles in harbours due to a lack of adequate waste management plans. In addition, even when EOL gear is collected from harbours, limited recycling facilities means that it can end up in landfill or is often incinerated.

ALDFG floating near or on the ocean's surface poses safety hazards for shipping and maritime activities, and negatively impacts fishers financially through lost fishing time and gear damage. ALDFG poses direct threats to wildlife including ghost-fishing (whereby it continues to 'fish' and trap animals), damaging coral reefs, spreading invasive species (by acting as a vector), and causing injury or death to marine species through ingestion or entanglement [7–9]. Cetaceans (whales, dolphins and porpoises) are particularly affected [2] which is of concern, not only for the suffering it causes individual animals, but also due to its detrimental impact on conservation. Cetaceans have protected status under the UK Habitats Directive and there is a need to restore populations to achieve Good Environmental Status (GES) under the UK Marine Strategy. Once washed ashore, ALDFG becomes beach litter and requires removal and disposal.

The EU has taken steps to address plastic pollution by enacting directives such as the revised Port Reception Facilities (PRF) Directive⁴ and the Single Use Plastics (SUP) Directive⁵. The PRF Directive aims to discourage waste discharges (including fishing gear) at sea by removing incentives for at-sea disposal, providing adequate waste reception facilities at ports, and allowing all visiting ships access to these (a 'right of delivery'). The SUP Directive introduces measures that include Extended Producer Responsibility (EPR) for fishing gear, making producers responsible for the collection, transport and treatment of gear, and providing for awareness raising measures amongst stakeholders, consumers and the public.

While the UK has expressed intentions to match or exceed EU ambition in relation to addressing plastic pollution, including waste fishing gear⁶, the current UK Port Waste Reception Regime falls short. It provides insufficient incentives for fishing gear to be returned to land, leading to continued waste discharges at sea and increasing negative impacts on the marine environment.

This research aimed to collect data on the existing waste reception facilities for EOL gear and ALDFG in UK ports and harbours, assess the state of fishing gear retrieval, and provide recommendations towards solutions.

2 <https://eur-lex.europa.eu/legal-content/ES/TXT/?uri=CELEX:52018SC0254>

3 Includes fishing and aquaculture gear, <https://www.mcsuk.org/what-you-can-do/join-a-beach-clean/beach-watch-2023-what-you-found/#scotland>

4 DIRECTIVE (EU) 2019/883 <https://eur-lex.europa.eu/eli/dir/2019/883/oj>

5 DIRECTIVE (EU) 2019/904 <https://eur-lex.europa.eu/eli/dir/2019/904/oj>

6 HM Government, Our waste, our resources: a strategy for England, Dec 2018, p22

METHODOLOGY

Survey Design

A survey with open and multiple-choice questions was designed to determine the following key information in the UK:

- Presence and type of waste reception facilities in harbours;
- Presence of specific reception facilities for fishing gear waste;
- Participation in established initiatives/programmes (e.g., Fishing For Litter);
- Items accepted;
- Disposal costs;
- Gear disposal method (e.g. recycling, incineration, landfill) and responsibilities.

A request to participate in the online survey was emailed to the UK Harbour Masters Association (HMA) and their members and was posted on UK-ports.org. Survey design and data collection focused on engaging the harbour masters and/or waste officers of UK harbours with fishing activities. The research was carried out late 2023 to early 2024.

Harbour information

Information on UK harbours was identified using the UK Ports Directory and online search engines. Data included harbour name, country, location (latitude/longitude), authority, ownership, type (municipal, private, trust, unknown), usage type (fishing, leisure, ferry terminal, etc.) and contact details. For this research, a 'fishing harbour' was defined as a location where a fisher lands their catch or berths their vessel. This included ports/harbours, piers, jetties, and bays/beaches.

Interviews

Harbours with fishing activities and contact details were called to carry out interviews of harbour masters, environmental/waste officers and/or managers over the phone. Emails were also sent to request the questionnaire be filled out online where no contact could be made via phone calls. Phone numbers that received no response were called several times over the following weeks, and voice messages left where possible. Questionnaires were emailed to those that requested on the phone to answer online, and harbour masters responsible for multiple harbours were emailed an Excel spreadsheet to complete.

Data cleaning and analysis

Harbour information was reviewed and updated based on details provided during the phone interviews (e.g. harbour type). Survey responses were cleaned to remove errors and duplicate information and to standardise formats, acronyms and abbreviations prior to data analysis. Where responses were unclear, harbours were contacted again where possible for clarification.

Harbour information and questionnaire results were analysed, plotted and mapped using custom scripts in R, version 4.1.2. Maps, plots, and summary tables were created both at the UK and country level. Countries were defined as England, Scotland, Wales, Northern Ireland, and the three British Crown Dependencies of the Isle of Man, the Bailiwick of Guernsey and the Bailiwick of Jersey.

RESULTS

Survey participation

Around the UK, 761 harbours were identified, and 23 on British Crown Dependencies. Of these, 59% are associated with fishing activities, with the majority located in Scotland (57%) and England (29%). Approximately 46% of harbours are classed as municipal harbours (run by a local or district council), 34% are private, 11% are run by trusts and 9% are classed as unknown. Scotland has the highest number of municipal harbours ($n = 242$). Excluding England, all countries had more harbours with fishing activities than without.

Of the 464 harbours associated with fishing, 41% participated in the survey (Figure 1). Other harbours had missing or incorrect contact details, did not want to participate, or did not respond to phone calls and emails.

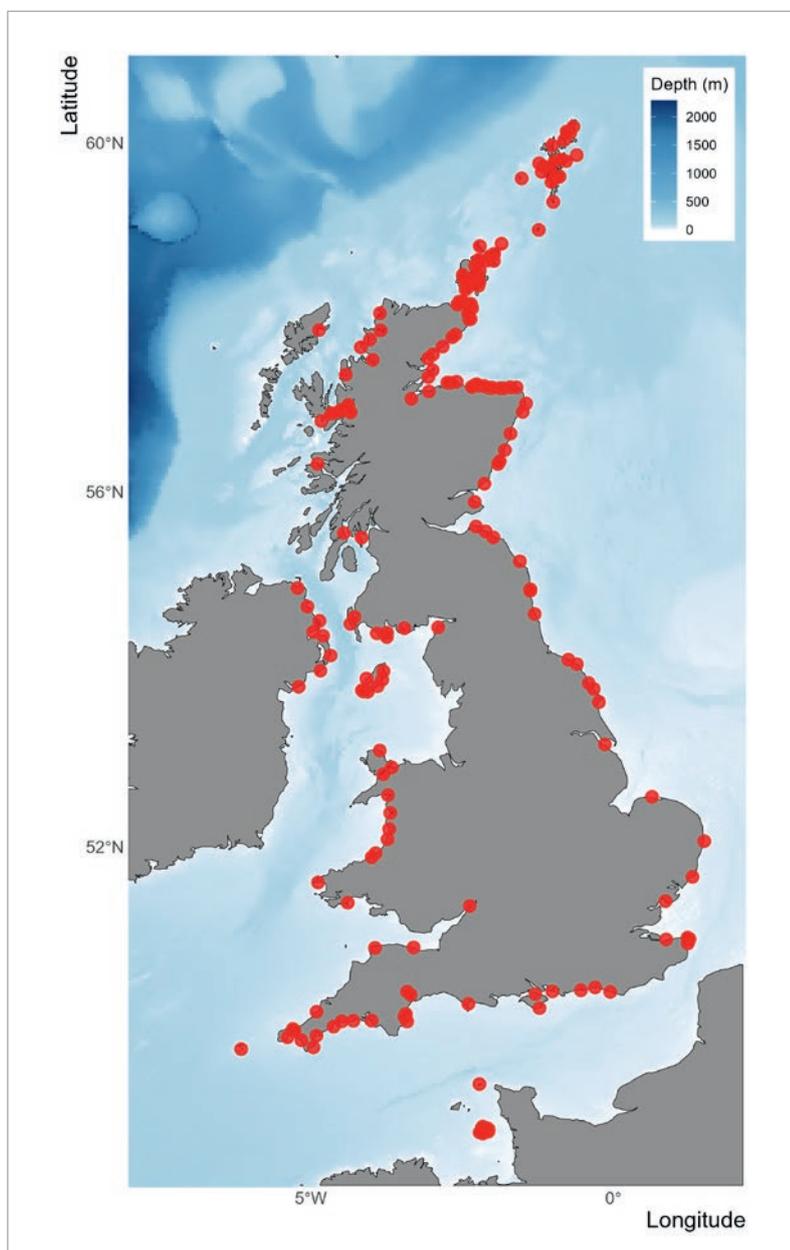


Figure 1: Location of fishing harbours around the UK and the British Crown Dependencies that participated in the survey.

Questionnaire

Waste reception facilities

Of those harbours interviewed, 93% have port waste reception facilities. Those that did not have waste facilities said they were limited by space or resources, cited a lack of demand, or held fishers responsible for their own waste and waste gear.

Wheelie bins (standard 240 - 1100L) are the most commonly used item to receive waste fishing gear in the harbours' reception facilities (87%), followed by skips (49%), containers (10%) and rubble sacks (5%; Figure 2). 46% of harbours provided a combination of waste receptacles.

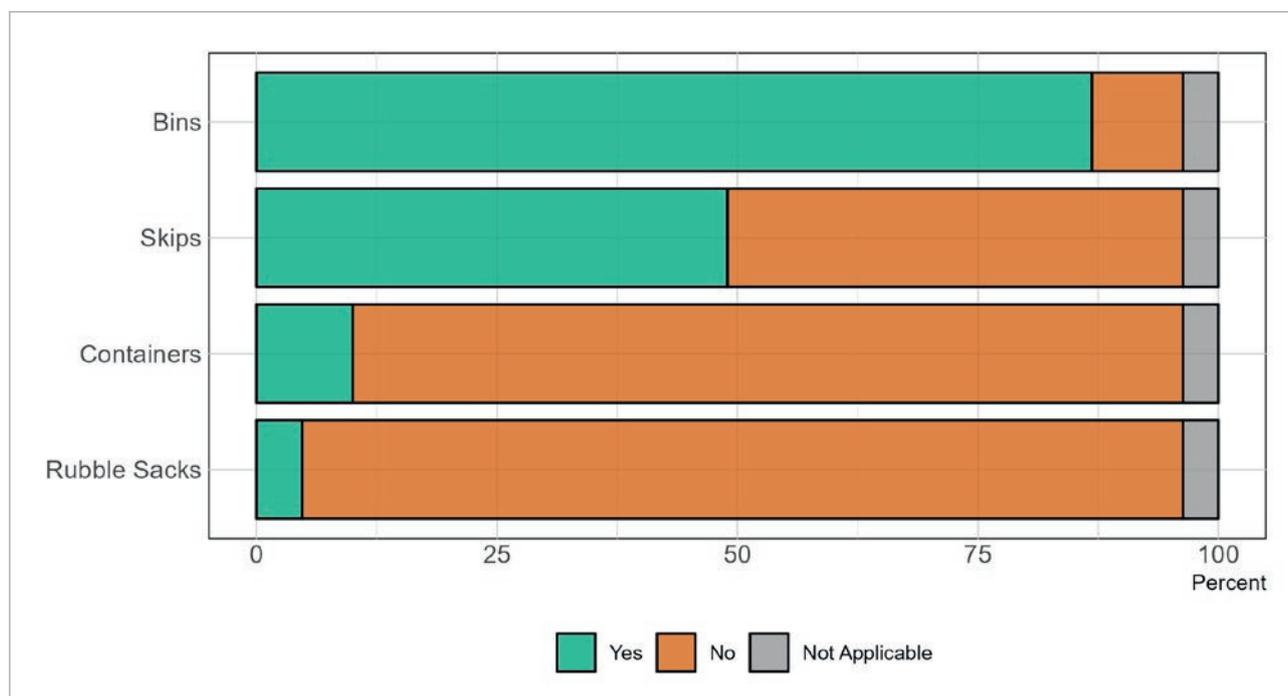


Figure 2: Type of harbour waste reception facilities available.

Fishing for Litter (FFL) and other initiatives

The FFL scheme is run by [KIMO](#), an international local government network representing more than five million citizens in eight northern European countries. FFL incentivises the removal of marine litter by funding disposal of waste brought up in the hauls of participating fishers.

[KIMO UK](#) runs 36 FFL schemes in Scotland, 33 in South-West England, and three affiliated FFL projects in Northern Ireland. 22 harbours that responded to our survey stated that they are participating in the FFL scheme, despite not being listed on the FFL website. The significant level of unregistered engagement suggests widespread appetite for the scheme and underscores the need for more funding.

Only 31% of interviewed harbours participate in FFL (Figure 3). The majority of those participating (64%) are municipal harbours.

Whilst 69% of interviewed harbours do not participate in FFL, 33% have other initiatives in place. Examples include regular voluntary beach cleans, flotsam collection from the harbour, support for local volunteer groups,

and the development of an educational programme (the latter is run by the Isle of Man harbours and the Isle of Man Department for Environment, Food and Agriculture (DEFA)).

Items accepted

Of those harbours with waste reception facilities, 65% accepted fishing gear for disposal (Figure 4) and the following fishing materials were accepted:

- 62% ALDFG;
- 58% broken down gear (parts of gear, e.g. net cuttings, bits of rope etc. from mending gear); and
- 53% EOL gear (Figure 5).

There were various combinations of different materials accepted (Annex A).

Easily recycled materials (e.g., polypropylene, polyethylene, rigid plastic, plastic bottles and caps, and plastic food containers) are accepted by the majority of harbours (Annex B). It is important to note that while many harbours may accept various plastic items, they still might not accept fishing gear made of the same type of plastic.

With regard to fishing related waste, traps/pots/creels were the most accepted item (52% of harbours), followed by net trimmings (51%) and trawl nets (50%). Of those harbours interviewed, 53% said they accept ad hoc fishing gear waste drop-offs from the public, 32% said they do not, and 13% did not answer the question.

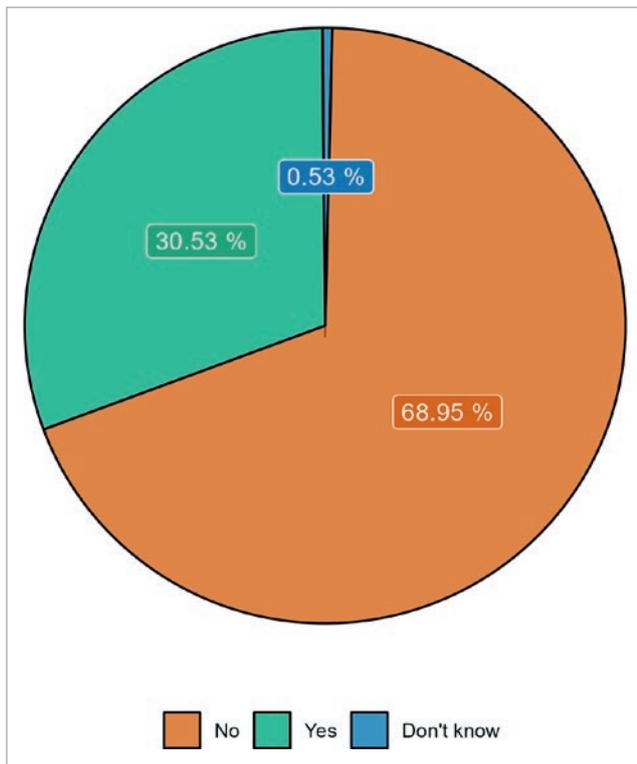


Figure 3: Harbour participation in the Fishing for Litter scheme.

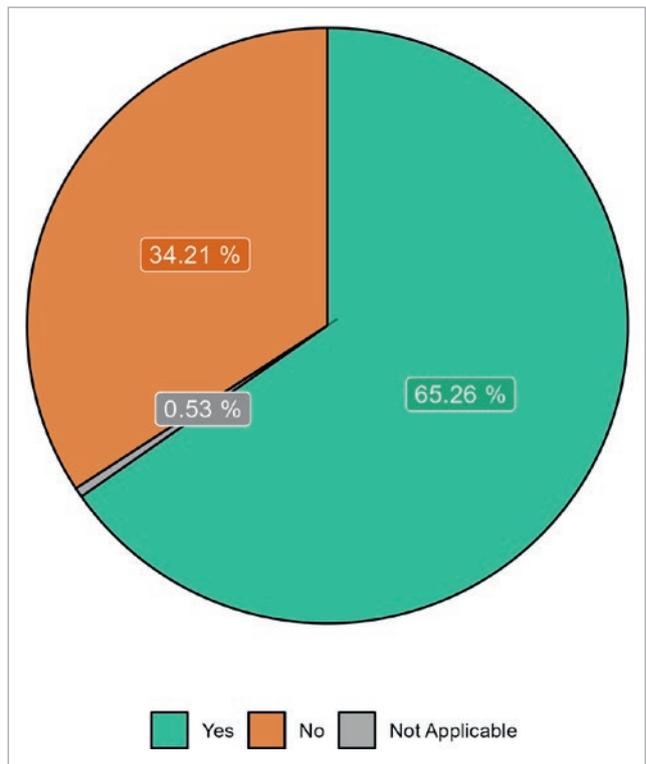


Figure 4: Proportion of harbours that accept fishing gear.

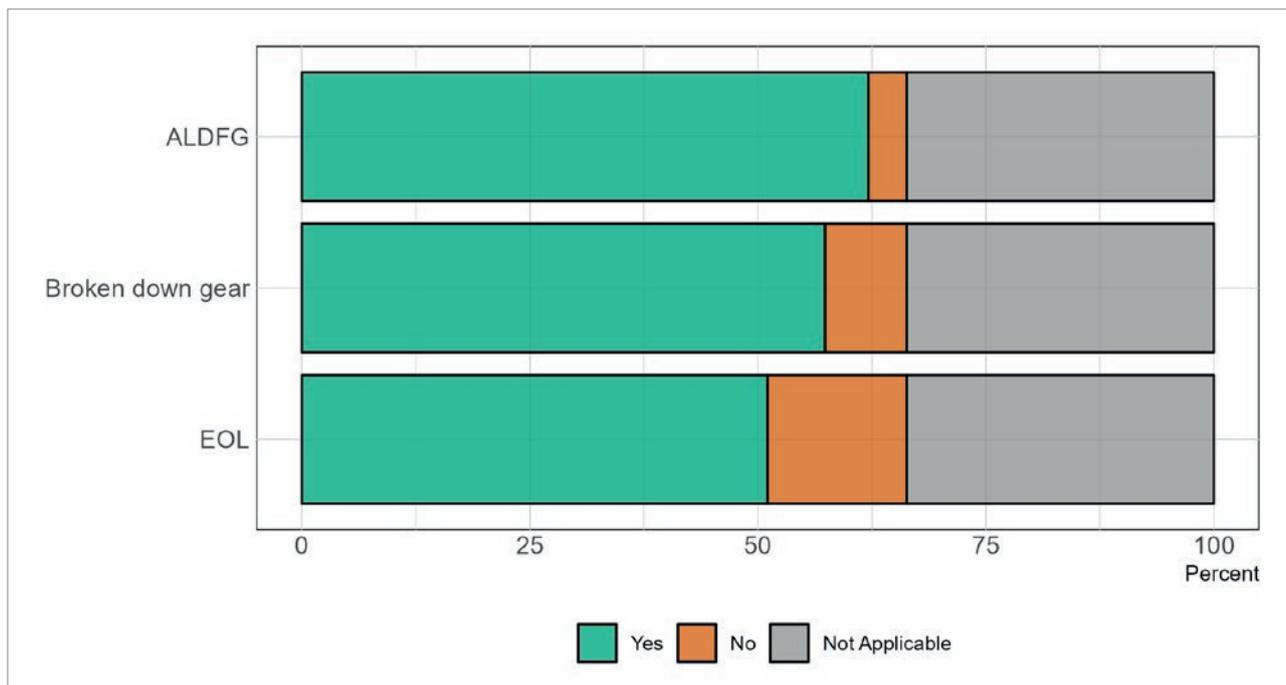


Figure 5: Types of waste fishing gear accepted at harbours; Not Applicable categorises harbours that do not accept any fishing gear.

Disposal costs

Free fishing gear waste disposal was provided at 61% of harbours, with costs covered by harbour dues or berthing fees. However, 18% of these harbours classify EOL gear as commercial waste, and either expect fishers to dispose of this themselves or will charge a fee. At 12% of harbours, there was a charge to use waste reception facilities.

Gear disposal method and responsibilities

Most reception facilities are emptied weekly (38%) or when required (13%), with 5% emptied monthly and 3% fortnightly.

Responsibility for emptying the waste reception facilities was stated as follows:

- 40% local councils,
- 32% private companies,
- 4% harbour masters or local fishers, and
- 2% by NGOs.

Occasionally a combination of entities are responsible.

31% of harbours send collected waste items to a recycling facility, 18% to incineration, and 18% to landfill (Figure 6). 28% did not answer or were not aware of how their waste was processed.

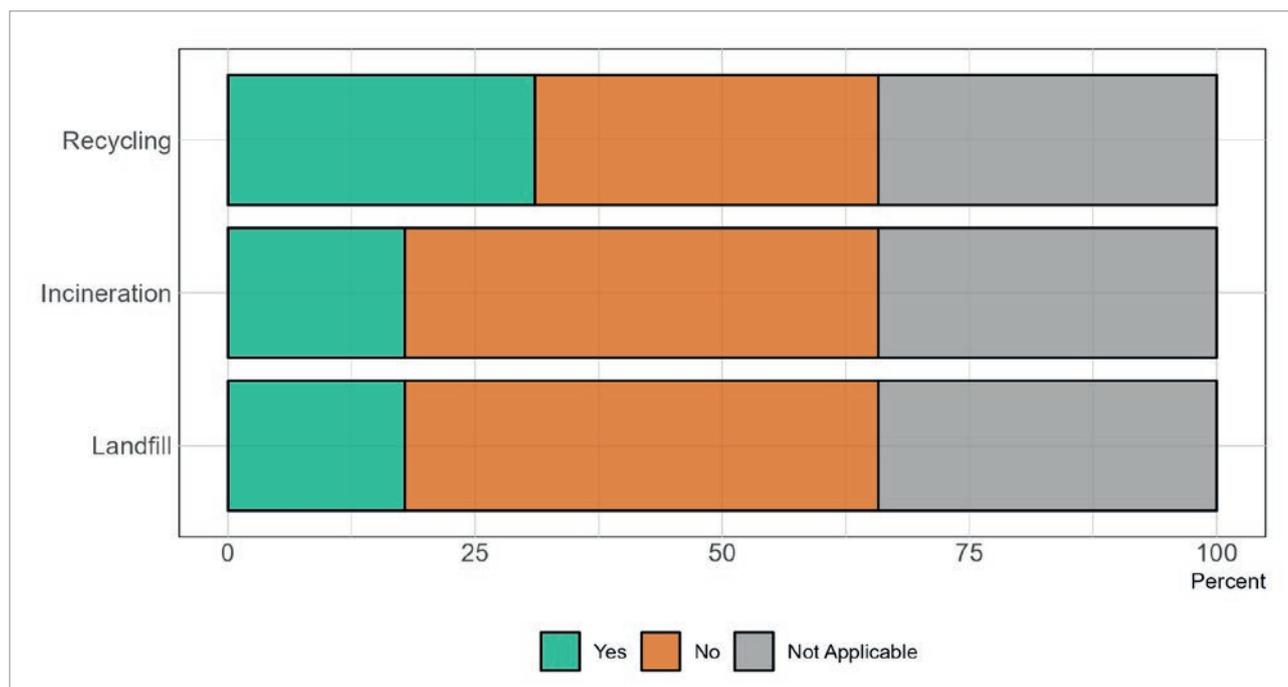


Figure 6: Final destination of all collected waste, Not Applicable combines answers ‘Don’t Know’, ‘Did Not Answer’ and ‘Not Applicable’ (harbours without reception facilities).

Additional information

82% of respondents volunteered additional information on their harbour’s waste management practices. These comments reflect the diverse range of approaches taken. The main points raised were:

1. Responsibility for disposal: Generally, harbour management consider fishers to be responsible for disposing of their waste equipment, including EOL and damaged fishing gear. This extends to the cost of recycling and/or incineration of gear. Although, harbours do have to deal with waste fishing gear when any is dumped in their vicinity. Regardless of who is responsible for the disposal of waste fishing gear, a large amount is disposed of in landfill if landed and there are concerns over how much might be disposed of at sea.

2. Availability of waste disposal facilities: There was significant variation in the availability of fishing gear waste disposal (e.g. designated areas on-land for waste gear storage, waste reception facilities, and acceptance of beach litter for disposal). This highlights the importance of providing standardised and adequate infrastructure and resources to support responsible disposal of fishing gear waste, regardless of port size. One successful example within a small port is demonstrated at Port Errol, which does not have permanent waste reception facilities, and so harbour management arranges for an annual skip so berth holders can dispose of their creel waste.

3. Financial considerations: The financial aspects of waste management were regularly raised as a concern. This included: costs to harbours and fishers associated with disposal; potential offsetting of expenses through the collection of scrap metal; and the negative impacts of charging disposal costs back to the fishers. It was clear that respondents doubted that fishing gear was being or would be disposed of correctly in circumstances where fishers had to pay for the disposal.

4. Collaboration and community involvement: Respondents flagged the need for collaboration between fishing communities, harbours, local authorities and government to address the challenges of fishing gear waste management. Additionally, existing community involvement in beach clean-up activities and waste management initiatives were highlighted as potential solutions.

RECOMMENDED ACTIONS TO IMPROVE RESPONSIBLE FISHING GEAR DISPOSAL IN THE UK

National and regional governments should:

■ Remove financial and practical barriers to fishing gear disposal, through:

- **Provision of free reception facilities for ALDFG and EOL gear disposal at all UK ports and harbours.** Removing financial barriers for a range of stakeholders will enable all interested parties to freely participate in the collection and disposal of gear, leading to increased removal at-sea, on beaches and in harbours/ports.
- **Development of a standardised framework to support waste management onboard fishing vessels and at ports and harbours.** A standardised approach to gear management is important to reduce cost, increase efficiency and enable local capability to recycle fishing gear. A central framework should include consideration of harbours of different sizes with different access to central facilities. Examples of best practice could include combining fishing gear with other recycling materials to reduce transportation costs, or investing in local recycling capabilities for fishing gear. These efforts need to be supported by government funding, at least initially.
- **Introduction of financial incentives for ALDFG retrieval and return to shore for disposal/recycling.** Monetary incentives could encourage fishers to actively participate in these efforts, saving on overall long-term costs.
- **Expansion of existing initiatives to retrieve ALDFG from the ocean.** For example, there could be increased funding for greater roll out of the Fishing for Litter scheme.

■ Promote and enforce the reporting of lost gear, through:

- **A transition towards mandatory gear marking.** Mandatory gear marking with fisher/vessel details will dissuade intentional disposal at-sea, incentivise reporting of loss, and support responsible disposal. The Food and Agriculture Organisation (FAO) has developed voluntary guidelines for gear marking [12] which could inform policy development. To ensure successful implementation, a delivery plan must include awareness-raising initiatives and enforcement measures.
- **A mandated requirement for all vessels to report lost gear.** It is essential for gear loss to be quickly reported to support retrieval and identify hotspots. Efforts should be made to promote prompt reporting of gear conflicts (where two active fishing gears overlap and become entangled which can cause gear loss) to relevant authorities, either through legislation, licensing requirements or stakeholder engagement. To promote compliance, it is important that fishers can report gear loss without facing recrimination.

■ Implement targeted mitigation and retrieval measures in areas of high gear loss or environmental and navigational safety risk, including:

- **Fisheries management measures.** The Global Ghost Gear Initiative's (GGGI) best practice framework for the management of fishing gear [11] provides robust examples of mitigation measures that can be implemented. For example: soak time limits for static gear; limits on the lengths of gillnet fleets or trap strings; spatio-temporal measures to prevent conflict between static (i.e., creels, pots or gillnets) and mobile (i.e., trawlers) gear operators; and employing alternative gears based on current weather and other conditions.
- **Targeted ALDFG retrieval in known hotspots and following reported gear loss.** Government funding for organisations which undertake ALDFG retrieval will increase their ability to remove gear from the ocean, particularly within key areas.

■ Investment in technological solutions, such as:

- **Lower impact fishing gear.** This can include the use of materials that decompose when left in water for longer periods (rot cords), gear with escape hatches for entangled wildlife, or emergency buoys to facilitate retrieval.
- **Design modifications on vessels.** It is crucial to improve vessel design to avoid gear storage limitations onboard that might result in gear loss or disposal at sea. Future vessel construction should incorporate onboard storage for EOL gear or recovered ALDFG.

■ Actively encourage manufacturers of fishing gear to promote responsible product use through Extended Producer Responsibility and other waste management options, such as:

- **Gear buy-back schemes.** Manufacturers can repurchase old gear for refurbishment or recycling, or offer a discount on new purchases.
- **Deposit schemes for specific gear components.** For example, plastic fishing pots and buoys could offer an end-of-life refund when returned to the manufacturer or supplier.
- **Gear traceability.** Manufacturers could be encouraged to incorporate traceability features into their products (e.g. marking them with manufacturer details and details of the purchaser).

Local harbours and ports should:

- **Prevent intentional or thoughtless discarding of gear through fisher education and engagement.** Raising awareness of the problems caused by marine litter is critical to drive behavioural change. However, of the harbours interviewed, only eight engage in educational activities on fishing gear waste and advocate for responsible disposal. Education should include promotion of the GGGI's best practice framework for fishing gear management [11] and highlight local waste management options.
- **Publicly share data on the collection and treatment of fishing gear waste.** Greater transparency about the method of disposal for fishing gear will increase accountability, support more effective waste management practices and promote greater environmental stewardship.
- **Encourage the establishment of local recycling capabilities in the UK for fishing gear.** Having local capability to recycle fishing gear will address the logistical and economic challenges associated with transporting gear for recycling.

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ANNEX

Annex A: Combinations of accepted fishing gear types at the interviewed harbours.

Type of fishing gear accepted	Count (%)
ALDFG, BDG, EOL	88 (46.32)
N/A	64 (33.68)
ALDFG, BDG	17 (8.95)
ALDFG	8 (4.21)
ALDFG, EOL	5 (2.63)
BDG	4 (2.11)
EOL	4 (2.11)
Total	190 (100)

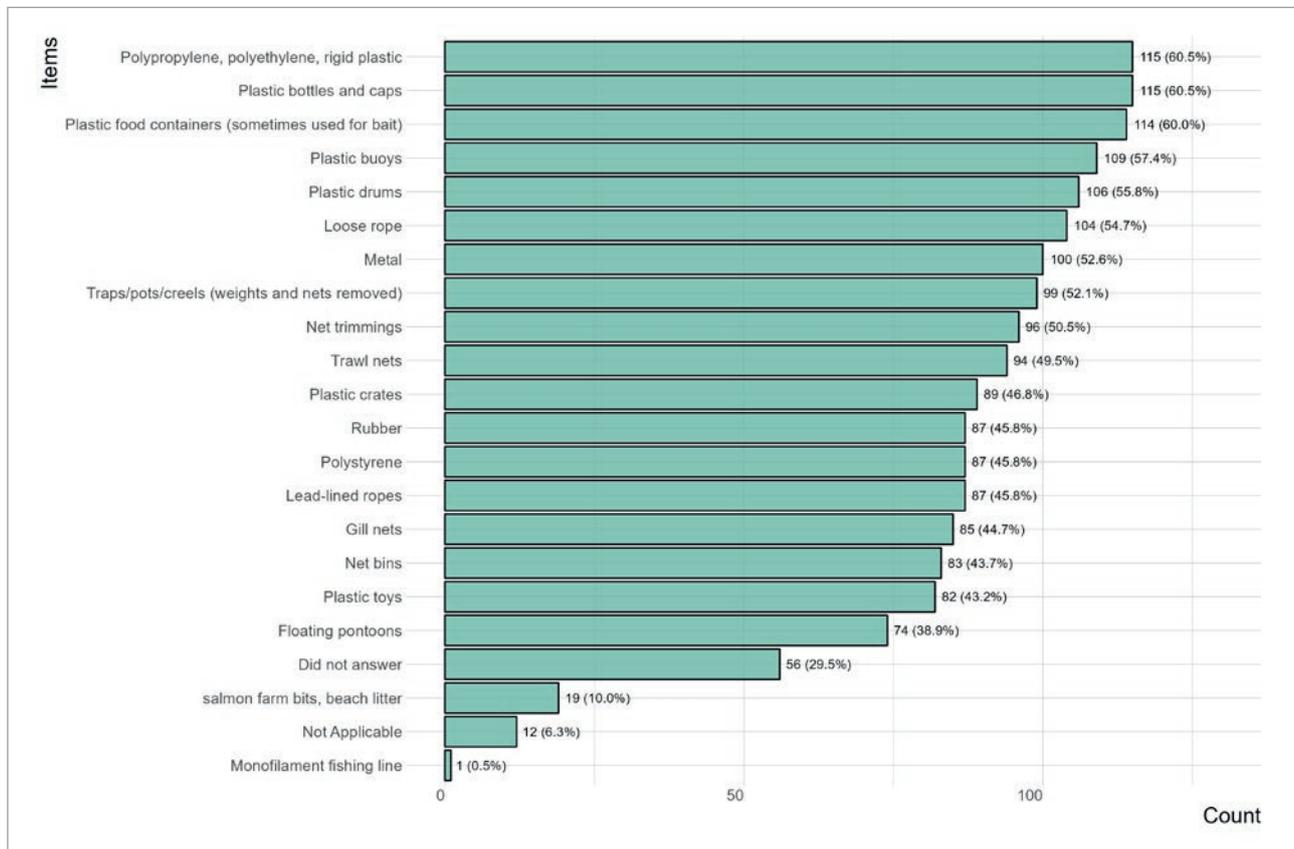
ALDFG = Abandoned, lost or otherwise discarded fishing gear;

BDG = Broken down gear, bits of gear;

EOL = End of life gear;

N/A = Not applicable (for those harbours that do not accept any fishing gear).

Annex B: Breakdown of items/materials accepted at the surveyed harbours with waste reception facilities.



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