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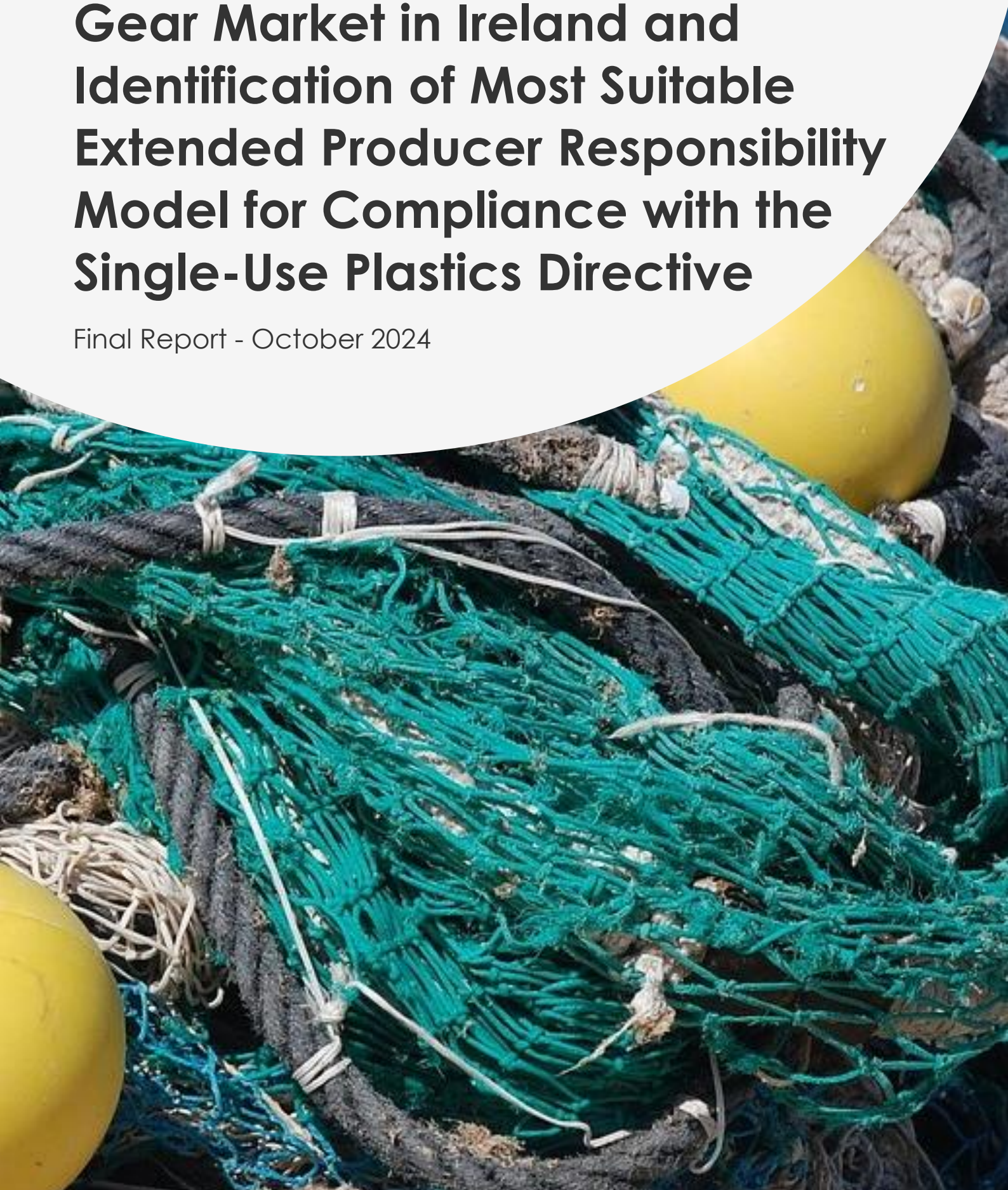
POSEIDON
AQUATIC RESOURCE MANAGEMENT

Analysis of the Marine Fishing Gear Market in Ireland and Identification of Most Suitable Extended Producer Responsibility Model for Compliance with the Single-Use Plastics Directive

Final Report - October 2024



Report For

The Department of the Environment, Climate and Communications (DECC)

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1. Introduction

Eunomia Research & Consulting (Eunomia), working with Poseidon Aquatic Resource Management Europe Ltd (Poseidon), was commissioned by the Department of the Environment, Climate and Communications (DECC) to conduct an analysis of the marine fishing gear market in Ireland and to identify the most suitable Extended Producer Responsibility (EPR) model for compliance with the European Union's (EU's) Single-Use Plastics Directive (SUPD).

This report aims to provide an overview of the current fishing gear market in Ireland and identify the most suitable EPR model for the sector, based on the most recent data available.

This report has been divided into the following main parts:

- Section 1: Introduction;
- Section 2: Market Analysis of Fishing Gear;
- Section 3: Identifying Potential EPR Models for Fishing Gear;
- Section 4: Assessment of EPR ;
- Section 5: Roadmap for the Establishment of EPR for Fishing Gear
- Appendix

1.1 Background

The EU Directive 2019/904 on the reduction of certain plastic products on the environment – commonly known as the Single-Use Plastics Directive (SUPD) – aims to reduce the volume and impact of specific plastic products on the environment by a range of measures that Member States must implement. The SUPD includes measures on fishing gear containing plastics even though it does not technically meet the definition of a single-use plastic in the Directive, because it was identified as a significant contributor to marine litter posing serious risks to marine ecosystems, biodiversity, human health and economic activities such as fishing, tourism and shipping. Fishing gear, along with the 10 most commonly found single-use plastic items on European beaches, represents 70% of all marine litter in the EU.[1]

The SUPD was adopted in 2019, with individual measures implemented gradually over subsequent years. The first mandatory measure came into effect in July 2021, when a ban was placed on a range of single-use items such as plastic cutlery, plates and straws. Much longer implementation dates were provided in the Directive for measures that impact product design or production, such as the inclusion of recycled materials in plastic beverage containers, to ensure those businesses have sufficient time to make the necessary adjustments. Accordingly, a period of 5 years was allowed for the implementation of a fishing gear EPR, the requirements for which must be complied with by 31 December 2024.

In Ireland, the EU Single-use Plastics Regulations (S.I. 516 of 2021) which transposed the Directive, set out the obligations for producers of fishing gear to comply with the SUPD, including participating in an EPR scheme. The EU (Extended Producer Responsibility)(Fishing Gear Containing Plastic) Regulations (S.I. 612) later set out the legislative framework around how an EPR may be established and operated.

This project, led by Eunomia, seeks to identify the most suitable EPR scheme for fishing gear (including aquaculture gear) that contains plastic in Ireland. To ensure an appropriate model is proposed, further analysis of the Irish fishing gear market is needed, and this report presents the results of this market analysis.

[1] European Commission (2024) *Single-use plastics.* Available at: https://environment.ec.europa.eu/topics/plastics/single-use-plastics_en

1.2 Definitions

The following definitions are used in the Single-Use Plastics (SUP)[2] and Port Reception Facilities (PRF)[3] Directives and have been directly translated into the related Irish Statutory Instruments.

Definitions used in the SUP Directive:

Article 3(4): '***Fishing gear***' *means any item or piece of equipment that is used in fishing or aquaculture to target, capture or rear marine biological resources or that is floating on the sea surface, and is deployed with the objective of attracting and capturing or of rearing such marine biological resources.*

Article 3(5): '***Waste fishing gear***' *means any fishing gear covered by the definition of waste in point 1 of Article 3 of Directive 2008/98/EC*, including all separate components, substances or materials that were part of or attached to such fishing gear when it was discarded, including when it was abandoned or lost.*

*Article 3.1 of 2008/98/EC: '***waste***' *means any substance or object which the holder discards or intends or is required to discard.*

Article 3(6): '***Placing on the Market***' *(POM) means the first making available of a product on the market of a Member State;*

Article 3(7): '***Making available on the market***' *means any supply of a product for distribution, consumption or use on the market of a Member State in the course of a commercial activity, whether in return for payment or free of charge;*

Article 3(11) '***Producer***' *means:*

(a) any natural or legal person established in a Member State that professionally manufactures, fills, sells or imports, irrespective of the selling technique used, including by means of distance contracts as defined in point (7) of Article 2 of Directive 2011/83/EU of the European Parliament and of the Council (21), and places on the market of that Member State single-use plastic products, filled single-use plastic products or fishing gear containing plastic, other than persons carrying out fishing activities as defined in point (28) of Article 4 of Regulation (EU) No 1380/2013 of the European Parliament and of the Council (22); or

(b) any natural or legal person established in one Member State or in a third country that professionally sells in another Member State directly to private households or to users other than private households, by means of distance contracts as defined in point (7) of Article 2 of Directive 2011/83/EU, single-use plastic products, filled single-use plastic products or fishing gear containing plastic, other than persons carrying out fishing activities as defined in point (28) of Article 4 of Regulation (EU) No 1380/2013.

1.3 Fishing and Aquaculture Taxonomy

A gear taxonomy was developed under the Bord Iascaigh Mhara (BIM) Clean Oceans initiative to categorise the fishing and aquaculture gear currently used in Ireland. This provides a structure to the Irish gear market as described in later sections of this report.

[2] EU (2019) *Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment*. Available at: https://eur-lex.europa.eu/eli/dir/2019/904/oj
[3] EU (2019) *Directive (EU) 2019/883 of the European Parliament and of the Council of 17 April 2019 on port reception facilities for the delivery of waste from ships, amending Directive 2010/65/EU and repealing Directive 2000/59/EC*. Available at: https://eur-lex.europa.eu/eli/dir/2019/883/oj

Figure 1-1 Fishing gear taxonomy (source: Poseidon, 2023)

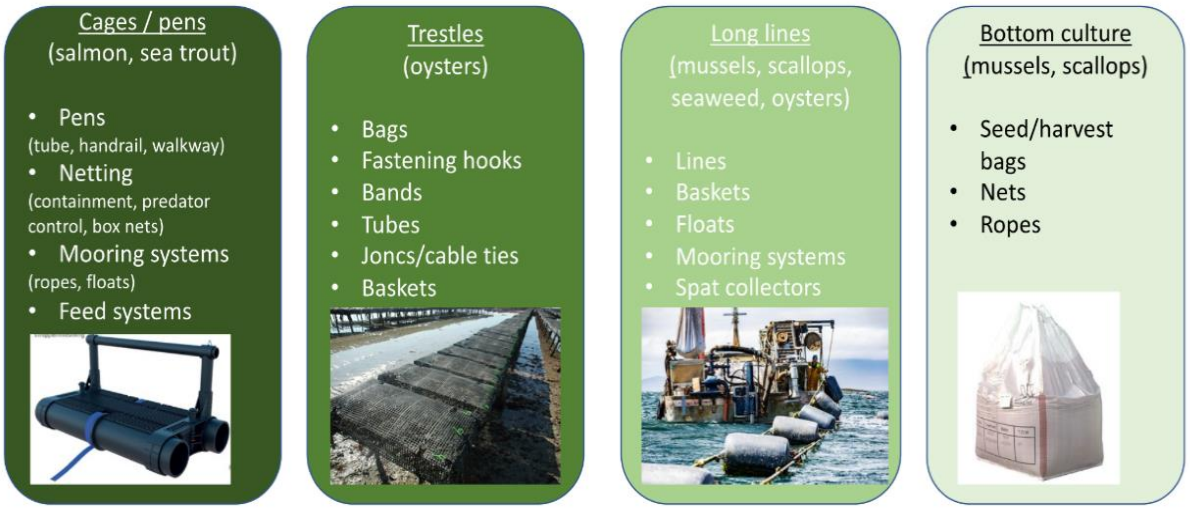
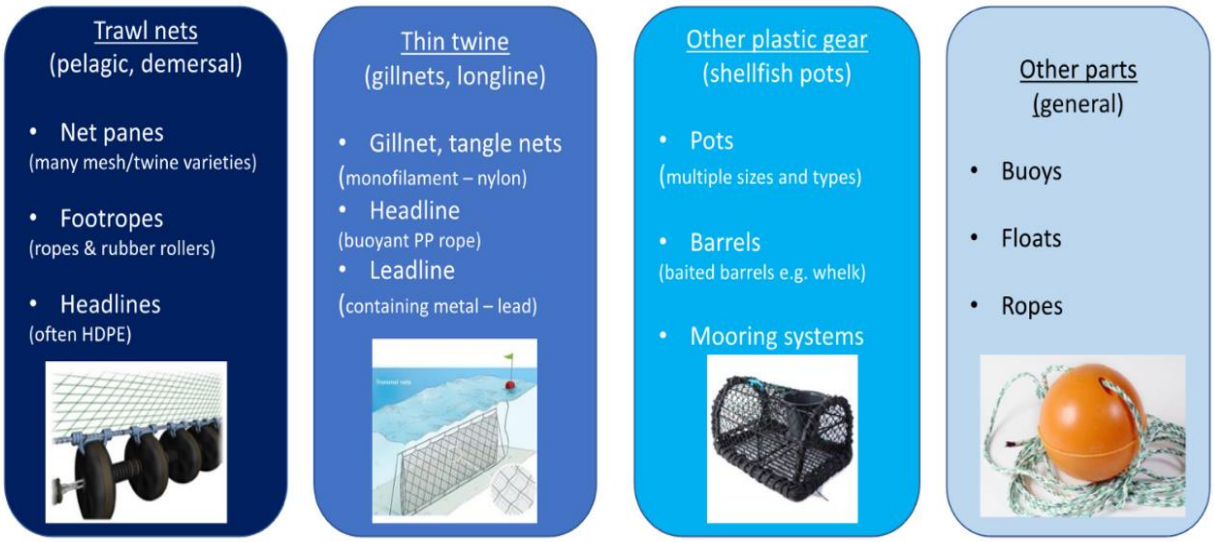


Figure 1-2 Aquaculture gear taxonomy (source: Poseidon, 2023)



The intent is that the taxonomy provides:

- A consistent scope for reporting fishing and aquaculture gear placed on and taken off the market.
- The potential to aggregate data in relation to the broad categories in the SUP reporting table.
- The ability to develop conversion factors for certain gear components.

The taxonomy should be used as a guide. It describes common gear components associated with each type of gear and the material(s) they are commonly made of, which is indicative as there are variations and innovations in the use of new materials. Fishing gear consists of multiple components that may be made from different materials and have varying specifications. The taxonomy is a simplified categorisation capturing the main gear components.

The taxonomy is likely to develop further as it is used with gear producers and users in the collection of data. Over time there may also be new gear types or components to include in future versions.

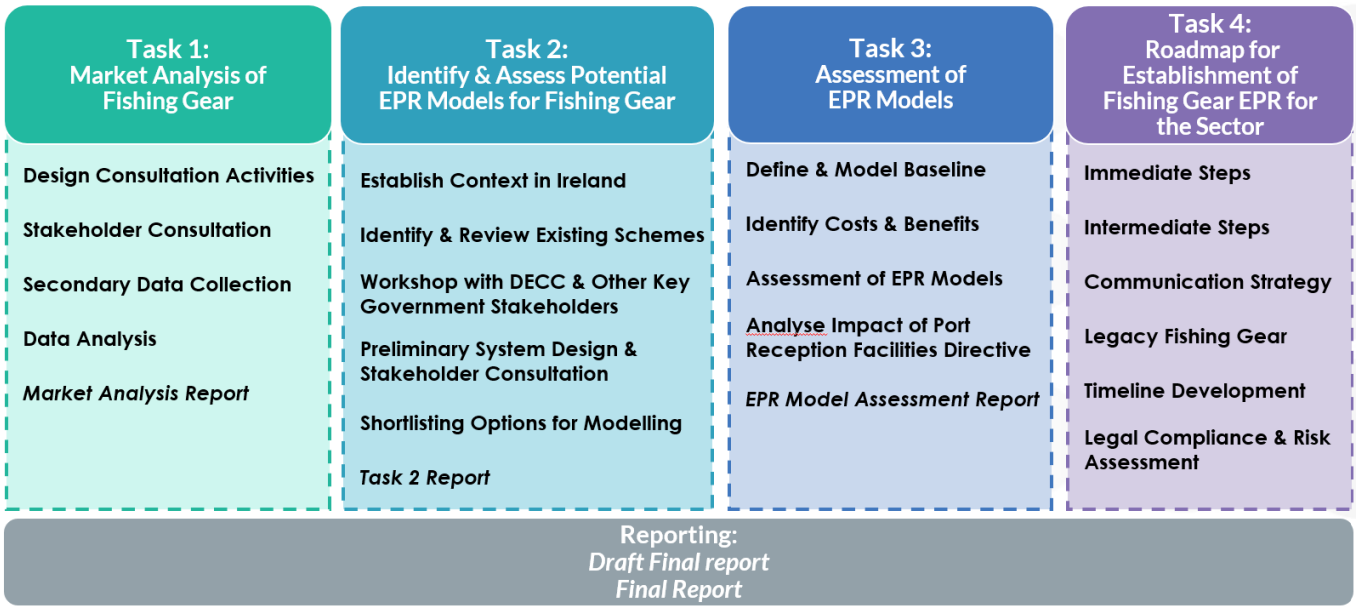
The current taxonomy proposes the exclusion of certain gear components, primarily those made of metal, to ensure reported weights relate predominantly to plastic. The SUP reporting table enables metal types to be recorded. This is intended for integrated components that cannot be readily removed from plastic parts, e.g. ropes with steel core or weighted ropes with lead inserts. However, it may be determined that metal components should be included in an EPR scheme as they provide good recycling (and so revenue) potential.

1.4 Methodology

Eunomia's project team has worked with key governmental and industry stakeholders to carry out a market analysis of fishing gear, identify and assess potential EPR models for fishing gear, and develop a roadmap for the establishment of a fishing gear EPR.

The following Figure 1-3 provides an overview of the methodology applied to each of the tasks within this project. More detail on the specific steps that were undertaken for the delivery of each of the tasks is provided in the relevant sections further below.

Figure 1-3 Methodology overview



2. Market Analysis of Fishing Gear

This analysis aims to provide an overview of the current fishing gear market in Ireland, based on the most recent data available.

2.1 Methodology and Approach

This task involved the collection of quantitative data and qualitative information on fishing & aquaculture gear to understand the sources, quantities and lifecycle of fishing gear being placed on the market and used in Ireland, with specific reference to 2022.

Poseidon and Ireland's Seafood Development Agency, Bord Iascaigh Mhara (BIM), directly engaged with gear producers and sellers of fishing gear in Ireland, based on a contacts database compiled by the two parties under the gear taxonomy project. Additional data sources included BIM's Annual Aquaculture Production Survey, the EU Fleet Register and the Scientific, Technical and Economic Committee for Fisheries (STECF) fisheries data and other sources to collect data to estimate the scale of the Irish fishing gear market.

This was completed through consultation of those businesses identified, including those within the chandlery sector (those selling the gear) and through use of proxies related to gear use and replacement rate. These two approaches were proposed as consultation response rates may be limited or responses incomplete, and as estimates of gear use/purchases will provide triangulation against response rates.

2.1.1 Engagement with the Fishing Gear Sector

To gain quantitative data on the amount and type of gear, and the plastic content of gear various Irish suppliers and producers placed on the Irish market in 2022, a survey, created by BIM, was sent to various stakeholders in the Irish gear supplier and producer market prior to direct consultation by Poseidon. The survey would allow for more accurate estimates of gear being placed on the market to be made.

Following the development of the gear supplier survey, a desk-based analysis of the various gear producers and suppliers operating in Ireland was undertaken by Poseidon. Using an earlier BIM study, which highlighted around 30 business operating as gear 'producers' in fishing and aquaculture sectors and additional research of other businesses operating across Ireland, a total of 42 stakeholders involved in the Irish fishing gear production and supply sectors were identified, which would be sent the BIM survey to complete.

The various stakeholders were separated into 3 stakeholder tiers, based on the significance of the business within the Irish market and whether they had not previously been interviewed to discuss the topic of EPR schemes within the Irish fishing gear industry.

- Tier 1: High Priority stakeholders
  - These stakeholders would be contacted, irrespective of whether they had responded to the BIM survey, to arrange an interview (face to face or remote) and would be followed up if a response was not received.
    - Tier 2: Priority stakeholders
      - These stakeholders would be contacted via email, sent reminders to complete the BIM survey and offered a phone discussion.
        - Tier 3: Medium Priority stakeholders
          - These stakeholders would be contacted via email and sent a reminder to complete the BIM survey.

The Tier 1 & 2 stakeholders identified were contacted for further consultation, to further develop and expand upon the quantitative information gained from the BIM gear producer surveys, to gain the best understanding of the market and to understand the levels of awareness and acceptance of the need to report and the introduction of an EPR scheme. Alongside this, recommendations, concerns and key points of consideration for the development of an Irish EPR scheme could be highlighted by the stakeholders, which would help ensure that the resulting reporting and EPR scheme is as appropriate for the sector as possible, with all considerations and concerns addressed and understood.

The consultation involved members of the Poseidon team interviewing gear producers remotely via MS Teams or telephone. During the consultation, Poseidon aimed to clarify and develop upon the quantitative information sought in the BIM surveys with additional qualitative information, such as identifying the extent to which fishers currently import gear directly, online purchases, the lifespan of gear components, various sales channels & market dynamics, production methods and gear usage. This information would enable estimates of gear usage to be calculated, which would assist during the estimation of on- and off-market gear within the Irish fisheries sector. Additionally, stakeholders were requested to provide data covering the amount of gear they had placed on and off the market, which would be used by Poseidon to help estimate gear placed off and on the market.

2.1.2 Estimating Fishing Gear Placed on the Market

An estimation of the amount of fishing gear placed on the market in 2022 was calculated based on the number of vessels per fleet segment in Irish fishing fleet, the fishing gear type associated with that fleet segment, and the replacement rate of that gear (average number of years it is used for before replacement).

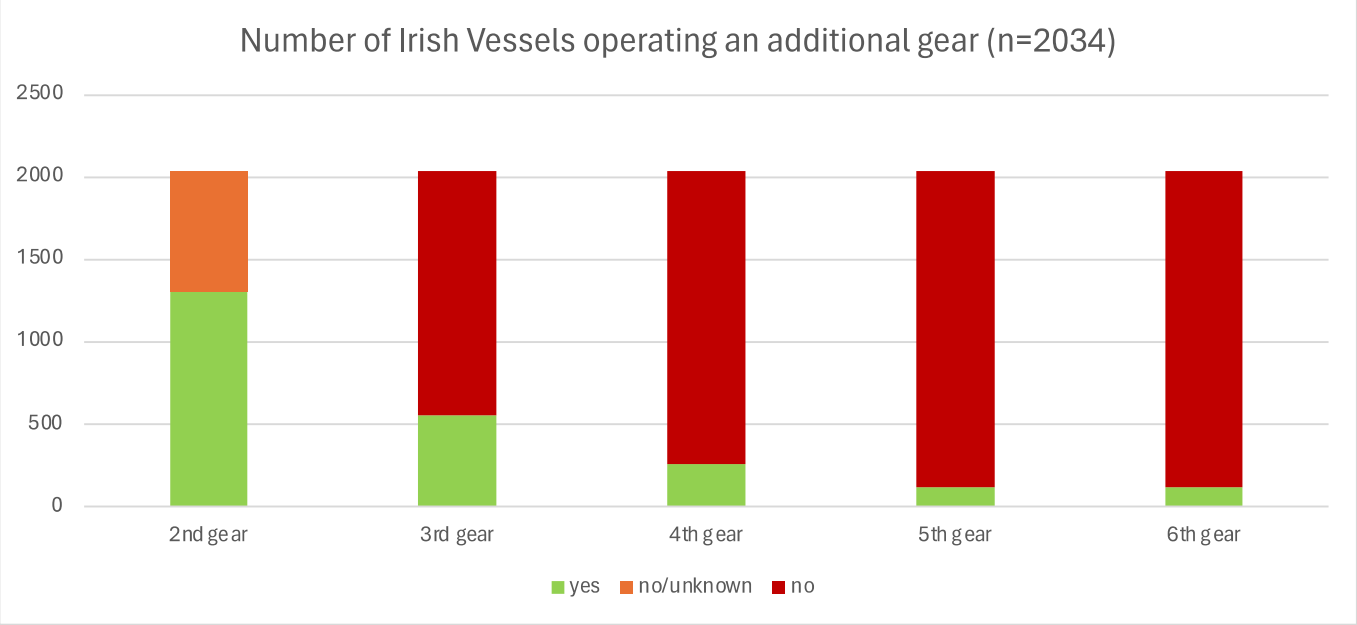
Data from the European Commission's Community Fleet Register (CFR) was used to determine the number of Irish fishing vessels within the various fleet segments (gear type and size of vessel). All Irish vessels present on the CFR in December 2022 were taken as the sample. The register contains information such as the number of vessels by length, the vessel's primary gear type, alongside any secondary or additional gears the vessel may operate. The estimate includes a vessel's primary and secondary gears as more than half of the Irish fleet operates with more than one fishing gear (Figure 2-1), and these secondary gears were considered as part of the overall gear estimates. The amount of activity per gear is unknown. We therefore assume that secondary gears would be operated half as much as the primary gear and therefore the replacement rate for the gear is doubled.

Less than a quarter of Irish vessels report a tertiary gear type, with fewer still operating further additional gears, hence these additional gears were excluded. However, it is important to note that these polyvalent vessels would attribute to additional gears being operated on the market, which are not accounted for in this report.

The CFR data, alongside industry knowledge gained from consultation and the gear fiches developed for DG MARE[4], the estimated quantity of gear operated by each vessel, its overall plastic content and weight per vessel was estimated and scaled up for the number of vessels per Irish fleet segments. This gives an estimate of the overall plastic content of gear used by the Irish fishing fleet. The replacement rate per gear component identified through background research then allows the amount of gear placed on the market per year to be estimated.

[4] European Commission (2020) *Study to support the implementation of obligations set out in the Single Use Plastics and Port Reception Facilities Directives*. Available at: https://op.europa.eu/en/publication-detail/-/publication/529ef643-173f-11eb-b57e-01aa75ed71a1

Figure 2-1 Number of Irish registered fishing vessels reporting more than one gear type[5]



Key assumptions made in the estimation of plastic fishing gear placed on the market are:

- **Activity level**: there is no indication of the fishing effort per vessel, which would influence a gear's replacement rate. There may also be Irish vessels listed on the CFR that are inactive. Those vessels reporting secondary gear are assumed to operate this only 50% of the time, with the replacement rate adjusted proportionately. Future iterations of this estimate could factor in activity levels more accurately.

- **Amount of gear per vessel**: the average amount of gear held per vessel was estimated based on consultation with gear producers and fishing industry representatives. Operators will hold spare gear on board as well as in storage to fully replace lost or damaged gear. They may also use parts of spare gear to make repairs. The amount of gear held is likely to vary per operator and could be more accurately estimated via fishing industry consultation. This exercise would be an opportunity to better understand the scale and type of legacy gear.

- **Plastic per gear**: Fishing gear is very diverse and often with multiple components. Assumptions are made on the scale of gear per fleet segment in proportion to the length of the vessel. This is relatively crude and could be further refined through industry consultation.

- **Replacement rate**: Gear components wear out and require replacement at different rates. Where information allows, replacement rates specific to the main gear components are estimated. However, for some gears only an overall replacement rate for the whole gear is available. These are primarily based on the gear fiches developed for the DG MARE study[6], supplemented with background research and industry consultation.

Assumptions made for specific fleet segments are present with the tables in Annex A.2.0.

[5] European Commission (2024) *EU Community Fleet Register 2024*. Available at: https://webgate.ec.europa.eu/fleet-europa/search_en

[6] European Commission (2020) *Study to support the implementation of obligations set out in the Single Use Plastics and Port Reception Facilities Directives*. Available at: https://op.europa.eu/en/publication-detail/-/publication/529ef643-173f-11eb-b57e-01aa75ed71a1

2.1.3 Estimating Aquaculture Gear Placed on the Market

The estimate of aquaculture gear placed on the market in 2022 is based on the production volumes in that year, as reported in BIM's annual production report.[7] This gives a breakdown of production per sector, which broadly align with the gear taxonomy:

- Salmon
- Oysters
- Mussel (rope grown)
- Mussel (bottom grown)
- Seaweed (rope grown)

Background research and consultation was used to determine the average amount of gear used to produce one tonne of product for each sector. Replacement rates for this gear were also determined based on secondary sources, including Life Cycle Assessment (LCA) studies that include gear in scope and the Crown Estate Scotland Management of Plastics Aquaculture Inventory Tool (CES, 2024).[8]

Assumptions made for specific production sectors are present with the tables in Annex A.3.0.

2.1.4 Estimating Gear Taken off the Market

Waste fishing and aquaculture gear market analysis has mainly been commissioned by BIM and through their activities under:

- the Clean Oceans Initiative, including the Fishing for Litter (FFL) scheme; and
- the Co-ordinated Local Aquaculture Management Systems (CLAMS) programme.

Consultation was undertaken with the Clean Technology Centre (CTC), Cork and BIM. We also sought information on gear being taken off the market from the gear producers consulted.

The estimate of gear taken off the market is simply an aggregation of the totals reported by each of these sources. This is because specific gear codes have only recently been adopted and, as yet there is no comprehensive data collection system for waste fishing and aquaculture gear and data specific to 2022 is not available from all sources.

Specific waste codes for waste fishing & aquaculture gear were introduced in 2023. With the establishment of systematic reporting in consistent formats, it is hoped that future years can be reported more comprehensively and accurately.

[7] BIM (2023) *Annual Aquaculture Report. Findings of the National Seafood Survey, 2023*. Available at: https://bim.ie/publications/aquaculture/
[8] CES (2024) *Crown Estate Scotland Management of Plastics Aquaculture Inventory Tool.* Available at: https://www.crownestatescotland.com/scotlands-property/aquaculture/annual-sustainability-reporting

2.2 Structure of the Irish Fishing and Aquaculture Gear Markets

2.2.1 Overall Structure

The structure of the Irish market differs significantly between fishing gear and aquaculture gear, as well as between sub-sectors in each. Four main routes for gear placed on the market are identified (Figure 2-2):

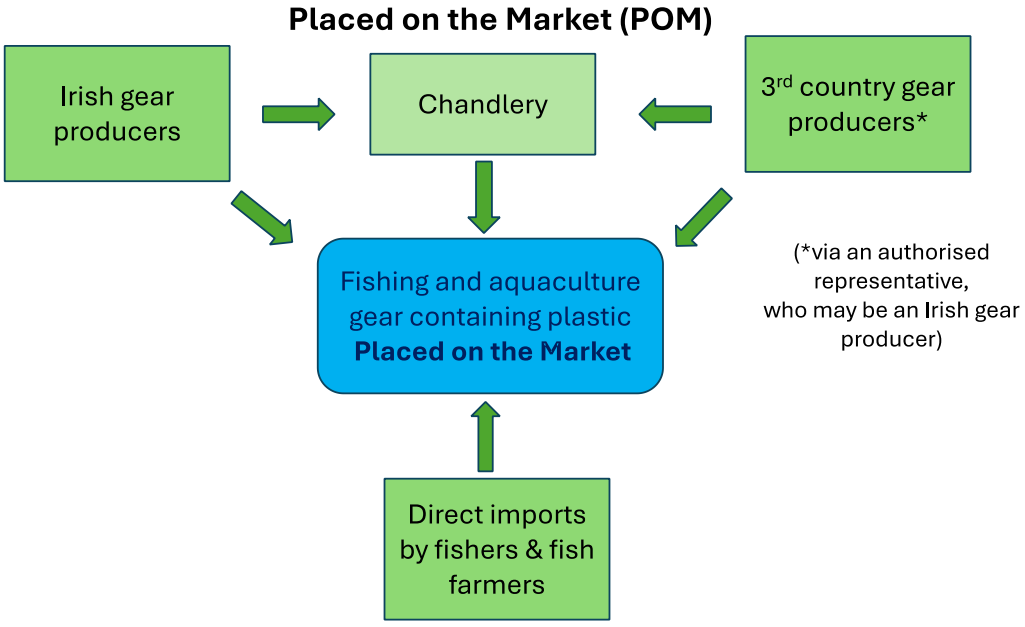
1. **Irish gear producers** – less than 20 companies that manufacture specific gear components or assemble finished gear. Finished gear is often made up of multiple components that may be supplied by a small number (around 5) of Irish manufacturing companies and imported components. These producers sell directly to fishers/fish farmers and/or via chandlery stores.

2. **3rd country gear producers** – Non-Irish companies supplying the Irish market directly or via chandlery or Irish companies using their products to assemble gear. Significant suppliers in certain sectors come from the UK (trawls, pots, gillnets), France (oyster bags) and Portugal (nets and ropes), but there are also supplies from Asia (monofilament lines, gillnets and pots).

3. **Chandlery** – specialised stores (around 12 companies and many with an online sales channel) selling gear from Irish and non-Irish companies to the fishing, aquaculture and other maritime sectors (recreational fishing, boating, etc.). Some have stated that they only supply non-fishing sectors, but it is challenging for others to distinguishing the proportion of their business represented by fishing/aquaculture customers.

4. **Direct imports** – For fishing, direct imports tend to be mainly the smaller, cheaper gear components (thin twine for lines or gillnets, pots). This currently represents a small proportion of total weight of fishing gear placed on the market (est. <10%), but is a major concern for Irish producers, who fear this proportion will grow if the EPR scheme does not provide a level playing field. For aquaculture producers, direct imports are significant as large-scale producers buy large quantities and even smaller-scale operators often buy in bulk (e.g. oyster bags from France).

Figure 2-2 Schematic of Irish fishing gear placed on the market



2.2.1.1 Fishers as Gear Producers

The recital in the SUP Directive states that:

> *(25) While all marine litter containing plastic poses a risk to the environment and to human health and should be tackled, proportionality considerations should also be taken into account. Therefore, the fishermen themselves and artisanal makers of fishing gear containing plastic should not be considered as producers and should not be held responsible for fulfilling the obligations of the producer related to the extended producer responsibility.*

S.I. 612 (2022) states that:

> *"producer" means any person, irrespective of the selling technique used, who is first to place a relevant product on the market in the State other than persons carrying out fishing activities as defined in point (28) of Article 4 of Regulation (EU) No. 1380/2013 of the European Parliament and of the Council [the Common Fisheries Policy];*

We suggest that the recital in the SUP Directive should be interpreted as recognising fishers are not liable to EPR Scheme costs as gear producers unless they are importing gear and then selling it on and so are placing that gear on the market. Fishers should nevertheless participate in the EPR scheme in terms of efforts to collect waste gear from the market, identifying non-Irish producers supplying the Irish market and contributing to reporting.

Direct importation does already occur in the fishing sector but is thought to be in relatively small quantities and not to the extent seen in the aquaculture sector. If fishers were not included in some form, this could:

- hinder the operation of the EPR scheme and waste gear collection efforts as it relies on fishers determining gear is waste, i.e. no longer usable, and then placing that gear at collection points;
- treat fishing gear 'users' differently to aquaculture gear users even though many aquaculture producers are also small-scale, and (most importantly),
- risk distortion of the market by incentivising the direct purchasing of gear by fishers.

It is also difficult to define who may be considered as 'artisanal' makers of fishing gear containing plastic. Again, we suggest the intent is to ensure individuals (often fishers or retired fishers) who construct and repair gear at a very small scale are not considered in the same way as companies. Nevertheless, this group should have an awareness of and appropriately participate in the EPR scheme.

2.2.1.2 Fish Farmers as Gear Producers

The SUP Directive does not distinguish fish farmers (small-scale or otherwise) in the same way as it does fishers and artisanal makers of fishing gear. The amount of direct importation of gear in the aquaculture sector is greater than in the fishing sector: the large-scale operators have direct purchasing arrangements and smaller-scale producers still use large amounts of plastic gear (each oyster farmer will use thousands of oyster bags) and will buy gear in bulk.

As Irish aquaculture operators place the gear they use on the Irish market themselves, they provide the link to their suppliers and are effectively agents for the non-Irish companies, unless those non-Irish companies participate directly. They are also critical to waste aquaculture gear collection and so should participate in the EPR scheme.

2.3 Gear Placed on the Market

2.3.1 Fishing Gear Placed on the Market

2.3.1.1 Estimates from the Consultation

The BIM gear producer survey was closed on 22 May 2024 and resulted in several useful responses, but the data provided is not sufficient to enable a reliable total to be estimated. We have, however, gathered qualitative information from those consulted.

The supply chains for fishing gear placed on the market differ by the fleet segment concerned, which is mainly due to the characteristics of the gear (cost of each purchase and how bespoke that gear is), which are summarised below. This diversity and the scale of the Irish industry means that overall there are less than 30 Irish companies involved in the supply of gear to the fishing fleet.

Most operators carry some additional gear and store spare parts on land to enable quick replacement and reduce downtime:

- **Pelagic gear** is a high-cost item (€100-300,000 for a complete trawl set-up consisting of a large amount of nylon net panels, rope and floats) and can last a relatively long time as they are not operated to be in contact with the seabed. Each vessel will have several nets that are for fishing specific small pelagic species (mackerel, herring and blue whiting) in seasonal fisheries.

- **Demersal gear** is also a significant investment (€30-40,000 per trawl) that can be bought 'off-the-shelf' but is also commonly designed and built to detailed specifications agreed with the operator. Most of the Irish fleet operates as quad-riggers (a set of four nets spread by warps and trawl doors) and would carry spares. They will also switch to heavier ground gear with heavy-duty rubber rollers for targeting whitefish over hard ground.

- **Pots** are mostly steel-framed (crab & lobster), wrapped in rope or rubber with netting panels. They come in multiple dimensions, but average around 15kg each of which 95% is the steel frame. There are also plastic-framed shrimp pots and plastic barrels used for whelk pots.

- **Static nets** (gillnets, trammel nets) and longlines are constructed from thin monofilament twine. This gear is sold by a small number (<5) of Irish gear producers who mostly import this material as pre-fabricated full nets (with floats and weighted ropes), lines (with snoods & hooks) and replacement net panels. Fishers increasingly source this online directly from Asian manufacturers.

- **General marine equipment** (e.g. floats, ropes, rubber clothing) is also purchased by fishing vessels – mainly from chandlery stores in ports, but increasingly online from non-Irish companies. Chandlers tend to supply other marine industries, making it difficult to accurately determine the proportion of trade going to fishing and aquaculture operators.

The two largest fishing gear producers account for around 90% of pelagic gear purchased by the Irish fleet. The remainder is mainly from purchases from non-Irish gear producers such as Vonin, Egersund and Hampidjan.

For demersal (prawn and whitefish) trawls there are less than ten Irish, UK and EU-based companies supplying the fleet. The Irish producers consulted state that the market is currently poor as the decommissioning scheme means that:

a) there are fewer customers;

b) there is a lot of second-hand trawl gear available from those decommissioned fishing vessels; and

c) high operating costs mean that operators are not investing in gear as much as previous years, instead choosing to 'make do and mend'.

Consequently at least two well-established Irish companies intend to stop operations, reducing the number of producers still further.

There are a small (<5) number of Irish pot suppliers, who compete with UK suppliers and increasingly with direct imports from Chinese manufacturers. Pots have become more expensive in recent years with increases in the price of steel, with the bulk of pots being imported from China. Most are sold through Irish gear producers, but recently direct imports from the same source have increased. There is also an active second-hand market for pots with those operating larger scale Vivier vessels selling pots after a couple of seasons to operators of smaller inshore boats, some of whom may only operate on a seasonal basis.

Two Irish gear producers for demersal and inshore fishing gear (who were consulted by Poseidon previously) account for around 150t of gear Placed on Market (POM) in 2022 (see Table 2-1). This shows the significant variation in plastic and metal types between these two suppliers and the substantial weight of metals that is integrated within weighted ropes. This excludes the weight of metal associated with pot frames, which could be included.

Table 2-1 Gear placed on the market reported by two Irish gear producers

Code	Plastic type	Producer A	Producer B
	Total weight of gear PoM	**107**	**40**
	Total plastics (tonnes)	**55**	**24**
	Proportion of plastics per type		
PE	Polyethylene	93%	14%
PES	Polyester	0%	0%
PA	Polyamide (Nylon)	2%	16%
PP	Polypropylene	4%	20%
HMPE	High Molecular Polyethylene	1%	50%
	Total metals (tonnes)	**52**	**16**
	Proportion of metals per type		
	Lead	8%	70%
	Stainless steel	4%	2%
	Mild steel	96%	28%

One of Ireland's main pot manufacturers reported that there are multiple sizes and product forms, making it difficult to provide common conversion factors for materials per unit sold. The most common crab/lobster pots they sell are creel-shaped and 26 inches in length, averaging 15kg with 95% of this weight being the steel frame. They only place 20% of their output onto the Irish market, with most being exported to the UK and the EU.

The gear producers reporting to date have used their purchase invoices to determine weights per material type. Chandlers, who have been less engaged in the process to date, are likely to use their sales invoices and rely on a weight per unit. This would require conversion factors to be developed.

2.3.1.2 Estimates Based on the Fishing Fleet

Below we estimate fishing gear Placed on the Market (POM) based on the Irish fishing fleet.[9] This approach is needed as the gear producer survey is expected to have significant gaps due to non-response by some that are known to be involved in the market. A comparison with gear survey results can identify where and how large those gaps are. The following tables based on Irish fishing fleet segments broadly reflect the gear taxonomy.

A breakdown of these calculations per fleet segment is provided in Annex A.2.0. The summed totals across the Irish fleet amount to an estimated 792 tonnes of plastic being placed on the market in 2022 (Table 2-2). This includes the gear associated with vessels listing this gear type as a secondary gear.

Table 2-2 Estimated weight of plastic fishing gear placed on the market per fleet segment[10]

Gear Types	Number of vessels (primary gear)	Number of vessels (second gear)	Estimated plastic weight (T) of gear in 2022
Pots*	783	380	96
Purse seine	13	2	28
Pelagic Trawls	117	84	104
Demersal Trawls	139	104	382
Beam trawl	9	1	36
Gillnets	481	362	132
Longlines	79	253	14
Total	**1,621**	**1,186**	**792**

*Excluding steel frame. With steel frame pot total is 1,391 tonnes, total waste is 2,087 tonnes

The largest volumes of waste fishing gear are the following gear types:

1. **Demersal trawls**: most of the Irish fleet operates as quad-riggers targeting prawns, using 4 nets at a time (with spares on board and further trawls stored on land). Many of these vessels will operate (and store) heavier groundfish gear to fish on a seasonal basis.
2. **Gillnets/trammel nets**: these are individually relatively light sets made of thin monofilament. But each vessel sets multiple nets, and so the total amount of gear used per vessel is significant. As different nets are used seasonally (a few weeks a year) to target certain species, the average replacement rate is estimated to be 10 years.
3. **Pelagic nets:** These mid-water trawl and purse seine nets are individually large, and each is a significant weight of plastic (nylon) estimated at 3.8 tonnes for large nets. Each operator will have multiple nets to target certain small pelagic species, but used on a seasonal basis and with no abrasion from the seabed, these will last longer than demersal trawls (est. 5 years).
4. **Pots** (plastic only, excluding steel frame): The amount of pots operated per vessel increases substantially with size: small boats work a few hundred pots, while the larger vivier crabbers can work thousands of pots. The replacement rate for large vessels is shorter than for smaller vessels as vivier crabbers fish the gear all year in tougher offshore conditions.

[9] European Commission (2024) *EU Community Fleet Register*. Available at: https://webgate.ec.europa.eu/fleet-europa/search_en
[10] Consultant's own calculations.

One key assumption is that the weight of pots (average 15kg) consists of 95% steel and 5% plastic/rubber. If the steel frame is included, the total amount of 'gear containing plastic' placed on the market increases to 2,094 tonnes.

2.3.2 Aquaculture Gear Placed on the Market

2.3.2.1 Estimates Based on Consultation

Data from the BIM gear producer survey shows a very limited response from aquaculture gear producers by the close of the survey (22/05/24), insufficient to derive a reasonable estimate of aquaculture gear placed on the market. Our interview with one of the largest aquaculture production companies suggests that they are detailing material used, but this has not been received to date.

2.3.2.2 Estimates Based on Production

The table below is based on Ireland's aquaculture production in 2022 as reported in the annual production survey.[11] A breakdown of the calculations per production sector is provided in Annex A.3.0. The summed totals across the Irish aquaculture sector amount to an estimated 593 tonnes of plastic being placed on the market in 2022 (Table 2-3).

Table 2-3 Estimated weight of plastic aquaculture gear placed on the market per production sector segment[12,13]

Aquaculture sector	Aquaculture production weight 2022	Plastic PoM in 2022 (tonnes)
Salmon	11,916	161
Farmed Oyster	11,121	375
Suspended mussel	12,921	45
Bottom culture mussels	6,864	10
Other Bottom Culture	399	0.6
Seaweed	493	1.5
Total	**43,714**	**593**

The amount of plastic in use per production site is greatest for salmon farming, but the replacement rate of the main and heaviest items making up the production equipment (cage collars/rings and feed pipes) are reported to last around 15 years and the nets around 5 years. Therefore, the annual PoM total is reduced accordingly. The replacement rates are supported by industry consultation and the Crown Estate Scotland.[14] This, and the bulk purchasing by large-scale operators means that the amounts placed on the market in the salmon sector may vary significantly year to year.

The oyster sector represents the largest amount of plastic PoM per annum, as while each oyster bag is only around 750g in weight, each operator will use thousands of bags which last around 4 years.

[11] BIM (2023) *Annual Aquaculture Report. Findings of the National Seafood Survey, 2023.* Available at: https://bim.ie/publications/aquaculture/
[12] Ibid.
[13] Consultant's own calculations.
[14] CES (2024) *Crown Estate Scotland Management of Plastics Aquaculture Inventory Tool.* Available at: https://www.crownestatescotland.com/scotlands-property/aquaculture/annual-sustainability-reporting

Although around 20,000t of mussels were produced in Ireland in 2022. The amount of plastic per tonne is much lower than other aquaculture sectors as the plastic gear for rope mussel (ropes and floats) are relatively long-lasting and the bottom culture sector mainly uses 1 tonne bags for seed and harvesting, that are lightweight (also around 750g) individual items. These seed/harvest bags could be considered as packaging rather than aquaculture gear.

The growing seaweed culture sector in Ireland uses a similar production method to rope-grown mussels and has a similarly low plastic input per tonne of production.

2.3.3 On Market Summary

There are less than 30 Irish companies placing fishing gear on the market, along with around a dozen companies from the UK and elsewhere in Europe supplying the Irish market. There is a small but growing proportion of gear being purchased online from manufacturers in Asia, which is already significant for smaller, off-the-shelf items such as monofilament lines and nets.

The information from the BIM survey of gear producers is not yet available and should provide more information, including from some of the main operators in the market, but significant gaps in this data are likely due to a lack of response from some known to be active in the market.

Based on activity by the users of the gear (fishing vessels, fish and shellfish farms), the total estimated amount of plastic fishing and aquaculture gear placed on the market in 2022 is 1,385 tonnes (792t fishing and 593t aquaculture). This amount increases to around 2,000 tonnes if pot frames made of steel are included.

The total amount placed on the market each year is dwarfed by the amount of 'legacy gear' around Ireland in port areas, net stores, sheds, etc., but the total volume of this material is unknown.

2.4 Waste Gear Taken off the Market

2.4.1 Fishing Gear Taken off the Market

It is difficult to currently estimate the amount of gear taken off the market based on consultation. The EPA's SUPD report indicates that 692 tonnes was collected in 2022. This was based on a survey described as follows: A characterisation study was carried out on a sample of the 12 main ports in Ireland to determine the waste fishing gear containing plastic that ended up in the municipal skips. This average percentage was then applied to the total municipal skip waste collected from the 12 ports.

The BIM gear producer survey results give limited insight to gear taken off the market as the focus of the survey was on gear placed on the market and there are significant gaps in this reporting.

Industry consultation indicates that there is a large but unknown volume of 'legacy gear': end-of-life gear that has gathered on land in ports and net stores as waste collection systems have not been available or are deemed too costly to use.

Port operators are required to provide facilities for solid waste. To date this has been a general skip, but now, under the EU Port Reception Facilities Directive to comply with MARPOL, separate collection and reporting of waste fishing gear is required.

Waste gear is mostly collected in skips in ports, collected by permitted waste operators and going to landfill or incineration. There is no system for dismantling of gear into separate material that can then go to recyclers. The project team understands from consultations that CTC has carried out some trials to determine the labour required to dismantle retired end-of-life (EoL) gear, finding that many man-hours

are needed for such gear. Note that this EoL gear is likely to be less mixed and cleaner than waste fishing gear collected.

New waste codes are now in place for permitted waste collection operators to use in their reporting. For at least 11 of the main fishing ports there are waste collection arrangements (6 run by DAFM and 6 by Local Authorities). BIM has collated this data in previous years (see section below) with a focus on waste categorisation.

The new waste codes (if used correctly – see Figure 2-3) could enable the amounts of fishing and aquaculture gear to be collated as part of national waste statistics. But currently, there is no co-ordinated collection of data focused on fishing gear and reporting is not in a consistent format. Use of the codes by waste collectors is patchy and improved reporting should be encouraged by the EPA.

Metal gear components such as chains, warps and trawl doors have a value as scrap metal and so, after multiple years of use and repair, would usually go to this established waste management route rather than enter the waste fishing gear stream.

Waste collection and recycling is already evident for gear types containing a high proportion of metal, i.e. crab & lobster pots and oyster trestles. Rubber, rope and netting around pots are either cut away by hand and/or melted off in fires. The remaining steel frame can then be reconditioned for producing a new pot (by the fishers themselves or by pot manufacturers). Weighted ropes (plastic twine ropes with a metal interior) may not always be stripped, or the plastic melted off for scape metal and so could end up as fishing gear waste.

Most waste plastic fishing gear is not currently separated for recycling. An exception to the general lack of plastic fishing gear waste collection arrangements is pelagic trawl gear, which is already being collected and recycled. It represents a relatively large amount of a single material (nylon) which can be stripped from the ropes & floats making up the gear.

Pelagic gear is fished mid-water and so this end-of-life gear has fewer contaminants (sand & grit particles) compared to other net and rope waste from demersal gear that is regularly in contact with the seabed.

Figure 2-3 Poster campaign to encourage use of correct waste codes for fishing gear[15]

To date, national waste statistics have not been able to distinguish fishing and aquaculture waste, but this should be possible with the new codes if they are used correctly. Data from permitted waste collectors may not present the whole picture as BIM and some individual companies undertake their own collection, which should ultimately end up with licensed waste collectors.

Waste collection reporting, specific to fishing and aquaculture gear, is available from the following sources:

- Ad-hoc collation of port fishing gear waste collection (by CTC and BIM); and
- Survey of Fishing for Litter material[16]

The focus of this waste gear reporting to date has been based on samples to understand the types of gear appearing in waste collection systems, rather than estimating a total.

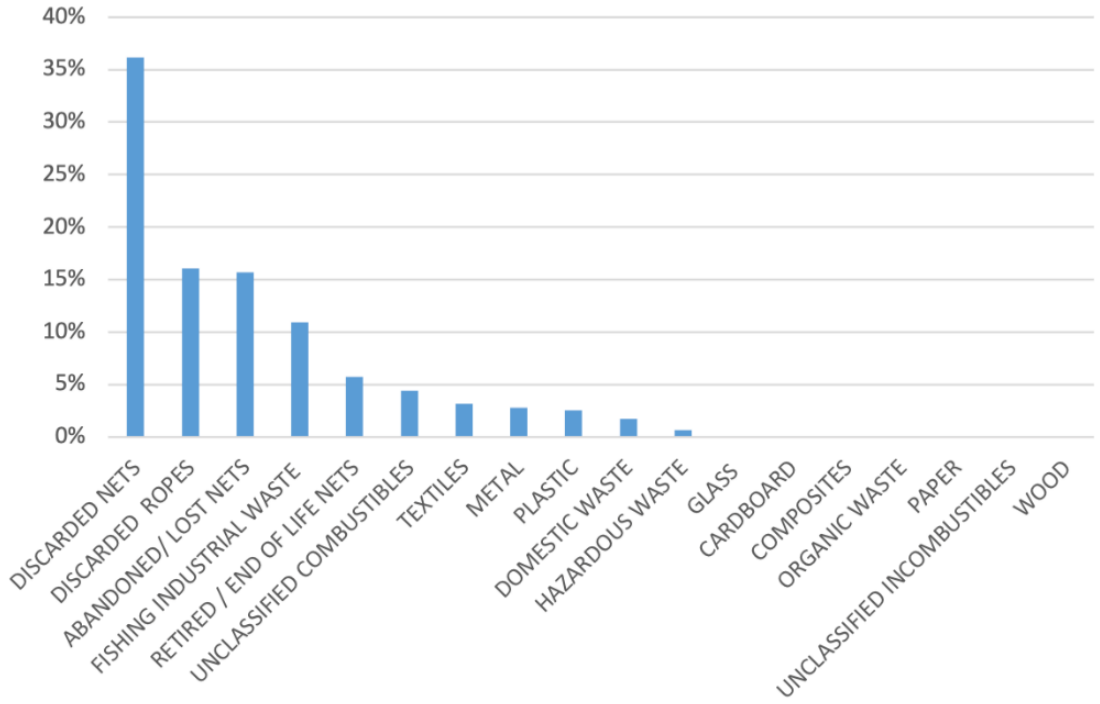
Fishing for Litter (FFL) is a well-established scheme run by BIM. It is in place in 12 fishing ports with 244 boats (over 95% of the trawl fleet) involved in retaining waste that has been collected in nets while trawling in bags provided by the scheme. This waste then goes into skips in ports. Over 409 tonnes of waste have been collected to date.[17]

[15] BIM (2023) *Don't skip the codes! Poster Campaign.*
[16] CTC (2020) *Waste Management Assessment in Irish Ports and 'Fishing for Litter' Characterisations Phase II.* Clean Technology Centre, Cork for BIM.
[17] BIM (n.d.) *Fishing for Litter*. Available at: https://bim.ie/fisheries/sustainability-and-certification/fishing-for-litter/

In a survey of FFL waste, almost 70% was found to be waste fishing gear, consisting of nets (53%), ropes (14%) and fishing-based clothing (2%).[18] A later survey in 2019 was based on a total of 190 tonnes FFL waste collected. From the waste characterisation surveys, the main constituent of the FFL stream is discarded nets (34%) followed by abandoned/lost nets (21.7%) and discarded ropes (15%). Industrial waste is 9% of the total and EoL gear accounted for 7%.[19]

With over 85 % of this being fishing-related containing plastic, at least 161.5 tonnes of fishing gear containing plastic was collected through Fishing for Litter. However, subsequent investigation found that while this may often include waste fishing gear from the vessels themselves, the waste also comes from multiple other vessels, including non-Irish vessels, and some will have been in the marine environment for years. For these various reasons it should be determined to what extent the FFL waste should contribute to estimates of the total amount fishing gear taken off the market. Additionally, when considering onward treatment, FFL waste is highly mixed and often contaminated with sediment and marine growth, making it very difficult to recycle.

Figure 2-4 Summary profile of Fishing for Litter waste[20]



A survey of 12 fishing ports found that all ports participate in the FFL programme but only 70% of these ports receive retired or EoL gear, with few actually having facilities in place for managing or disposing of it as a dedicated stream.[21]

A recent survey by CTC of waste collected from four fishing ports shows that more than 80% of the waste consisted of trawl nets with thick twine (52%) and ropes (21%) and monofilament nets (9%) (Table 2-4).

[18] CTC (2018) *Final report on Vessel Waste Characterisation and 'Fishing for Litter' Waste Assessment.* Clean Technology Centre, Cork for BIM.
[19] CTC (2020) *Waste Management Assessment in Irish Ports and 'Fishing for Litter' Characterisations Phase II.* Clean Technology Centre, Cork for BIM.
[20] Ibid.
[21] Ibid.

Table 2-4 Material types from skips in four fishery harbours in 2024[22]

Gear Category	Recovered weight (tons) 2024	% of all weight recovered in 2024
Combination ropes (plastic/steel)	0.00435	0.2
Combination ropes (plastic/steel)	0.004	0.2
Fine mesh net	0.009	0.3
Fishing nets (net panes thick)	1.430	51.6
Fishing nets (net panes thin)	0.086	3.1
Mixed fishing gear (nets & ropes)	0.044	1.6
Mixed nets/ropes	0.001	0.1
Monofilament Nylon line PA	0.003	0.1
Monofilament Nylon nets PA	0.248	8.9
PE ropes and Nylon line (some hooks/fish attached	0.015	0.6
Plastic floats	0.014	0.5
Polyethylene nets PE	0.015	0.5
Pots (crab and lobster)	0.168	6.1
Rigid and semi-rigid plastics (buoys, oyster bags)	0.032	1.1
Ropes	0.568	20.5
Ropes (PE & PP)	0.061	2.2
Twine	0.008	0.3
Waste components of fishing gear which are neither plastic or metal (rubber floats)	0.008	0.3
Waste metal components of fishing gear (cables, chains)	0.002	0.1
Waste metal components of fishing gear (cables, chains)	0.052	1.9
Total tons	**2.769**	

Key to understanding the cost-effectiveness of treatment is determining the costs associated with the dis-assembly for different fishing gears. Fishing trawls use a variety of plastics and other materials and are designed not to come apart in very tough working conditions at sea. To facilitate re-use and recycling these need to be separated to some extent and it is expected that the labour associated with this will be a significant cost.

The European end-of-life fishing gear (EOLFG) market is dominated by three companies, namely Nofir, Aquafil and Plastix.[23] Irish companies already send occasional consignments of material to these

[22] CTC (2020) *Waste Management Assessment in Irish Ports and 'Fishing for Litter' Characterisations Phase II.* Clean Technology Centre, Cork for BIM.
[23] Schneider (2020) *A Life Cycle Assessment (LCA) on the retrieval and waste management of derelict fishing gear. Falk Schneider. PhD thesis.* University of Bath.

companies on an individual company basis. MOWI Ireland (part of the Norwegian-owned MOWI group) has an arrangement to send its aquaculture net & tarpaulin waste to Nofir[24] Norway & Lithuania.

Some Irish gear producers and some waste collectors send consignments of nets (mainly nylon pelagic nets to date) to Nofir in Lithuania and Aquafil in Slovenia.[25] 150 metric tons of legacy gear was sent by SNG to Lithuania for recycling in 2022, and this summer another 80 metric tons will be sent. SNG have also had discussions with Plastix[26], Denmark, who state they can receive and recycle all types of plastic, including HDPE, but an arrangement is not yet in place.

2.4.2 Aquaculture Gear Taken off the Market

One Irish aquaculture gear producer supplying the rope mussel sector states that they did take back old floats for recycling, but it was not possible to control what happened to that material post collection.

An Irish company, IFF Plastics[27], has recently started recycling end-of-life oyster bags and fishing nets in addition to recycling farm plastics that is now well-established. Material is currently received via the BIM and port collection system, not yet direct from operators. They produce fence posts from recycled plastic and are now trialling an oyster post (an alternative production system to trestles) made from 30% recycled oyster bags (HDPE). A higher proportion is not currently feasible as the material has a lot of contaminants that reduce the structural integrity of the finished products. The project team understands from consultations that further investment in appropriate equipment is needed to improve the feasibility of the operation.

The CLAMS network conducts regular beach cleans in shellfish production areas. This provides a focus and disposal route for general beach waste, but also aquaculture gear waste (

Figure 2-5). BIM holds some data on the categorisation of the waste collected, showing a high proportion is from aquaculture operations (oyster) and general fishing waste. BIM data reports that 64 tonnes of marine litter and 42 tonnes of retired gear were collected from the 16 different clean up events associated with CLAMS in 2022.

Figure 2-5 Clean-up operations at aquaculture production through the CLAMS network.[28]

[24] Nofir (n.d.) *Homepage*. Available at: https://nofir.no/en/
[25] Aquafil (n.d.) *Homepage*. Available at: https://www.aquafil.com/
[26] Plastix (n.d.) *Homepage*. Available at: https://plastixglobal.com/
[27] IFF Plastics Limited (n.d.) *Homepage*. Available at: https://iff.ie/
[28] BIM (2019) *Co-ordinated Local Aquaculture Management Systems (CLAMS)*. Available at: https://bim.ie/aquaculture/advisory-services/co-ordinated-local-aquaculture-management-systems-clams/

2.4.3 Off the Market Summary

There is currently no systematic reporting of fishing and aquaculture gear waste collected. This could change with new waste codes introduced in 2023 enabling each to be distinguished in national waste collection statistics. However, the use of these codes by waste operators needs to be encouraged.

Fishing gear waste is collected in ports by licenced waste collectors and through BIM-led initiatives (Fishing for Litter and the Clean Oceans Initiative). There is also waste collection directly from gear producer companies, but taking back waste gear is a very limited practice and only for material such as nylon nets, where onward treatment (outside Ireland) has been identified.

Aquaculture waste is collected through direct arrangements made by major operators. The largest salmon producer in Ireland, MOWI Ireland, has a company-wide commitment to recycling its waste and already ensures 100% if its waste is collected by licenced operators and does not go to landfill. The CLAMS beach clean activities, which target shellfish production areas, provide an established system for waste collection associated with the shellfish production sector.

2.5 Implications for Fishing Gear EPR Scheme

2.5.1 Characteristics of the Fishing and Aquaculture Gear Market

The following main characteristics of Ireland's fishing and aquaculture gear markets should be considered in the development of an EPR scheme:

2.5.1.1 Market Structure

There is only a small number (<30) of Irish companies that manufacture, assemble and sell fishing and aquaculture gear. There is also a small number (<15) of non-Irish specialist gear companies selling into the Irish market.

At the same time there are various complexities to the market. There is a very large variety of gear types within each market segment. Multiple materials make up most gear components containing plastic, and these materials can change with product development (e.g. moving to HDPE, which is more difficult to recycle, but lasts longer).

Many users also buy direct from non-Irish companies including online purchases, and there is a major concern from Irish producers that any costs applied to them will make them less competitive – at a time when they are facing multiple financial pressures. Producers consulted urge a 'soft' and phased approach to implementation of the EPR scheme, which could still be possible within the SUPD timelines.

2.5.1.2 Legacy Gear

There is a substantial volume of end-of-life gear stored on land and in harbours/stores as it is cheaper to leave it somewhere than pay for its disposal. The amount of this legacy gear is much greater than the annual amount placed on market and could well result in a spike in volumes in the first years of any collection scheme established.

Funding the collection of legacy gear outside of the EPR scheme could encourage involvement by gear producers and the fishing industry. It may also enable collection systems and supply chains for onward treatment to be established.

2.5.1.3 Existing Recycling

Recycling some gear components, such as steel pot frames and nylon nets, can create revenue, and cost-effective onward treatment already exists for these. An EPR scheme should deal with all waste and the waste streams that create revenue could help to fund the waste that cannot be treated cost-effectively. It will, however, be difficult to ensure the 'valuable' waste is collected within the EPR system rather than being by-passed, which would make it more difficult to account for this waste and potentially to meet future collection targets.

Some companies are already taking responsibility for their waste and this needs to be taken into account within the national EPR scheme. Consultation with these companies could identify opportunities to build on these existing company activities and support others to take responsibility.

There is also a significant second-hand market for certain gear components. For example, crab pots are sold on by large-scale operators and recently many second-hand demersal trawls are on the market following vessel decommissioning. This should be recognised by the EPR scheme as it creates a risk of double-counting material that has already been placed on the market.

2.5.2 Additional EPR Considerations

2.5.2.1 Communication

There is a growing awareness, if not acceptance, amongst gear manufacturers of the inclusion of fishing gear in the SUP Directive and that an EPR scheme for fishing gear is to be established. However, engagement remains challenging as these stakeholders have not often been part of previous fisheries sector engagement and are not part of existing industry associations.[29] The broad definition of producers also means that chandlers and other importers of fishing and aquaculture gear (including the operators themselves) must be made aware of the SUP and PRF requirements and their implications for their operations.

Operators are likely to continue to avoid engagement and ignore survey requests for data unless there is clear communication to them on:

- the EPR scheme arrangements and their responsibilities under the scheme, implications for non-participation and assurance that all producers are included; and
- assurances that EPR schemes are being established in other Member States and their producers must also comply with SUP Directive requirements.

2.5.2.2 Avoid Free-Riders

Free-riders, i.e. those not participating in the EPR Scheme despite placing gear on the market, result in a less-effective scheme as their contribution is missed, the market may be distorted, and this causes resentment in those that are participating. The SUP Directive states that fishers '*should not be held responsible for fulfilling the obligations of the producer related to the extended producer responsibility*'.

While they may not be directly liable for EPR Scheme costs, fishers should be involved in the scheme. Without fisher involvement, there will not be the awareness regarding collection of gear and there is an increased risk that more will look to buy directly from non-EPR members.

[29] There are no Irish members of Eurocord listed, but some are suppliers to Irish gear producers: https://www.eurocord.com/memberslist

2.5.2.3 Incentivise Circularity

Accounting for plastic gear placed on the market and the improved collection of waste should address the SUP Directive objective of reducing marine litter. However, while treatment through incineration is likely for difficult to manage wastes, systems should be designed to be part of the circular economy. This can be achieved through incentivising retirement of gear, before it becomes waste that is more difficult to treat; and supporting the separation of gear into different materials at point of collection.

2.5.2.4 Reporting

Gears are provided in many grades and sizes, making it difficult to develop common conversion factors. The 2022 data for gear placed on the market is also still to be provided by many gear producers and this year's reporting may have to be estimated based on the fishing fleet and aquaculture production, as presented in this report.

The fishing and aquaculture gear markets show some overlap, but there are significant differences, which justify adopting different approaches to reporting:

- Fishing gear determined via a new annual survey of gear producers; and
- Aquaculture gear via the existing annual survey of aquaculture operators.

Verification of these survey results could be via further refinement to the methodology presented in this report.

Future waste collection reporting could come from national waste collection statistics if the new gear waste codes are effectively applied. The existing gear-specific waste collection activities through Fishing for Litter and CLAMS should also be captured and the waste should ultimately go to licenced waste collectors.

3. Identifying Potential EPR Models for Fishing Gear

The aim of task 2 was to identify and assess potential EPR models for fishing gear. This commenced with an understanding of the sector and market for fishing gear in Ireland, based on the findings of a detailed market analysis in Section 2 (task 1) of this study, and an evaluation of the applicable legislation and principles that should underpin the EPR scheme. This was followed by the identification and review of relevant existing schemes in other countries, including EPR schemes related to fishing gear that have been proposed and/or implemented by EU Member States as a result of the requirements laid out in the SUPD, as well as EPR schemes for other products in Ireland (such as farm plastics, end-of-life vehicles (ELVs), waste electrical and electronic equipment (WEEE), tobacco and tyres) and voluntary take-back or recycling schemes for fishing gear that are in operation around the globe that may have applicable elements relevant to the design of a potential EPR model in Ireland's context. Based on the findings from the preceding steps, a preliminary design for the scheme was developed, looking at key features such as producer and product coverage, cost coverage, targets, and roles and responsibilities of different actors. This preliminary design was additionally informed by feedback from key government stakeholders, including DECC, BIM, the Environmental Protection Agency (EPA) and CTC. Further feedback on the key design elements for the scheme was also gathered in a wider stakeholder workshop including representatives from the fishing gear sector and industry.

The outputs of this task and feedback from both government and industry stakeholders have fed into the identification of two broad options for the EPR scheme, which has been assessed using a cost-benefit-analysis model in task 3 (Section 4 of this report) before further recommendations for the scheme's design and implementation are provided in later stages of the study.

This section summarises the findings of task 2 as described above, and proceeds as follows:

- Section 3.1 provides a summary of the findings the preceding task to underpin the project team's understanding of the Irish fishing gear market.
- Section 3.2 contains a review of existing schemes.
- Section 3.3 provides a preliminary scheme design.
- Section 3.4 provides a summary of findings from the stakeholder engagement.
- Section 3.5 identifies options for modelling.

3.1 Understanding of the Irish Fishing Gear Market

Section 2 (task 1) provided an analysis of the market for fishing and aquaculture gear in Ireland, including estimates of the amounts and types of gear placed on the market, disposal routes for gear at the end-of-life, and the structure of the market. The following is a summary of the characteristics that were highlighted for consideration in the design of an Extended Producer Responsibility (EPR) scheme in this context:

- **Market structure –** there is a limited number of companies (both based in Ireland and outside Ireland) placing gear on the Irish market. However, there is a need for online sellers (i.e., those who are not based in Ireland and selling direct to users via online marketplaces, for example) to be included to ensure that other companies are not placed at a competitive disadvantage once EPR is implemented. In addition, there is a wide variety of gear, often made up of multiple materials, of which plastic may not be the majority – the scope of the scheme in terms of both producers and types of gear covered must therefore be designed with these considerations in mind.

- **Legacy gear –** This refers to the large volume of end-of-life gear that is currently stockpiled on land/ in harbour(s)/ stores as a cheaper alternative to proper disposal routes. The funding of the correct disposal of this gear is a key question for the EPR scheme – as they may present "low hanging fruit" in terms of tonnages available to meet collection targets in the early years of the scheme, but equally represent a waste stockpile that was generated prior to the scheme's implementation and associated costs should therefore not be retrospectively applied to the obligated producers.

- **Existing collection and recycling –** Some companies are already managing their gear at the end-of-life on a voluntary basis, and recycling schemes already exist for some of the more valuable gear components (such as nylon nets and steel pots). While the EPR scheme must incorporate these material streams, it should be designed to do so in a way that builds on existing activities rather than displacing them. The distinction between gear that is waste, and gear that requires preparation for reuse is also important, as there is a significant second-hand market for certain gear components, and this could cause double counting in the EPR system if not well designed.

- **Communication –** Engagement with stakeholders will be critical in the design and implementation of any EPR scheme for fishing and aquaculture gear – as highlighted by the points above. Whilst producers may be obligated under the new scheme, it will be important for all stakeholders in the sector to be aware of new requirements (e.g., chandlers, fishers, etc.) as they will need to support and engage with the scheme proactively to maximise effectiveness.

- **Risk of free riders –** This is a key risk that may undermine the effectiveness of the scheme and unfairly increase the cost burden on participating producers. This risk may arise if, for example, fishers are not incentivised to participate positively within the scheme (e.g., opting to buy gear from non-EPR companies if it is sold more cheaply, or not using the collection points provided).

- **Incentivising circular economy –** Whilst in the short term, the objective of the scheme is to improve collections of end-of-life fishing gear (and thereby reduce marine litter as per the SUPD), the scheme should be designed with longer term circular economy goals for the sector in mind. For example, treatment of gear through incineration, and some landfill of residual wastes will initially be necessary, but over time, through the use of targets and dynamic fee structures, the scheme should be leveraged to move fishing gear waste up the waste hierarchy and incentivise improved design to facilitate greater levels of recycling and reuse at end-of-life. Designing the EPR scheme to be adaptive and dynamic over time will help smooth this transition over time and minimise potential inefficiencies arising out of a need to redesign down the line.

- **Reporting -** Gears are provided in many grades and sizes making it difficult to develop common conversion factors. This potentially necessitates the use of a range of data collection tools and techniques, with robust verification approaches to ensure reliability. Reporting to the scheme is likely to present a significant short-term cost and administrative burden for producers, so identifying reporting requirements and data needed early on is important to ensure that producers do not have to change their systems multiple times down the line.

With this context in mind, a review of existing EPR schemes was undertaken to identify options for the design of an EPR scheme for fishing and aquaculture gear in Ireland, which were then further refined into a preliminary scheme design and modelling options as detailed in the sections that follow.

3.2 Review of Existing Schemes

3.2.1 Methodology and Approach

This section will give an overview of the methodology and approach taken for the review of existing schemes. This included a preliminary stage:

1. **Identification of range of relevant schemes for review** – compiling a long list including a wide range of schemes to ensure all potentially relevant elements to the design of an Extended Producer Responsibility (EPR) model for fishing gear in Ireland were included.

Once the longlist was developed, the review was completed in two stages:

2. **Strategic review** – high-level research on the specific elements of longlisted schemes, intended to identify a shortlist of five schemes for further research that hold the most relevance to Ireland's context.

3. **Deep dive** – extract further detail on the key features of the shortlisted five most relevant schemes that will enable the preliminary design of an EPR scheme for fishing gear in Ireland.

3.2.1.1 Identification of Relevant Schemes for Review

A preliminary step of the strategic review process consisted of identifying a longlist of schemes for desk-based review. The aim of this was to create a wide scope for the research to ensure that no potentially applicable elements to the design of an EPR model in Ireland were excluded from the initial review. This approach was taken because the implementation of EPR for fishing gear is a relatively new concept compared to EPR for other products like packaging or WEEE, meaning that there is relatively little understanding of how schemes should be designed for this particular sector and type of product, and limited evidence to review regarding the design and performance well-established fishing gear schemes. Therefore, the scope of the longlist was expanded to consider voluntary 'EPR-like' schemes for fishing gear, including take-back and recycling mechanisms, as well as EPR schemes for other products in Ireland. The following types of schemes were included in the review, with a full list of schemes reviewed available in Appendix A.4.1:

- EPR schemes for fishing gear that have been proposed and/or implemented by EU Member States either as a result of the requirements laid out in the SUPD, or prior to the SUPD requirements;
- EPR (or EPR-like) schemes that have been implemented globally;
- EPR schemes for other products in Ireland (such as farm plastics, end-of-life vehicles (ELVs), waste electrical and electronic equipment (WEEE), tobacco and tyres); and
- Voluntary take-back or recycling schemes for fishing gear that are in operation around the globe.

3.2.1.2 Strategic Review

The strategic review considered the evidence available on the design and performance of the schemes identified in the longlist above at a high level. A key element of the research at this stage was to determine whether the scheme in question met the basic principles of EPR (i.e., the polluter pays principle) and whether the country or jurisdiction in question had any legal provisions facilitating this and setting clear parameters for the scheme operation.

Fishing gear is a relatively novel policy area, meaning there are only a few countries with existing schemes. Norway, Iceland and Finland are amongst those with existing producer responsibility (or similar) schemes for fishing gear currently in operation, all of which pre-date the SUPD and therefore do not entirely match up with the requirements for schemes as set out in the Directive. A small number of EU Member States have developed detailed proposals for schemes that are due to be implemented by the end of 2024 to comply with the requirements of the SUPD, including Denmark and Sweden. A range of

other EU member states like Austria, Spain, France and Estonia have made legal provisions for the implementation of fishing gear EPR but have not yet operationalised these through implementing regulations or similar – the detailed design and operation of such schemes is therefore still to be determined. In others, there is evidence of ongoing work (scoping studies, or similar) to design an EPR scheme for fishing gear (e.g., Netherlands), or to update the existing scheme to be compliant with the SUPD (e.g., Norway), but detailed legislative proposals have not been identified in the review.

We delved into European schemes such as the Net Regeneration Scheme, Fishing for Litter and the Net Collect Programme. We also explored several schemes operating in South Korea and the United States, including Stop Ghost Fishing in South Korea, the voluntary buyback scheme implemented by the Government of Korea, and Net your Problem and Fishing for Energy, which both operate across America.

A review template was created in Microsoft Excel to compile high-level details of the schemes regarding scope, objectives, type of model, cost coverage, fee mechanism, reporting requirements, impact, consequences, exemptions and supplementary measures. A more detailed overview of the countries included in the strategic review as well as the list of the criteria reviewed can be found in Appendix A.4.0.

3.2.1.3 Deep Dive

Five schemes that were the most developed, with the greatest availability of information regarding specific design features, and which were likely to be of most relevance given our understanding of the fishing gear sector in Ireland were shortlisted for further assessment in the form of a deep dive. The following schemes were shortlisted:

1. **Norway** – highlights the nationwide collection scheme Nofir[30], the ongoing requirements for commercial fishers to report lost gear, and some limited evidence on proposals for a mandatory scheme.

2. **Iceland** – focusing on the voluntary return scheme operated by industry body Fisheries Iceland in place of an advanced disposal fee as a mechanism to avoid higher costs.

3. **Sweden** – provides insight into the EPR scheme currently being phased in which is due to be fully implemented by 2025. Its clear, straightforward design offers an opportunity for future alterations if needed.

4. **Ireland** – the farm plastics recycling scheme provides a successful case study from Ireland of an industry-led producer responsibility scheme that is well established.

5. **Denmark** – the proposed decree on EPR for fishing gear outlines clear criteria for the eco-modulation of fees.

Once the shortlist was identified, a more detailed review was conducted on each of these schemes with an aim to identify models, and specific design features, that are most suited to Ireland for the purpose of undergoing an options modelling process in the subsequent stages of the project.

A case study template was developed to capture detailed information about the country being reviewed. Information collected broadly fits into three subjects:

- Sector and scheme model information;
- Specific scope and design elements; and
- Implementation of the scheme.

[30] Nofir (n.d.) *Homepage*. Available at: https://nofir.no/en/

Information was collected about the sector as a whole to establish contextual information which could be used to draw upon the similarities or differences in Ireland's fishing sector and other country-specific characteristics. Information about the legal provisions for EPR was then reviewed such as the legal instrument used, scheme implementation date, and type of scheme (mandatory or voluntary, compliance through PRO or individually etc.). The scope of the scheme was also established (primarily products covered by the scheme and which producers were in scope).

Key design elements of each scheme were looked at in detail where there was sufficient availability of information. Examples of the type of elements considered include the nature of obligations on producers (and end users), cost coverage, fee mechanisms, eco-modulation of fees, and requirements for data reporting validation.

Finally, the deep dive aimed to collate information surrounding the implementation of the scheme in practice. While information in these areas tended to be severely limited, the review included components such as the collection and treatment infrastructure in place, scheme operation (from end-of-life to final treatment routes) and supplementary measures introduced to maximise the effectiveness (e.g., traceability and certification). It also extended to any emerging evidence of impacts on collection rates, recycling and compliance; potential unintended consequences of the scheme were also considered as part of this (e.g., freeriding and anticompetitive behaviour). Appendix A.5.0 provides the detailed findings from the deep dives and the individual case studies carried out for the five shortlisted schemes. A summary of findings from this review is presented below.

3.2.2 Summary of Findings

This section summarises the findings from the deep dive review in which we looked to deepen our understanding of the types of schemes and specific design features that have both been implemented, or are proposed to be implemented, in Norway, Iceland, Sweden and Denmark. In addition, to gain an understanding as to how schemes with a similar sectoral context have been designed within Ireland, we also delved into Ireland's collection and recycling scheme for farm plastic.

This section therefore explores:

- The headline findings (Section 3.2.2.1).
- The scope of products and producers covered by the relevant active and proposed schemes (Section 3.2.2.2).
- The obligations placed on producers and other key actors, and the costs which they are required to cover (Section 3.2.2.3).
- The roles and responsibilities of different actors, including how they contribute to the operation of the scheme (Section 3.2.2.4).
- Any data reporting and verification requirements (Section 3.2.2.5).

The detailed findings from the deep dive can be found in Appendix A.5.0.

3.2.2.1 Headline Findings

Our research found that very few EU Member States have implemented EPR schemes for the collection and treatment of fishing gear in response to the SUPD requirements. However, this is not to say that no progress is being made prior to the Commission's implementation deadline of 31 December 2024. Several countries, for example, Spain, France, Norway and Denmark, have made commitments to align with the requirements outlined in the SUPD and put in place an EPR scheme for fishing gear. The degree to which this commitment will translate into a functioning scheme before 2025 varies between countries. For example, in Spain and France, no information regarding how the scheme will operate and what obligations will be placed on producers is available, though legislative commitments to implement EPR by the deadline are in force. Article L541-10-1, paragraph 22 in France's Environmental Code, for

example, states that fishing gear containing plastic will be subject to EPR from 1 January 2025 and provides for the establishment of PROs and other common modalities for EPR through other articles in that subsection.[31]

However, Ireland is not the only country which is moving forward with developing a more detailed design for their EPR scheme for the collection and treatment of fishing gear – Denmark and Sweden are both examples where more detailed provisions are being made and, in some cases, have already been brought into force. Specifically, the Danish Government has proposed a decree on extended producer responsibility for fishing gear that contains plastic and enacted some provisions within this whilst others are still being consulted upon, and Sweden has implemented the 'Ordinance (2021:1001) on producer responsibility for fishing gear' in 2021. From 2023 this ordinance placed obligations on producers to register with a PRO and report annually on the fishing gear that they place on that market to the Swedish EPA. However, both these schemes are being implemented gradually, and complete data on their design and performance is not yet available.

Outside of the EU, in Iceland, a collection and recycling scheme for fishing gear is currently operated by Fisheries Iceland (SFS). The scheme was developed in response to the Icelandic Government implementing Article 8 Processing Charge Act No. 162/2002, which gave the government powers to introduce an advanced disposal fee on fishing gear. To avoid the introduction of an advanced disposal fee the predecessor of Fisheries Iceland, National Association of Icelandic Fishermen, entered into an agreement with the Recycling Fund in August 2005 for the processing of fishing gear waste made of synthetic materials. As long as the Icelandic Government is satisfied with the performance of the scheme operated by Fisheries Iceland, they have agreed not to enact powers to introduce an advance disposal fee. In the instance that the industry fails to achieve recycling targets in future, or to provide adequate coverage in terms of obligated producers or products, advance disposal fees could be applied to fishing gear in Iceland. Several fishing gear producers work with Fisheries Iceland to provide collection points for used fisheries gear to ensure collection rates meet the expectations of the Icelandic Government.

In Norway, though no legal instruments or provisions have been found in the research, the Norwegian Environment Agency has published a report titled 'Further development of producer responsibility in Norway' scoping out the possible transition from the current collection system spearheaded by Nofir to a mandatory EPR scheme.

Our research also found that a scheme with similar contextual factors to those in the fishing gear sector is currently operating in Ireland for the collection and treatment of farm plastics. In the review, we explored how this scheme operates and whether aspects of the scheme (particularly in relation to the mechanism for producer compliance and for involving farmers, i.e., final users of farm plastics) could be applied to the development of a scheme for fishing gear in Ireland.

3.2.2.2 Scope

This section summarises findings in relation to the scope of EPR schemes reviewed (i.e., producers obligated, and products covered by the scheme). The range of fishing gear currently collected by voluntary schemes, and which is proposed to be collected by EPR schemes, differs in the schemes reviewed. In the context of an EPR scheme, a 'producer' refers to any entity that places fishing gear containing plastic on the market, which may include manufacturers, importers, distributors, retailers, or wholesalers. This section therefore examines the types of products typically covered and highlights any variations in the categories of producers that are involved or obligated under the scheme.

[31] Légifrance (2024) *Article L541-10-1 – Environmental Code*. Available at: https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000043974960

Product Coverage

The SUPD requires that Member States *"shall ensure that extended producer responsibility schemes are established for fishing gear containing plastic placed on the market of the Member State, in accordance with Articles 8 and 8a of Directive 2008/98/EC"*. The SUPD defines fishing gear as:

> *"any item or piece of equipment that is used in fishing or aquaculture to target, capture or rear marine biological resources or that is floating on the sea surface, and is deployed with the objective of attracting and capturing or of rearing such marine biological resources".*

In addition, it defines plastic as:

> *"a material consisting of a polymer as defined in point 5 of Article 3 of Regulation (EC) No 1907/2006, to which additives or other substances may have been added, and which can function as a main structural component of final products, with the exception of natural polymers that have not been chemically modified".*

Our research found that across the EU Members States that either have implemented EPR schemes for fishing gear, or are proposing to introduce a EPR scheme for fishing gear, the scope of material tends to cover fishing gear that contains plastic and therefore aligns with the requirements of the SUPD.

In 2021 the **Swedish Government** introduced the 'Ordinance (2021:1001) on producer responsibility for fishing gear' which requires that fishing gear that contains plastic and is used in the fisheries and aquaculture sector to be subject to EPR.[32] The Ordinance notes that regardless of the amount of plastic the fishing gear contains, it should be covered by the EPR scheme. The regulation does however exclude waste consisting of fishing gear that contains electronic components and is therefore subject to EPR for WEEE or batteries, as well as gear that was lost at sea or littered and is subsequently collected within the framework of a project financed by public funds.

In **Norway**, 'The Norwegian Plastics Strategy' proposes to introduce a mandatory EPR scheme for fishing gear that is used in the commercial fishing and aquaculture sector and contains plastic.[33] This may however be extended to include fishing gear that contains plastic and is used for recreational fishing. Nofir, which currently operates a collection and recycling scheme for fishing gear from fishing and fish farming, collects and recycles the following materials:

- trawl nets;
- ring netting;
- gill nets;
- ropes;
- fish farming nets;
- tarpaulins;
- cleansing fish shelters; and
- sludge.[34]

[32] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/

[33] Norwegian Ministry of Climate and Environment (n.d.) *Norwegian Plastics Strategy*. Available at: https://www.regjeringen.no/contentassets/ccb7238072134e74a23c9eb3d2f4908a/en/pdf/norwegian-plastics-strategy.pdf

[34] Nofir (n.d). *Homepage*. Available at: https://nofir.no/en/

It should be noted that Nofir requires that any rockhoppers are removed from trawl nets before collection.

In **Denmark**, the Danish Government has proposed a decree which will introduce an EPR scheme for fishing gear that contains plastic.[35] The proposed decree divides fishing gear that contains plastic into two categories and places obligations on producers of both:

- commercial fishing gear, which was defined by the proposed decree as *"towed fishing gear that contains plastic, including trawls, seines, scrapers and seines"*; and
- other fishing gear, which was defined by the proposed decree as *"any item or piece of equipment used for fishing or aquaculture, to track, catch or farm marine biological resources, or which floats on the surface of the sea and is used for the purpose of attracting, catching or farming such marine biological resources"*.

Although we have not found evidence that **Iceland** has proposed changes to its EPR scheme for fishing gear, it does have in place a voluntary return system which is operated by Fisheries Iceland for the processing of fishing gear waste made of synthetic materials.[36]

Ireland does not currently offer a collection scheme for fishing gear; however, a similar scheme was introduced for the collection and treatment of farm plastic. In 2017, Ireland first introduced the Farm Plastic Regulation which requires suppliers of farm plastic products to collect, sort and process the products they place on the market.[37] This includes sheeting, netting, bale twine, bale wrap or bale bags composed mainly of polyolefins, including polyethylene, polypropylene or polyvinyl chloride.

Producer Coverage

The SUPD defines a producer as anyone that:

> "professionally manufactures, fills, sells or imports, irrespective of the selling technique used, including by means of distance contracts […] and places on the market of that Member State single-use plastic products, filled single-use plastic products or fishing gear containing plastic […]"; or
>
> *"any natural or legal person established in one Member State or in a third country that professionally sells in another Member State directly to private households or to users other than private households, by means of distance contracts […], single-use plastic products, filled single-use plastic products or fishing gear containing plastic […]"*

The definition of producer in EPR legislation for fishing gear implemented in **Sweden** and proposed in **Denmark** aligns with this definition.[38,39] The **Irish 'Waste Management (Farm Plastics) Regulations 2017'** also defines a producer as those who import or manufacture farm film plastics for supply to suppliers or end users in Ireland.[40]

Swedish EPR legislation for fishing gear expands on this further stating that producers who are not based in Sweden but sell gear in Sweden have the option to appoint an authorised representative to act on

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[35] Hoerings Portalen (n.d). *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285
[36] Fisheries Iceland (n.d). *Homepage*. Available at: https://csr.sfs.is/fishing-gear/
[37] Government of Ireland (2017) *Waste Management (Farm Plastics)(Amendment) Regulations 2017 (S.I. No.396/2017).* Available at: https://www.irishstatutebook.ie/eli/2017/si/396/made/en/print#:~:text=These%20Regulations%20amend%20the%20Waste,i.e.%20netting%20and%20bale%20twine
[38] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/
[39] Hoerings Portalen (n.d). *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285
[40] Government of Ireland (2017) *Waste Management (Farm Plastics)(Amendment) Regulations 2017 (S.I. No.396/2017).* Available at: https://www.irishstatutebook.ie/eli/2017/si/396/made/en/print#:~:text=These%20Regulations%20amend%20the%20Waste,i.e.%20netting%20and%20bale%20twine

their behalf. The **Norwegian Environment Agency** has not yet defined 'producer' in the context of the proposed EPR scheme, however as a member of the European Free Trade Association (EFTA), it must align with EU waste legislation and as such it is expected to also align with the definition outlined by the SUPD.

Through the SUPD Member States are required to exclude *"the fishermen themselves and artisanal makers of fishing gear containing plastic"* from EPR obligations. This has been partially translated into **Swedish** law and is proposed to be translated into **Danish** law. [41,42]

The Swedish Ordinance places EPR obligations on *"a person who, in a professional capacity:*

> *1. brings fishing gear into Sweden,*
>
> *2. manufactures fishing gear in Sweden, or*
>
> *3. from a country other than Sweden sells fishing gear to an end user in Sweden.*
> *'producer' shall not mean any person engaged in fishing activities as defined in Article 4. (28)of Regulation (EU) No 1380/2013 of the European Parliament"*[43]

The Ordinance does not appear to make any exemption for artisanal makers of fishing gear.

In **Denmark** the Order proposed uses the term manufacturer and producer interchangeably and defines a manufacturer as any natural or legal person who professionally manufacturers or imports fishing gear that contains plastic. There is an exemption for non-industrial manufacturers of fishing gear that contain plastic, and persons who engage in fishing as defined in Article 4, No. 28, of Regulation (EU) No. 1380/2013 of the European Parliament and of the Council.[44] The Order does not however outline a threshold for what could be considered as 'non-industrial' and therefore exempt from EPR obligations in Denmark.

It is currently unclear whether **Norway** will also exclude these groups from its EPR obligations. As Norway is not a Member of the EU it is not legally required to transpose and implement the requirements outlined in the SUPD.

In **Norway** and **Iceland** fishing gear recycling schemes have been implemented by private organisations. In Norway, the scheme run by Nofir does not place any obligations on producers, however key actors include the fishers, participating port operators and the scheme operator. In Iceland, producers of fishing gear participate in the scheme run by Fisheries Iceland by providing no-cost disposal centres for the recovery of used fishing gear. More information regarding the roles and responsibilities of each of these key actors can be found in Section 3.2.2.4.

3.2.2.3 Obligations and Cost Coverage

The SUPD requires that producers obligated under EPR for fishing gear cover the costs of separate collection, and subsequent transport and treatment of gear, as well as awareness raising activities to inform consumers and to incentivise responsible consumer behaviour. Accordingly, in **Sweden** the 'Ordinance (2021:1001) on producer responsibility for fishing gear' requires that these costs are covered by producers (defined in Sweden as companies that professionally produce, import, or sell fishing gear that contains plastic).[45] **Norway** is proposing to introduce policy which similarly requires producers to

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[41] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/

[42] Hoerings Portalen (n.d.) *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285

[43] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/

[44] Hoerings Portalen (n.d.) *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285

[45] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/

cover the cost of separate collection, transport, treatment and raising awareness for fishing gear containing plastic.[46]

In **Denmark**, the proposed decree states that manufacturers of commercial fishing gear or 'other fishing gear' after 31 December 2024 must, at their own expense, arrange for the take-back of a fixed allocation of fishing gear 'when they are used up' and ensure that these are handled separately in accordance with the regulations - allocations are proportionate to the amount a producer places on the market. Producers can arrange for the take-back of the allocated fishing gear either through a collective scheme or by establishing a take-back scheme individually, and must also cover the costs of existing collections at ports run by municipalities.[47] More information on the role and responsibilities of producers can be found in Section 3.2.2.4. At this stage it is not clear whether subsequent sorting will be required or where and how the waste will be treated.

Producers in Denmark, therefore, do not pay the Danish Producer Responsibility (an organisation responsible for the administration of EPR schemes)[48] for the collection and treatment of the fishing gear that they have placed on the market. Producers are, however, required to register on the producer register, and pay annual administration costs to Danish Producer Responsibility. These additional costs to be covered are explained in more detail below.

- **Cost of registering on the producer register:** This requires the producer to pay a one-time fee of DKK 1,000 (equivalent to €134) to the Danish Producer Responsibility organisation. If the producer is already registered with the system within another EPR scheme in Denmark (e.g., for WEEE or batteries), then the cost of the one-time payment reduces to DKK 500 (equivalent to €67).

- **Annual administration costs:** For administration of the allocation scheme for end-of-life commercial fishing gear, producers pay an annual fee to Danish Producer Responsibility. The fee is calculated in relation to the amount of commercial fishing gear that was marketed in the previous calendar year. The fees must correspond to the actual cost of administrative tasks incurred by Danish Producer Responsibility in operating the allocation scheme.

In addition, manufacturers will be responsible for providing information to end users. The decree states that end users of fishing gear containing plastic are informed about the following in sales and information material, including in instructions for use or at the point of sale[49]:

> *"End-of-life fishing gear that contains plastic must be collected separately.*
>
> *Where and how the end user can dispose of his used fishing gear, including information on established take-back and collection schemes.*
>
> *The potential effects on the environment, including the marine environment, by discarding used fishing gear containing plastic in nature or by failing to use established take-back and collection schemes."*

Collective schemes must collect contributions from members of the scheme to cover costs of collection of commercial and other fishing gear and waste treatment of collected gear and information material for end users.

The Danish decree further proposes that the products in scope are divided into three groups dependent on whether they meet four criteria for eco modulation of fees – durability, reusability, repairability and recyclability.

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[46] Norwegian Environment Agency (n.d.) *Further development of producer responsibility in Norway.* Available at: https://www.miljodirektoratet.no/sharepoint/downloaditem/?id=01FM3LD2SZGGWDWVNUHVDKGVGJV7LHTYV4

[47] Hoerings Portalen (n.d.) *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285

[48] Danish Producer Responsibility (n.d.) *About us.* Available at: https://producentansvar.dk/en/about-us/

[49] Hoerings Portalen (n.d). *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285

The criteria for commercial fishing gear and other fishing gear vary slightly.[50] More information on the criteria for commercial fishing gear and other fishing gear can be found in Appendix A.5.5. The decree proposes to recommend that the collective schemes introduce eco-modulation whereby producers with products in group 3 pay an extra cost of 20% of the operational costs for waste management of their products in group 3. This is paid to the collective scheme to cover waste management costs for products in group 1.[51] The three proposed eco-modulation groupings can be found in Table 3-1.

Table 3-1 Proposed Eco-modulation Groupings in Denmark

Group	Description
Group 1	Meets all criteria above (good eco-design)
Group 2	Meets three of the criteria
Group 3	Meets two or fewer of the criteria

In **Sweden** and **Norway** some form of eco-modulation is expected to be implemented, however details regarding the fees are not yet available or accessible. In Sweden it is proposed that the PRO sets the producer contribution based on the weight of fishing gear placed on the market by the producer, and the reusability and material recyclability of the fishing gear. In Norway a report by the Norwegian Environment Agency proposes that *"the scheme gives the manufacturer incentives to reduce this cost by making products that are more durable and easy to reuse and recycle".*[52]

In addition, **Ireland** operates a collection and recycling service for farm plastic, wherein producers and farmers together cover the costs of collection, sorting, processing, further transportation and awareness raising measures - 70% of these operational costs are covered by the producer contributions, and 30% of the costs are covered by a collection fee charged to farmers at bring centres and farmyard collections.[53]

- **Operational costs:** The Producer Recycling Contribution is paid by members of the Irish Farm Film Producers' Group (IFFPG), who collect farm film plastics as part of the national compliance scheme for the Farm Plastics Regulation, at a rate of €286 per tonne for farm plastics placed on the market, as of 23 January 2023. For a standard roll of wrap, the contribution increased from €4.16 to €6.24 per roll (excl. VAT) in 2023.

- **Collection fee:** The collection fee charge to the consumer varies depending on the materials. For example, the collection of netting and twine typically costs €5 per half-tonne bag. Furthermore, a label code is issued to farmers at the time of purchase of wrap and sheeting which confirms that the producer recycling contribution was applied to the product. Farmers who present a valid label code at the time of collection can avail of lower charges. For example, a farmer that takes farm plastic to a dedicated bring centre without a label code could pay €190 per tonne, but if they are able to provide a label code then this is reduced to €70.

The scheme currently operated by Nofir in **Norway** does not place any obligation on producers (and is therefore not considered an EPR scheme). Instead, the scheme is funded through revenues from recycled material sales and EU funding (under the EUfir programme). In Iceland, where a waste gear processing scheme is managed on behalf of fishing gear producers by Fisheries Iceland, the cost for the scheme offered by Fisheries Iceland is covered from a combination of:

[50] Hoerings Portalen (n.d). *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285
[51] Hoerings Portalen (n.d.) *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285
[52] Norwegian Environment Agency (n.d.) *Further development of producer responsibility in Norway*. Available at: https://www.miljodirektoratet.no/sharepoint/downloaditem/?id=01FM3LD2SZGGWDWVNUHVDKGVGJV7LHTYV4
[53] Irish Farm Film Producers' Group (2023) *Operational Report 2022.* Available at: https://farmplastics.ie/wp-content/uploads/2023/08/IFFPG-OperationalReport2022-May23-v4.pdf

1) the recycling revenue;
2) from transport charges to fishing vessels; and
3) the several producers who operate reception centres at their facilities to facilitate take back.[54,55,56]

More information on the Nofir scheme can be found in Appendix A.5.1 and more information on the Fisheries Iceland scheme can be found in Appendix A.5.2.

To monitor progress, some countries have introduced collection targets that the scheme will be obligated to meet. For example, in **Sweden** there is a 20% minimum collection target for the total weight of fishing gear placed on the market by 2027, which PROs will be 'effectively contributing to' from 2025.[57] In addition, the Netherlands has proposed a phased increase in the collection targets for fishing gear (though it is not clear whether this has been implemented). In a letter to the House of Representatives of the States General, the State Secretary of Infrastructure and Water introduced a fishing gear collection target of 23% in 2022, which could be adjusted by at least 3% every year. The State Secretary of Infrastructure and Water proposed that after the first monitoring year the collection target of 23% may be increased to 33% and the annual increase by be increased by a further 3% (i.e., to 6%).[58] This means that the collection target could potentially reach a maximum of 63% in 2027. However, it's currently unclear what the current and further collection targets are, and whether these are being achieved.

Norway legally requires commercial fishers to report any lost or found fishing gear to the Directorate of Fisheries (this also applies to parts of equipment, such as trawl ropes). Although recreational fishers are not legally required to report any lost fishing gear, they are encouraged to also report any lost gear to the Directorate of Fisheries. The scheme enables the Directorate of Fisheries to record and monitor the quantities of lost commercial and recreational fishing gear and target clean up and retrieval activities at hotspot areas. Producers are not required to contribute towards the scheme. Instead, according to a report by the Nordic Council of Ministers the fishing industry contributes more than 50% of the funding to national annual clean-up, through a fee.[59]

3.2.2.4 Roles and Responsibilities

Denmark and **Sweden** are the only two countries explored as part of the deep-dive research phase which provide details as to how an EPR scheme for fishing gear is proposed to operate. They each propose different approaches to operating a scheme, which is explored further in this section.

Denmark proposes that producers will be assigned a port whereby they must collect all end-of-life commercial fishing gear that is handed over to the producer by the port. Appendix 2 of the Decree outlines 16 ports which are included in Danish Producer Responsibility's allocation to manufacturers of commercial fishing gear.[60] The Danish Producer Responsibility proposes to allocate ports based on producer reporting on the ports at which they have registered business activity. The Danish Producer Responsibility has the power to require producers to collect end-of-life fishing gear from other ports listed in the Appendix of the Decree other than where the producers have their business activities.

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[54] European Commission (n.d.) *A European system for collecting and recycling discarded equipment from the fishing and fish farming industry.* Available at: https://cordis.europa.eu/project/id/304305/en
[55] Rijkswaterstaat WVL/BN REM (2021) *How to come to a more circular (management) system of fishing gear in the OSPAR-region.* Available at: https://www.noordzeeloket.nl/publish/pages/189036/report-how-to-come-to-a-more-circular-management-system-of-fishing-gear-in-the-ospar-region_.pdf
[56] Fisheries Iceland (n.d.*) Fishing gear recycling.* Available at: https://samfelag.sfs.is/endurvinnsla-veidarfaera/
[57] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/
[58] State Secretary for Infrastructure and Water Management (2020) *Government letter :Implementation of single-use plastics directive*. Available at: https://www.tweedekamer.nl/kamerstukken/brieven_regering/detail?id=2020Z23096&did=2020D48772
[59] Rijkswaterstaat WVL/BN REM (2021) *How to come to a more circular (management) system of fishing gear in the OSPAR-region.* https://www.noordzeeloket.nl/publish/pages/189036/report-how-to-come-to-a-more-circular-management-system-of-fishing-gear-in-the-ospar-region_.pdf
[60] Hoerings Portalen (n.d.) *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285

A take-back scheme for commercial fishing gear and 'other fishing gear' that the producer has placed on the market can also be carried out in one of two ways:

1. They collect the end-of-life commercial fishing gear and/or 'other fishing gear' from the end user.

2. The end users return the used commercial fishing gear and/or 'other fishing gear' to the producer or to a place or area designated by the producer.[61]

In **Sweden**, on the other hand, producers pay the relevant fees to the PRO with which they are registered. A PRO for fishing gear must then collect waste fishing gear intended for professional use in easily accessible locations, and free of charge to the end users in question. PROs must also work together with municipalities that currently provide fishing gear collection and transport services to provide these services and pay fees to municipalities to cover the necessary costs of doing so. The PRO sets the producers' fee contribution based on the weight of fishing gear placed on the market by the producer, and the reusability and material recyclability of the fishing gear.

Similar to **Sweden**, in **Ireland**, the Irish Farm Film Producers Group (IFFPG) is responsible for the collection, sorting and forwarding of the material. As discussed in Section 3.2.2.3, 70% of the operational costs are covered by the producer contributions, and 30% of the costs are covered by a collection fee charged to farmers at bring centres and farmyard collections. There are 235 bring centres operated twice annually, the IFFPG claims that most farms should be within approximately 6 miles of a bring centre.[62] Farmyard collections can also be organised at a separate cost to the farmers. The IFFPG asks that materials are presented separately.

Nofir and Fisheries Iceland both require that the fishing gear is prepared for recycling. For example, Nofir asks that any rockhoppers are removed from trawl nets and Fisheries Iceland require gear to be dry, sorted by type and free of all foreign items (such as sand and marine vegetation) and fishing gear accessories (such as floats, rubber and wires).[63,64]

Once any rockhoppers have been removed from trawl nets, fishers can dispose of their fishing gear at regional collection facilities established in Norway. Information on the number of collection facilities currently operational across Norway is not available. In addition, fishers or ports can also request collections of gear via the Nofir website once they have amassed a certain quantity.[65]

In **Iceland**, once prepared, the material is transported to a collection centre in **Iceland** with the transport cost paid for by the vessel owner. The cost to vessel owners varies based on transport distance required. Alternatively, for small vessel owners using major harbours some collection containers are provided where material can be deposited free of charge. A range of manufacturers offer reception facilities for obsolete gear for their consumers. Around 14 collection centres have opened across Iceland that receive all fishing gear waste free of charge, if they meet the reception conditions. These collection centres are operated by a range of fishing gear producers, including Hampidjan, Ísfell, Egersund Iceland, The Skinney-Þinganes Fishing Gear Division, G.Run's net workshop and Veiðarfæraþjónustan ehf Grindavík.[66] The terms for reception are as follows:

- *"Fishing gear containing plastic refers to the fishing gear specified in Annex XVII to Act No. 162/2002 as amended.*

    - *Fishing gear waste shall be dry and sorted according to material type.*

[61] Hoerings Portalen (n.d.*) Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: Høringsdetaljer - Høringsportalen (hoeringsportalen.dk)
[62] Irish Farm Film Producers' Group (n.d.) *Frequently Asked Questions.* Available at: https://farmplastics.ie/faq/
[63] Nofir (n.d.) *Homepage*. Available at: https://nofir.no/en/
[64] Fisheries Iceland (n.d.) *Waste fishing gear*. Available at: https://csr.sfs.is/fishing-gear/
[65] Rijkswaterstaat WVL/BN REM (2021) *How to come to a more circular (management) system of fishing gear in the OSPAR-region.* Available at: https://www.noordzeeloket.nl/publish/pages/189036/report-how-to-come-to-a-more-circular-management-system-of-fishing-gear-in-the-ospar-region_.pdf
[66] Fisheries Iceland (n.d.) *Fishing gear recycling.* Available at: https://samfelag.sfs.is/endurvinnsla-veidarfaera/

- *Fishing gear waste shall be free of all foreign objects, contaminants and impurities, such as sand, oil, fish and marine vegetation.*
- *Fishing gear waste must be free of all accessories, such as floats, lead, rubber, chains and wires.*

- *Recyclable fishing gear waste is accepted on weekdays during the opening hours of the reception centres.*
- *Reception must be ordered at least 24 hours in advance if more than one tonne is to be delivered, but otherwise at least 4 hours in advance. When ordering, the estimated quantity and the type of fishing gear waste must be specified.*
- *Upon receipt, the representative of the receiving station and the waste holder shall complete a receipt report containing information on the quantity, origin and type of fishing gear waste. If the waste holder receives a copy of it, he/she requests it.*
- *If the fishing gear waste does not meet the conditions of item 1, the receiving centre may demand payment from the holder of the waste to cover the cost of necessary treatment to make the waste reusable or its disposal.*
- *Provided that the conditions of items 1-5 above are met, foreign parties or their agents may return fishing gear waste from foreign vessels to a reception centre against payment directly to the contractor."*[67]

Most of the waste collected is transported mainly to Lithuania and Denmark to be processed.[68] Some is also sent for further sorting to Nofir. There is an open market for recycling companies to compete for the material. However, at the moment the Danish firm Plastix receives most of the material exported.[69,70] This is then recycled, or transported onwards to other reprocessors for recycling. The cost of shipping from Iceland to Denmark (~95€/t) is paid by the receiving recycler and no gate fee is charged.[71]

As discussed in Section 3.2.2.3, **Norway** legally requires commercial fisheries to report any lost fishing gear. The documented losses serve as the foundation for the Directorate of Fisheries to identify priority areas during the yearly cleanup efforts along the Norwegian coast.[72] According to a report by the Nordic Council of Ministers cleaning operations focus on cages and hooks because of the risk of ghost fishing, but other types of fishing gear, such as nets and fishing line, are retrieved as well.[73]

3.2.2.5 Data Reporting and Verification

The SUPD states that *"Member States should monitor and assess, in line with the reporting obligations laid down in this Directive, fishing gear containing plastic".* Member States are therefore required to report to the Commission data on fishing gear containing plastic placed on the market and on waste fishing gear collected in the Member State each year.

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[67] Fisheries Iceland (n.d.) *Fishing gear recycling.* Available at: https://samfelag.sfs.is/endurvinnsla-veidarfaera/
[68] Fisheries Iceland (n.d.) *Waste fishing gear.* Available at: https://csr.sfs.is/fishing-gear/
[69] The Danish Plastics Federation (n.d.) *Plastix A/S.* Available at: https://plast.dk/en/members/plastix-as/
[70] Personal Communication with Gudlaugur Sverrisson, Operational Manager, Icelandic Recycling Fund (2019) via Publications Office of the European Union (2022) *Study to support preparation of the Commission's guidance for extended producer responsibility scheme.* Available at: https://op.europa.eu/en/publication-detail/-/publication/ecb86ea2-932e-11ea-aac4-01aa75ed71a1/language-en
[71] Personal Communication with Gudlaugur Sverrisson, Operational Manager, Icelandic Recycling Fund (2019) via Publications Office of the European Union (2022). *Study to support preparation of the Commission's guidance for extended producer responsibility scheme*. Available at: https://op.europa.eu/en/publication-detail/-/publication/ecb86ea2-932e-11ea-aac4-01aa75ed71a1/language-en
[72] Directorate of Fisheries (n.d.) *Marine Litter.* Available at: https://www.fiskeridir.no/English/Coastal-management/Marine-litter
[73] Nordic Council of Ministers (2022) *Quantification and environmental pollution aspects of lost fishing gear in the Nordic countries.* Available at: https://www.diva-portal.org/smash/get/diva2:1729769/FULLTEXT01.pdf

Accordingly, Commission Implementing Decision (EU) 2021/958 lays out further details on the format for reporting data and information on fishing gear placed on the market and waste fishing gear collected in Member States, specifying that the reporting must be carried out in units of weight (tonnage) rather than number of items or volume, though conversion factors (e.g. from volume to mass) may be used as part of the methodology to ascertain these data. Data on the total weight of fishing gear containing plastic, as well as the quantity of plastic contained therein must be provided, with further breakdown by the type of gear on a voluntary basis.

Data must initially be reported for the reference year 2022 by June 2024 (prior to the implementation of EPR), based on a collection target set at the Member State level.

In order to enable member states to report these data to the Commission, our research has found that as part of the EPR scheme requirements, reporting requirements can be placed on producers, scheme operators, municipalities, port reception facilities (PRFs) and in some cases the consumer (in the context of this report, this includes fishers). A summary of the type of reporting requirements that can be placed on each of these actors is explored further in this section. It is noted that the available information on this topic is patchy at present, reflecting the fact that 2024 is the first reporting deadline (for data collected in 2022) and as such member states are still in the process of finalising systems and requirements for data reporting in the EPR schemes that have yet to be implemented.

Producer Reporting Requirements

Producers tend to be required to report the quantity and/or types of fishing gear containing plastic placed on the market, although it can vary as to whether the producer reports to the PRO in charge of the scheme or directly to a governmental body.

In **Sweden** there have been obligations on producers since 2023. These have included requirements to register and report the following to the Swedish EPA, via the EPA's e-service, annually:

- The full weight of fishing gear placed on the market during the preceding calendar year consisting solely of plastics; and
- The full weight of fishing gear placed on the market during preceding calendar year consisting of plastic and other materials during preceding calendar year. [74]

At present, there are 52 producers listed in the Swedish EPA register.[75] Data reporting is done directly to the Swedish EPA by the producers but there is no information available on the data verification process before it is reported to the Commission.

In **Denmark** producers who market commercial fishing gear must report information to Danish Producer Responsibility on the quantity of commercial fishing gear that the producer places on the market. Producers must report quantities in kg and separately for 1) commercial fishing gear; and 2) other fishing gear.[76] They must also report on the:

> "quantities of end-of-life fishing gear containing plastic that the producer has taken back and separately treated as waste in the previous year"; and
>
> "amounts of recovered end-of-life commercial fishing gear that has been recycled in the previous year to Danish Producer Responsibility".[77]

At least once a year producers and collective schemes must carry out self-inspections to ensure the following:

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[74] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/

[75] Swedish Environmental Protection Agency (2024) *Existing producers in the Swedish EPA register.* Available at: https://www.naturvardsverket.se/en/services-and-permits/e-services/e-services-for-producer-responsibility/

[76] Hoerings Portalen (n.d.) *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285

[77] Hoerings Portalen (n.d.) *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285

Table 3-2 Self inspections for producers and collective schemes in Denmark

Producers	Collective schemes
1. *"that they finance the take-back and handling of end-of-life commercial fishing gear and other fishing gear in accordance with the requirements";*	1. *"that the collected contributions from the members of the collective scheme cover the financing of the collected quantities that the collective scheme must handle, and the obligation to provide information to end users";*
2. *"that they finance the obligation to provide information to the end users of commercial fishing gear and others fishing gear in accordance with the requirements of section 38";*	2. *"that the collected contributions from the collective scheme's producers are graduated in accordance with Annex 4";*
3. *"that the quality of the collected and reported data on marketed commercial fishing gear and other fishing gear and collected and processed end-of-life commercial fishing gear and other fishing gear complies with the requirements"; and*	3. *"that the quality of the data that the collective scheme collects and reports on behalf of the producers, complies with the requirements"; and*
4. *"that they comply with the requirements of the European Parliament and Council Regulation No. 1013/2006/EC of 14 June 2006 on the transfer of waste with later amendments".*	4. *"that the quality of the data that the collective scheme receives from producers and passes on to Danish Produce Responsibility on marketed quantities complies with the requirements".*

The Order proposes that producers and collective schemes must document the process of self-inspecting the quality of data reported and its compliance with the requirements (point 3 listed above) and make these available to the Danish Environmental Protection Agency on request.

Norway proposes similar reporting requirements. According to a report by the Norwegian EPA it's expected that the following information will need to be collected in some form:

- the number and/or weight of fishing gear containing plastic placed on the market; and
- the relative share of fishing gear containing plastic collected.[78]

The Norwegian EPA recommends that further consideration is given as to whether the use of a third party for verification is appropriate. In the return scheme for WEEE, for example, there is a requirement that the return companies' annual report and calculation methods must undergo the auditor's check.[79]

[78] Norwegian Environment Agency (n.d.) *Further development of producer responsibility in Norway*. Available at: https://www.miljodirektoratet.no/sharepoint/downloaditem/?id=01FM3LD2SZGGWDWVNUHVDKGVGJV7LHTYV4
[79] Norwegian Environment Agency (n.d.) *Further development of producer responsibility in Norway*. Available at: https://www.miljodirektoratet.no/sharepoint/downloaditem/?id=01FM3LD2SZGGWDWVNUHVDKGVGJV7LHTYV4

In **Ireland**, the Farm Plastics EPR requires Irish Farm Film Producers' Group (IFFPG) members to complete monthly and annual return forms to comply with the regulation. This includes reporting on the volume by weight of production, sales, purchases and exports of specified farm plastics products.

Producer Responsibility Organisation (PRO) Reporting Requirements

In addition to the producer reporting requirement, in **Denmark** starting on 31 March 2025, the Danish Producer Responsibility must report the following to the Danish EPA every year:

- Total amount of commercial fishing gear and other fishing gear that producers have marketed in previous calendar year.
- Total quantity of end-of-life commercial and other fishing gear that producers have taken back and handled separately.
- Achieved share of recycling of recovered end-of-life commercial fishing gear.

It's unclear whether Sweden and Norway will implement similar requirements.

Municipality Reporting on Collection Tonnages/ Costs

In **Sweden** municipalities are also required to report on the costs associated with collections and removal of waste from fishing gear, as well as the weight, in kilograms, of the waste consisting of fishing gear transported and collected separately by the municipality during the preceding calendar year.[80]

Norway proposes to implement similar reporting requirements. However, it is currently unclear as to whether collections will be undertaken by municipalities or port reception facilities (PRFs), and hence who will be responsible for reporting this information.[81]

Reporting Lost Fishing Gear

Currently in **Norway**, it is obligatory for commercial fishers to report any lost fishing gear either to the Directorate of Fisheries or the coast guard via the web-based tool FishInfo (FiskInfo).[82] As discussed above, the Directorate of Fisheries in Norway use this information to target cleanup efforts along the Norwegian coast.[83]

3.3 Preliminary Scheme Design

Based on the above findings, a set of key considerations in the design of an Extended Producer Responsibility (EPR) scheme for fishing gear in Ireland were compiled, and discussed in a workshop with government stakeholders, including DECC, BIM, EPA and CTC on 1 May 2024. Based on DECC's feedback, the principles and objectives underpinning the scheme were agreed, and a preliminary scheme design was developed, as described below.

3.3.1 Objectives

The Single-Use Plastics Directive (SUPD) requires EPR for fishing and aquaculture gear containing plastic placed on the market to be in place in member states by 31 December 2024, and that schemes must meet the minimum requirements for EPR established in Article 8a of the Waste Framework Directive (WFD).

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[80] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/

[81] Norwegian Environment Agency (n.d.*) Further development of producer responsibility in Norway*. Available at: https://www.miljodirektoratet.no/sharepoint/downloaditem/?id=01FM3LD2SZGGWDWVNUHVDKGVGJV7LHTYV4

[82] Directorate of Fisheries (n.d.) *Reporting lost gear for commercial fishermen*. Available at: https://www.fiskeridir.no/Areal-og-miljo/Marin-forsoepling/meld-fra-om-tapt-redskap/Meld-fra-om-tapt-redskap-yrkesfiske

[83] Directorate of Fisheries (n.d.) *Marine Litter*. Available at: https://www.fiskeridir.no/English/Coastal-management/Marine-litter

The scheme should be designed to cover the costs associated with the separate collection of such gear in adequate PRFs (or similar facilities), as well as the subsequent transport and treatment of such gear and awareness raising activities for stakeholders involved. The SUPD is clear that the costs of the scheme should be borne by producers of gear (i.e., those placing gear on the Irish market) and that fishermen themselves and artisanal makers of fishing gear containing plastic should not be considered as producers and should not be held responsible for fulfilling the obligations of the producer related to the extended producer responsibility". This suggests that fishers acting in the capacity of gear users/ consumers are excluded from producer obligations, but those acting in the capacity of producers (i.e., placing gear on the Irish market) should be included.

While targets are not specified in the SUPD, it does require Member States to determine annual collection targets for themselves, and for collection performance to be reported to the Commission from the year 2022 onwards (with the deadline for reporting set 18 months after the calendar year in question). In the longer term, the Commission may define EU-wide collection targets based on Member State level reporting in these early years as part of SUPD revisions due in 2027. Recycling targets are also not currently specified, though the SUPD does state that "the Commission shall request the European standardisation organisations to develop harmonised standards relating to the circular design of fishing gear to encourage preparing for re-use and facilitate recyclability at end-of-life" suggesting that design for recycling criteria, and recycling targets, may be feasible in the longer term.

In terms of objectives for the Irish scheme in particular, the Request for Tender (RfT) noted the following objectives for the EPR scheme for fishing and aquaculture gear containing plastic in Ireland:

- to ensure cost-effective end-of-life collection and environmentally sound treatment of collected waste products, and

- to establish an effective waste fishing gear reporting system and processes – this must additionally be in accordance with the requirements of EU Implementing Decision 2021/958.

The above aligns closely with the requirements of member states under the SUPD. In terms of the first objective, it is worth considering what is meant by the term "cost-effective" in this context. This suggests the need for a system of collection (and end-of-life treatment) which represents the lowest feasible costs incurred for a given level of service quality and performance. In a scheme in which such costs are covered by producers, this aligns with the 'necessary costs principle' enshrined in Article 8a(4)(c) of the revised Waste Framework Directive (WFD). This holds true also for the second objective, which aims for "effective" reporting system and processes – i.e., one that delivers the information necessary to regulate the scheme, and enables the requisite reporting to the EU Commission, but without placing undue administrative burden on producers. This is discussed further in Section 3.3.2.2 below.

It is also worth considering what constitutes "environmentally sound treatment" in the context of end-of-life fishing gear, bearing in mind the current availability of collection, sorting and recycling infrastructure and pathways in Ireland, and the compatibility of different types and components of fishing gear with such infrastructure. In the short term, effective collection of end-of-life gear for treatment in itself represents an environmentally sound alternative to some current practices. This includes storing or dumping large amounts of used gear on land in storage facilities etc. to avoid disposal costs, and in the worst case, abandoning such gear in the marine environment, the prevention of which is the explicit goal of the SUPD. In terms of treatment, however, while there are viable recycling routes available for many types of plastic used in fishing and aquaculture gear, this is not the case across the board, and in some cases, the costs of doing so may be considered unfeasibly high relative to the benefits therefrom. In the short term, this implies a tension between this objective and the desire for a cost-efficient scheme as discussed above. However, environmental performance (in the form of diversion from landfill and incineration to increased levels of recycling, repair and reuse) is achievable within the scheme in the longer term, particularly if incentives for improved design of gear are also incorporated over time (e.g., through increased granularity and eco-modulation of fees).

This is also reflected in the additional objectives for the Irish EPR scheme identified in the requirement specification for this project that go beyond the minimum explicitly required by the SUPD:

- to incentivise producers to design more resource-efficient products with lower environmental impacts (e.g., in terms of the type or amount of material used); and
- to create higher rates of reuse and recycling.

3.3.2 Key Principles

In the sections below we present some guiding principles to inform the design of the EPR scheme for fishing gear containing plastic in Ireland. These reflect the discussions held to date with DECC and other government agencies, as well as some of the minimum requirements for EPR schemes in the EU as laid out in the Waste Framework Directive (WFD). All the minimum requirements in the WFD are not reiterated here for brevity; rather the focus is on the application of what are considered the most pertinent ones in the context of fishing gear EPR for Ireland.

3.3.2.1 Polluter Pays Principle (PPP)

The polluter pays principle (PPP) is central to EPR approaches in both Ireland and the wider EU, and is enshrined in the SUPD, which states in recitals:

> *As plastic components of fishing gear have high recycling potential, Member States should, in line with the polluter pays principle, introduce extended producer responsibility for fishing gear and components of fishing gear containing plastic […]*

This is explained further in terms of the burden of cost coverage in the WFD (article 14), which states that:

> *In accordance with the polluter pays principle, the costs of waste management, including for the necessary infrastructure and its operation, shall be borne by the original waste producer or by the current or previous waste holders.*

Whilst the above implies that the burden of responsibility can apply to both producers of the relevant products as well as waste holders (including users), or that the additional costs to producers resulting from EPR may be passed on to consumers, this reflects a general principle to be applied to EPR for a range of products. The SUPD further clarifies that in the context of fishing gear specifically, fishermen who are the users of fishing gear (waste holders in this case) should not be obligated:

> *the fishermen themselves and artisanal makers of fishing gear containing plastic should not be considered as producers and should not be held responsible for fulfilling the obligations of the producer related to the extended producer responsibility.*

This implies that the financial burden and any EPR obligations to which they relate must fall solely on the producers of fishing gear containing plastics – and that those who place gear on the Irish market, including fishermen, should be considered producers in this context. Whilst fishermen who are only the users of fishing gear should not be subject to such obligations, they may, nevertheless, be required to participate in the scheme (e.g., by meeting requirements to dispose of gear in specified locations and in a specified condition) to support the efficient operation of the scheme, so long as this does not imply a disproportionate burden of effort or cost. This is the case, for example, in Iceland, where fishers must ensure gear meets certain conditions before reception at collection centres (see Section 3.2.2.4 above).

The polluter pays principle also implies that fees paid by producers should be differentiated according to the costs associated with managing specific gear types in order to avoid cross-subsidy, wherein producers of gear that are more easily collected, separated and recycled end up paying more than what it actually costs to manage their products at end-of-life, while producers of gear that is more challenging to collect, dismantle, and may not have a recycling pathway pay less.

3.3.2.2 Necessary Costs

The principle of necessary costs is formalised in Article 8a(4)(c) of the revised Waste Framework Directive (WFD) which requires that EU-Member States ensure that the contributions required of producers:

Do not exceed the costs that are necessary to provide waste management services in a cost-efficient way. Such costs shall be established in a transparent way between the actors concerned.

This is a sound principle that should underpin the approach to EPR design for fishing gear in Ireland. It is important as a means of reassuring producers that while they certainly will have to pay to meet the performance requirements under EPR, it does not mean that they have unlimited financial responsibilities without any input into the design of the system itself.

There is sometimes confusion among stakeholders who perceive that EPR is a new form of tax, but it is not. Placing the 'necessary costs' principle at the heart of the scheme will provide reassurance to producers that they will not be paying any more than they need to, or for inefficient systems.

Ideally any EPR system should itself be no more costly than necessary to achieve the specific objectives. However, in some cases, particularly where producers are taking over financial responsibility for the costs of collection and management that are either required to be undertaken directly by other actors (municipalities, port companies/ authorities, public agencies etc.), or subject to enduring contractual agreements that public sector entities have signed up to and that have several years left to run, the necessary costs principle limits the exposure of producers, ensuring they do not pay for costs that are determined to be in excess of those necessary.

3.3.2.3 Equal Treatment

The principle of equal treatment is provided in Article 8a(1)(d) of the revised Waste Framework Directive (WFD), whereby Member States shall:

Ensure equal treatment of producers of products regardless of their origin or size, without placing a disproportionate regulatory burden on producers, including small and medium-sized enterprises, of small quantities of products.

The two particular elements of note for the concept of 'equal treatment' are:

- Producers are treated equally regardless of their origin or size; and
- A disproportionate burden is not placed on producers of small quantities of products.

The application of this principle needs to be considered alongside the polluter pays principle – smaller producers (e.g., the artisanal makers of fishing gear referred to in the recitals to the SUPD) still contribute to fishing gear that needs to be collected and managed.

In practice, this principle is most relevant when it comes to considerations related to the reporting burden for producers of relatively small quantities of products, which can be disproportionate to the scale of their activities.

There is a potential tension between treating producers fairly (which is the issue at the heart of the principle of equal treatment) and the desire to ensure that the polluter pays (implying full coverage of producers). The objective of a 'cost-effective' EPR scheme also comes into play, particularly in terms of the relationship between the EPR scheme and the obligated producers.

In practice, a small number of larger producers are often responsible for the vast majority of products placed on the market, suggesting that differentiated obligations based on producer turnover and quantities placed on the market (PoM) may initially make sense. However, it is noted that not all producers will be based in Ireland, and a level playing field must be ensured by also including importers and online sellers to prevent freeriding or undercutting of local businesses. This is also reflected in the definition of a 'producer' in the SUPD:

'producer' means:

(a) any natural or legal person established in a Member State that professionally manufactures, fills, sells or imports, irrespective of the selling technique used, including by means of distance contracts as defined in point (7) of Article 2 of Directive 2011/83/EU of the European Parliament and of the Council (21), and places on the market of that Member State single-use plastic products, filled single-use plastic

products or fishing gear containing plastic, other than persons carrying out fishing activities as defined in point (28) of Article 4 of Regulation (EU) No 1380/2013 of the European Parliament and of the Council (22); or

(b) any natural or legal person established in one Member State or in a third country that professionally sells in another Member State directly to private households or to users other than private households, by means of distance contracts as defined in point (7) of Article 2 of Directive 2011/83/EU, single-use plastic products, filled single-use plastic products or fishing gear containing plastic, other than persons carrying out fishing activities as defined in point (28) of Article 4 of Regulation (EU) No 1380/2013.

In Ireland, S.I. 612/2022 defines a producer as meaning:

> *any person, irrespective of the selling technique used, who is first to place a relevant product on the market in the State other than persons carrying out fishing activities as defined in point (28) of Article 4 of Regulation (EU) No. 1380/2013 of the European Parliament and of the Council*

This definition therefore includes both local manufacturers as well as importers as obligated producers if they are the first to place a relevant product on the market, as well as online sellers ("…irrespective of selling technique used"). There is a risk, however, that the definition as it is currently worded could be misinterpreted to imply that persons carrying out fishing activities cannot be considered producers – even if they are the first to place a relevant product on the market. This should be amended to clarify that persons ***only*** carrying out fishing activities are exempt, i.e., that those that place relevant products on the market for the first time should still be considered obligated producers.

3.3.2.4 Start then Strengthen

Given the objective for the fishing gear EPR scheme to be 'cost-effective' whilst ultimately delivering on the objectives 'to create higher rates of reuse and recycling', we believe a key principle should be to 'start then strengthen'. This reflects the reality that EPR schemes evolve over time, and that through 'learning by doing', and in particular gathering improved data as time passes, be better placed to fine-tune elements of scheme design.

This also relates to the 'political' challenges associated with establishing a scheme, and the need to ensure stakeholder support (or at least minimise resistance from stakeholders). Getting a scheme in place that can then be expanded and developed over time is likely to be easier than trying to implement a scheme that immediately tries to do everything that one might ideally want an EPR scheme to do.

For example, starting a scheme by requiring all actors to register with a producer responsibility organisation (PRO), but obligating only the largest producers that account for the bulk of gear placed on the market to provide detailed reporting and pay granular fees, may be more practical than having the same level of requirements for all producers, regardless of tonnages placed on the market.

Small producers would still need to contribute to the scheme in line with the polluter pays principle, but this could take the form of a flat fee based on simplified reporting (i.e., one that is not based on the specific tonnage, or types of gear placed on the market) so long as their tonnages placed on the market fall below a certain threshold. This also reflects the principle of equal treatment whereby smaller producers should not be disproportionately burdened. Similarly, the granularity in the fee structure (by different gear types and materials) as well as eco-modulation is something that typically evolves over time and goes hand in hand with higher levels of performance linked to gradually increasing collection and/or recycling targets.

3.3.3 Scope

3.3.3.1 Product Coverage

The products in scope of the EPR scheme must include gear used for fishing and aquaculture that contains plastic. This is defined in the SUPD (see Section 3.2.2 above) to include gear used with the objective of attracting and capturing, or rearing marine biological resources. The EPR scheme should therefore not cover other items used in the course of fishing and aquaculture activities that contain plastic but that do not directly relate to these objectives, such as life jackets and boats. Further exclusions could be considered for gear that contains electric or electronic components (as is the case in the Swedish scheme) to the extent that these cannot be easily separated from the gear or are included within the EPR schemes for other products like WEEE/ batteries already.

Fishing Gear Containing Plastic

The SUPD recitals further state that components of fishing gear containing plastic should also fall within the scope of the scheme. This suggests that gear containing plastic, regardless of the amount of plastic relative to other materials, should be in scope. However, in practical terms, this broad application may be challenging, and raises additional questions around what constitutes a plastic component. For example, some shellfish pots are steel-framed, with plastic netting or mesh. Steel accounts for the vast majority of the material used by weight and contributes significantly to the total tonnages of gear placed on the market. While these frames tend to be reused repeatedly, and ultimately are recyclable, the plastic net is replaced more often, and may not be suitable for recycling if highly deteriorated or contaminated. A threshold-based approach, whereby products containing less than 5% by weight of plastic could therefore be considered, but this would likely be difficult to enforce, and may give rise to perverse incentives to re-design products that are near or around the threshold in sub-optimal ways.

A further example to be considered is that of lead or other metal in ropes, pots, etc. that may only include plastic as a surface coating, or weighted rope containing lead pellets, which are mostly plastic by volume. Anecdotal evidence suggests that despite the relatively small tonnages of plastic used in these cases, it is often the reason for such materials being rejected by recyclers. The plastic is therefore sometimes burned off in order to reduce disposal costs or enable recycling.

Excluding such items from the scope of the scheme would therefore go against the intent of the SUPD, and the overall objectives for the EPR scheme – which are to reduce the negative impacts of plastics on the environment, and to improve recycling of end-of-life fishing gear, including by creating incentivise for circular design where possible. However, in the absence of improved design for circularity for such products, a certain proportion of material loss can be anticipated for such products. Similarly, if composite products that contain a relatively small share of plastic (by weight) are instead directed to treatment routes for other materials (e.g., metal dealers), the relevant plastic materials will be lost from the EPR scheme. Coordination with actors involved in waste processing operations for other materials may therefore be necessary to prevent mismanagement of plastic waste and loss of potentially valuable materials.

Given the risks associated with the exclusion of any plastic elements of fishing gear and the intent of the SUPD and objectives of the scheme discussed above, it is therefore recommended that fishing gear containing plastic in any quantity should fall within the scope of the EPR scheme in Ireland. Stakeholders at the industry consultation workshop raised no objections to this approach.

Types/ Uses of Fishing Gear

A further consideration is around the types of gear and their uses that should be in scope. Previous work has already been carried out to determine a gear taxonomy for Ireland, and to determine the relative shares of these products on the market in task 1. It is noted that gear for commercial purposes tends to make up the vast majority of what is placed on the market, and as such will be in scope. However, whether or not gear used by private individuals (or for recreational purposes) should also be considered. It should be noted that "gear for recreational purposes" refers to the type and use of gear produced, rather than the production method, and is therefore distinct from "artisanal producers", which is

discussed further in Section 3.3.3.2. The SUPD includes requirements related to artisanal makers of gear but does not clarify whether gear for recreational purposes should be within the scope of the EPR scheme. Individual member states will therefore need to determine this on a case-by-case basis.

In **Denmark**, for example, the scheme includes both types of gear (termed 'commercial' fishing gear and 'other' fishing gear), with slightly different requirements for each. The proposed Decree defines commercial fishing gear as "towed fishing gear that contains plastic, including trawls, nets, scrapers and seines" and other fishing gear as "fishing gear that contains plastic and which is not commercial fishing gear".

The limited scope of commercial fishing gear in this definition reflects the fact that there are likely to be significant overlaps between the types of gear used for commercial and recreational purposes, and few examples of commercial gear that can be clearly differentiated from recreational gear. In addition, producers and suppliers are not likely to be specialised based on user – individuals buying traps and pots for recreational purposes are likely to do so from the same suppliers as commercial users. It would therefore be challenging to either clearly define gear for recreational purposes as being distinct from commercial, as well as to monitor and enforce this distinction in practice.

In **Ireland**, given that gear for recreational purposes tends to be placed on the market in small amounts, and through a range of channels (many of which are likely to be difficult to monitor, e.g., online sales directly to individuals), the inclusion of such products is not likely to be efficient. These gears tend to have a longer lifetime in use(though there may be exceptions for items like fishing line and tackle) and are typically discarded via different routes than commercial gear, with a tendency to end up as lost gear. As such, in keeping with the start then strengthen principle, they should not be included in the scheme at the outset.

This does, however, imply a need for the legislation underpinning EPR for fishing gear in Ireland to clearly define and distinguish between gear used for recreational and commercial purposes, with the latter referring to gear that has been supplied/sold for business purposes, and excluding gear sold for personal/ recreational use. This can be done to some extent by gear type, where some items such as rods and reels tend to be used almost exclusively in the recreational sector and can therefore simply be excluded from the obligations. For other items which are used in both sectors (e.g. pots, cages, some gill nets and ring nets), further solutions are needed. It is likely to be necessary that producers of gear for commercial purposes will be obligated for the full tonnage of gear they place on the market (regardless of whether some of this is ultimately used by recreational users). However, an additional exemption could be provided for the relevant tonnages that are used recreationally, so long as producers can furnish evidence of the relevant tonnages being sold to such users (e.g., supplied through retailers/ distributors that do not service the commercial sector). If such evidence cannot be provided, and the relevant gear type is also used by commercial users, then it must be included in the scheme.

Legacy Gear

Finally, the task 1 report also placed some emphasis on the issue of legacy gear that is currently stored on land. This gear represents a potentially valuable source of material that either still has potential use (e.g., as back-up gear, or for spare parts to repair primary gear) or has already been collected in such a way that valuable materials can be recovered for recycling, and may, therefore, result in a short-term spike in the EPR scheme's performance. However, this gear has yet to be disposed of, and in many cases, represents gear that has reached the end of its useful life and has no further value, and that has been dumped specifically to avoid disposal costs. The allocation of these costs, and the mechanisms by which users can be incentivised to dispose of this gear correctly, are key questions that must be resolved in the scheme's design.

While producers may reasonably be required to cover the costs of this disposal after the scheme's implementation, given that their obligations extend not only to the collection of gear but subsequent transport and treatment of end-of-life gear as well, it is also the case that this is a significant tonnage of end-of-life gear that was generated prior to the scheme and therefore pre-dates producer obligations. In addition, the allocation of such costs to producers would likely be challenging – given that there is no way to establish who placed the gear on the market, it is likely that all producers would need to be required by amendments to the existing legislation to contribute to its cleanup in proportion to the tonnages they place on the market. In addition, it should be noted that the sector is now smaller than it

was prior to decommissioning and other market pressures – this means that a smaller number of producers with a more limited income stream would be responsible for managing a disproportionately large amount of waste gear generated by a much larger sector in the past, potentially implying that EPR fees would be restrictively high for many. This has understandably given rise to resistance among Irish producers. This approach is therefore not recommended, as it would result in a disproportionate additional burden on producers to take responsibility for gear that reached end-of-life before the EPR scheme was established.

An alternative could be considered wherein DECC or other public agencies agree to fund its clean up during the transition to EPR, which would likely be well met by stakeholders and secure their participation in the scheme, though this represents a trade-off with the polluter pays principle, and with the requirements in the SUPD, which require producers to cover cost obligations and requires no funding commitments from the State. Further consultation with stakeholders will need to be conducted by the relevant governmental bodies (including relevant departments, agencies, and/or local authorities) on this point to determine how best it may be tackled as part of the scheme design before the EPR scheme is established.

3.3.3.2 Producer Coverage

The producer coverage within an EPR scheme should include a range of producers to ensure a comprehensive scheme and reduce waste generated by the fishing gear products in scope.

A "producer" in the context of an EPR scheme is any entity that places fishing gear containing plastic on the market for the first time. This is potentially inclusive of both commercial and recreational fishing gear and gear for aquaculture (as discussed in the preceding section). Within commercial and recreational fishing and aquaculture, this includes manufacturers and importers as a minimum, but could also include distributors, retailers/wholesalers and chandlers where they are responsible for placing gear on the Irish market for the first time. This is in line with the definition of "producer" in S.I. 612/2022 - "producer" means any person, irrespective of the selling technique used, who is first to place a relevant product on the market in the State". The table below provides more detail on the types of specific producers in scope for this EPR scheme.

Table 3-3 Producer coverage

Producer in scope	Description
Manufacturers	Companies that manufacture fishing gear and aquaculture products containing plastic. This is inclusive of companies that manufacture and use their own gear and do not sell it to other companies (so long as they are not considered "artisanal" producers).
Importers	Businesses or individuals that import gear from another country into Ireland for use or sale by themselves or another company. This is inclusive of distance sellers which import gear into Ireland.
Distributors	Companies that distribute fishing gear to retailers or directly to consumers (where they are the economic operator responsible for placing the gear on the market for the first time).
Retailers	Businesses that sell fishing gear directly to consumers, including both specialised fishing gear stores, general stores and chandlers (where they are

	the economic operator responsible for placing the gear on the market for the first time). This includes online retailers and e-commerce platforms.
Wholesalers	Companies that sell goods in large quantities at low prices, typically to retailers, brands, or other companies directly, where they are the economic operator responsible for placing the gear on the market for the first time.

The SUPD states that "the fishermen themselves and artisanal makers of fishing gear containing plastic should not be considered as producers and should not be held responsible for fulfilling the obligations of the producer related to the extended producer responsibility."

It is therefore suggested that those that are defined as "artisanal producers" are exempt from the EPR scheme. Artisanal producers are not defined in either the SUPD or the Irish regulations at present. However, they can be considered producers that have a certain amount of turnover, scale of activity, or tonnage of obligated gear below which regulatory requirements do not apply. In the proposed **Danish** decree on EPR, for example, "non-industrial" manufacturers of fishing gear are exempt. It is recommended that in **Ireland**, the term "artisanal producer" should be defined to include manufacturers of gear that are not mass-produced in industrial/ highly optimised or mechanised processes, but rather operate on a smaller scale, with production as one-offs, or in small batches, using a high proportion of manual contribution. This could also include producers of gear that are not made available on the market (i.e., manufactured for their own use). Producers that fall under this definition should then be exempt from EPR obligations as per the SUPD requirements.

The SUPD also specifies exclusions from producer obligations for fishermen themselves. Note this does not mention fish farmers who are carrying out activities for commercial purposes, which would appear to be an unintended oversight (in that it would not be fair to exclude one group, but not the other). In Swedish law, this has been interpreted to mean that those *only* undertaking activities such as searching for fish, releasing, deploying, towing, and picking up fishing gear, taking catches on board, transshipment, preservation on board, preparation on board, transfer, placing in cages, fattening, and landing of fish and fishery products are not included in the fishing gear EPR scheme. However, any fishermen who are responsible for bringing gear on to the Swedish market for the first time for commercial use are obligated as producers - this could include fishers/ fish farmers where they are responsible for direct imports. It would therefore make sense to require that fishers bringing in gear from other Member States or third countries should be responsible for paying EPR fees, though in practice monitoring and undertaking enforcement activities against such fishers may prove challenging. Though this may be viewed by some as contravening the requirement in the SUPD, it could reasonably be argued that this is justified where the fisher in question meets the definition of a producer in so far as he is the first entity placing gear on the Irish market. This is also reflected in the Swedish requirements which obligate *"a person who, in a professional capacity […] brings fishing gear into Sweden"*. As discussed previously (see Sections 3.3.1, 3.3.2.1, and 3.3.2.4) this also aligns with the objectives and principles for the EPR scheme in Ireland and should be incorporated in the relevant legislation.

A further related point was raised by industry stakeholders in the context of the Irish scheme, regarding fishers who have access to markets for direct sales (including online sales) in Northern Ireland or the UK, where EPR requirements do not apply, potentially making products cheaper. In aquaculture, direct purchases are more common because items like oyster bags are small and often bought in bulk, placing domestic producers at a competitive disadvantage. Therefore, it is recommended that importers of gear, as well as online sales platforms and distributors/retailers providing overseas-manufactured gear, should participate in the EPR scheme, as they are the ones placing gear on the Irish market for the first time. However, enforcing this, particularly on fishers who bring in gear from other countries as private imports, will likely be challenging.

Finally, as per the start then strengthen principle discussed above in Section 3.3.2, and in order to avoid disproportionate burden on smaller producers of fishing gear containing plastic, differentiated

responsibilities for smaller producers should be considered. Such producers would still be required to register, report and pay fees for the obligated products they place on the market, albeit to reduce administrative burden, reporting requirements could be simplified, and a flat fee could be payable (as opposed to detailed reporting on specific types of gear, and granular fees related to these specific types of gear/ plastic placed on the market).

Establishing a threshold by which producers can be considered 'small producers' is currently challenging due to a lack of comprehensive data on all producers and the tonnages of gear containing plastic that they are responsible for. However, based on the data estimations in task 1, an initial threshold for small producers placing less than 10 tonnes of gear containing plastic on the market per year could be established. This threshold is likely to be low enough to ensure that the data remains representative of the market as a whole, while still avoiding disproportionate administrative burden on the smallest businesses. Over time, as the EPR scheme generates more comprehensive and granular data on the number of relevant producers, their activities, and the tonnages of gear they are responsible for relative to the market as a whole, this threshold could be revised.

3.3.4 Roles and Responsibilities

The roles and responsibilities of the different actors within the EPR scheme include the administrator of the scheme and the subsequent responsibilities such as overseeing waste management activities, financial administration, compliance with regulations and awareness and communication as well as monitoring and enforcement.

Producer Responsibility Organisation (PRO) Responsibilities

It is proposed that the scheme is administered by a producer responsibility organisation (PRO). The PRO will consist of producers of fishing and aquaculture gear and will be a non-profit organisation. For example, in the Swedish and Danish EPR schemes, the PRO consists of companies that professionally produce, import or sell fishing gear that contains plastic. The PRO will have several distinct responsibilities including overseeing waste management activities, financial administration, compliance with regulations and awareness and communication. In Ireland, S.I. 612/2022 sets out the functions of a PRO ("Approved Body) in Part III, Article 5(1), including the responsibility to recoup the costs of managing end-of-life gear in the form of fees from registered producers.

The EPR fees should therefore be set by the PRO to equate to the cost of covering the end-of-life management of the gear placed on the market and provide funding for additional infrastructure investment (such as collection points or further collection). The PRO will oversee the collection, sorting, recycling and disposal of fishing gear and aquaculture products. This will involve ensuring that the waste hierarchy is being adhered to with as much gear being recycled or reused as possible. In addition, the PRO will provide funding for additional infrastructure such as collection points which will work in tandem with existing collection activities spearheaded by BIM. The infrastructure funding can also include further collection mechanisms such as takeback schemes or operating separate collection points at ports.

Similarly, financial administration will be a responsibility of the PRO. As mentioned, the PRO will manage the financial aspect of waste management including collecting the EPR fees from the producers. The PRO will be responsible for disbursing payments to waste management service providers.

Compliance with regulations will also be another responsibility of the PRO. This will include helping producers comply with EU regulations and adhering to collection and recycling targets established by the EPR scheme. This is inclusive of ensuring that producers are also reporting to the PRO the required level of data. The data would include the quantity and type of products placed on the market as well as the amount of waste collected and recycled. In relation to this, the PRO will be responsible for managing the data that is collected and reported by the producers to the PRO. This can be through managing a database to ensure that data is stored in an organised and secure manner.

Lastly, the PRO will be responsible for raising awareness among consumers and users of fishing gear regarding the negative impacts such gear can have if improperly disposed of. This can include communications about proper disposal methods, their availability in Ireland, and the importance of recycling. This could be in partnership with BIM (assuming the availability for continued funding in this

role). Awareness raising and education can help contribute to improving collection and recycling rates of the products in scope and reducing environmental impacts.

Enforcement and Monitoring

In line with other EPR schemes implemented, the enforcement of the scheme should be undertaken by the Environmental Protection Agency (EPA) and the relevant Local Authority. They would be responsible for ensuring that the producers are complying with their legal obligations under the Regulations. This is due to the PRO being a non-governmental body which will not have the legal capacity to enforce compliance of the producers to the scheme. This would also include the EPA overseeing the PRO in terms of ensuring that the data that is reported is accurate, as the EPA will report the data to the European Commission. The PRO can nonetheless support with enforcement activity (e.g., revoking membership for or 'red flagging' non-compliant companies registered with them to the EPA/ Local Authority).

3.3.5 Obligations and Cost Coverage

Depending on specific EPR scheme design, producers could have specific obligations to ensure the proper management of end-of-life fishing equipment. These obligations include registration, reporting, financial contributions and potential operational responsibilities. A key determinant of costs will be the targets that are set by the Minister, including collection or recycling targets, which should be informed by the PRO. The current target is 100 tonnes of collected fishing gear, which has been met in 2023.

All producers of commercial and recreational fishing gear and aquaculture products, regardless of size, will be obligated to register with the PRO. Commercial producers must report detailed information about the types and quantities of gear they place on the market which can include production volume, material composition, weight and number of products. Smaller producers would have simplified reporting requirements, such as providing high-level data on product volumes, associated with a flat fee structure. This will help ease the administrative burden on companies that would be under the threshold for granular reporting/ paying granular EPR fees. The reporting of data to the PRO is not only essential for compliance but will also help improve the effectiveness of the EPR scheme by calculating producer fees more accurately.

Based on scheme design, financial management should also be an obligation of the producers. This can include paying the EPR fees in accordance with the data reported to the PRO. Commercial producers will pay fees based on the quantity and type of fishing gear placed on the market. These fees are proportional to the cost of collection, transport and treatment of end-of-life gear; infrastructure investment; awareness raising activities by the PRO; and the PRO's administrative costs for management, data collection and reporting. The smaller producers can pay a flat fee to simplify the process, ensuring that they are contributing to the EPR scheme with minimal administrative burden.

Lastly, operational responsibilities that the producers may have would be related to the specific EPR scheme and infrastructure that is in place. For example, producers may be required to implement take-back schemes, where they accept the return of used fishing gear which can be done through collection points or retail locations. In addition, producers may be responsible for collaborating with waste management entities as they may need to discuss the logistics, collection and processing of their fishing gear products. This would also include producers gathering data from waste management entities to report on the quantities of gear that are collected or recycled.

3.3.6 Data Reporting and Verification

Data will be collected and reported by the producers to the producer responsibility organisation (PRO). The producers will have to report the volume and quantity of fishing gear placed on the market on an annual basis. Producers will submit their data through a standardised online form provided by the PRO which will ensure uniformity in reporting and facilitates easier data management and analysis. The PRO will be responsible for reporting the data to the EPA who is responsible for reporting to the European Commission.

The PRO will be responsible for verifying the data reported by producers by performing audits. These audits involve reviewing the records and practices of producers to verify the accuracy of the submitted

data. The PRO may perform on-site inspections, review production records and cross-check reported figures with sales and distribution data. The EPA will receive the aggregated data from the PRO and has the authority to conduct its own verification processes. This includes auditing the PRO's records and the methods used to verify the producers' data. The EPA would ensure that the data is accurate and reflects the actual market situation. This multi-tiered approach will ensure a high level of data accuracy and transparency.

3.3.7 Supporting Measures

There are several additional measures that can support the fishing gear EPR scheme. The supporting measures include traceability, certification, adjustment to landfill tax, co-ordination with other Member States, and a DRS scheme.

Traceability is crucial for monitoring the lifecycle of fishing gear, ensuring that producers are accountable for their products from production to disposal. This can include label codes, as similar to the Farm Plastics Scheme, fishing gear can be tagged with unique label codes. The codes can be scanned to track the gear's distribution and return which would help ensure proper disposal and recycling. Traceability can also include utilising digital solutions such as RFID tags to provide tracking of the gear placed on the market. The labels or digital codes would be integrated within a centralised database which would allow for efficient tracking and reporting. The system would log when the gear was manufactured, sold, used and collected for end-of-life treatment.

A **certification scheme** can also be implemented which would be linked to sustainability standards to simplify compliance and promote best practices among producers. This would include certification based on established sustainability criteria in line with environmental and ethical standards. Producers that are certified can be listed in a database making it easy for fishers to identify compliant producers to purchase products from.

An adjustment to **landfill levy** would be a beneficial supporting measure as it would adjust landfill levy to be higher than EPR fees to promote recycling over disposal. This would make recycling the most economically viable option as the cost of recycling would be cheaper than landfill. This adjustment would align with the waste hierarchy, prioritising recycling over disposal.

Co-ordination with other countries is essential in cross-border harmonisation of EPR schemes as fishing gear can be used and disposed of in other Member States and non-EU neighbouring countries, such as the UK and Norway. This would help ensure consistent implementation and compliance, regardless of where the gear is used and disposed of. This can also foster cross-border recycling initiatives where gear might be manufactured in one country but recycled in another country. There could be information sharing between entities to ensure that the product is collected and recycled properly regardless of the country that it ends up in. Co-ordination between Member States and non-EU countries can also help with enforcement if penalties across countries are consistent. This would discourage producers attempting to dispose of fishing gear waste in a different country.

Lastly, another supporting measure that could be considered in the long-run is a **deposit return scheme (DRS)** for high-value products. This would be a part of the EPR scheme and involve fishers paying a fee when purchasing a high-value product and then getting the fee returned to them when they return the high-value product to a collection point. Since the scheme would be run in parallel to the existing EPR scheme and financed by producers, the relevant products would be exempt from EPR fees (to avoid double charging). This could be beneficial for products with high recycling value such as those that contain metals or other materials that are in demand, safeguarding that high-value materials are recycled and potentially remanufactured.

3.4 Stakeholder Engagement

A workshop was held with government stakeholders, including DECC, BIM, EPA and CTC on 1 May 2024, to gather feedback on the preliminary scheme design, insight into regulatory capacity to support the proposed design, and to identify key areas in which industry buy-in will be needed. Relevant revisions to the preliminary design were incorporated, following which industry stakeholders were invited to a

stakeholder consultation workshop that took place on 6 June 2024. In agreement with DECC, government stakeholders including BIM were excluded from the latter session to encourage a frank, open discussion with industry stakeholders.

A summary of the industry stakeholder workshop and key points of discussion raised by participants are provided in Appendix A.6.2. Additional stakeholder engagement activities were not included in the scope of this study, but further engagement between all relevant governmental bodies and industry (both producers and waste operators) will be required and should be prioritised in order to finalise the recommendations in this report.

3.5 Identification of EPR Options and Next Steps

The preliminary scheme design was developed based on discussions with government stakeholders at a workshop on 1 May 2024. A range of EPR models were presented and discussed at this meeting, including:

1. **Advance fee system** – The government is responsible for collections/ recycling and producers must pay a fee into a government fund to cover the costs of waste management for their relevant gear before placing it on the market. Government stakeholders at the workshop were not in favour of this model as it is likely to be inefficient relative to a scheme in which producers (through the PRO) have direct involvement in decisions related to waste management. Industry stakeholders may be resistant to such a model due to the perception of the fee as a tax, the disbursement and level of which they have no control over.
2. **Deposit return system** – Producers would be required to operate a collection and treatment scheme for gear whereby fishers would pay a deposit on purchasing the gear that could then be redeemed when disposed of correctly. This model was not taken forward as it is likely to be relatively costly to set up, with little scope to recycle gear at present. Determining a suitable level of deposit for many different types of gear will likely be challenging and given the long life of some types of gear, may imply an unacceptable cost burden for some fishers in the short term.
3. **EPR with producer take back** – producers are individually responsible for their gear at the end-of-life. They would be required to set up take-back systems for users of fishing gear to dispose of gear at the end-of-life, and to fund the subsequent transport, treatment, etc. of their gear and report on these activities to the EPA individually. This is likely to be challenging and impractical for most producers except the largest local manufacturers. It is also likely to be inefficient relative to collection and sorting of end-of-life gear in collective systems. The burden of enforcement for government would also be higher due to the need to monitor compliance across individual producers.
4. **Collective EPR** – Producers must comply with their obligations collectively through a government approved not-for-profit, industry-led producer responsibility organisation (PRO). The PRO would be responsible for gathering and reporting data on gear placed on the market and collected/ treated to the government, collecting producer fees in proportion to tonnages of gear placed on the market by individual producers, and for disbursing these producer fees to cover the relevant costs for waste operators to manage end-of-life gear. This was the preferred model for EPR, and the model that has already been laid out in the Irish regulations.

Accordingly, the preliminary design described in section 3.3 above is based on a collective EPR model. However, within this model, a range of design options were discussed further, focussed on the scope of the scheme, and an achievable level of performance that it should be held to.

The above preliminary scheme design was also discussed with industry stakeholders at a workshop on 6 June 2024. Feedback gathered, both during and after session, was used to refine the preliminary scheme design further, and this formed the basis of two key options modelled in task 3 (Section 4). The first option modelled represents a pragmatic approach, while the second option represents an ambitious approach. In both cases, the 'start then strengthen' principle is applied, with obligations increasing over time until the scheme is fully implemented in the short term, and thereafter with increased levels of scheme performance driven by higher targets. Based on the research summarised in this report and

further feedback from both government and industry stakeholders, the following are the key elements of the scheme design that will be varied within these options.

Table 3-4 Initial EPR elements to be varied in options for modelling

EPR design element	Option 1 – pragmatic	Option 2 – ambitious
Product scope	Gear for commercial uses only	All gear (including recreational)
Cost coverage	No incentives for fishers to participate in scheme (regulatory requirement only)	Incentives for fishers to participate in scheme (e.g., label code scheme whereby fishermen presenting end-of-life gear that is subject to the EPR scheme at a producer responsibility organisation (PRO) location can get discounts off new gear).
Initial targets (first 2-3 years)	Collection only - 25% to 40%	Collection 30% to 50% with recycling 10% to 20%

Option 1 – pragmatic

This option focuses exclusively on commercial gear, with no inclusion of recreational gear. By narrowing the focus to commercial gear only, the scheme aims to provide a more targeted approach. It is assumed that under this option, all recreational gear ends up in the waste destined for incineration. In addition, the cost coverage does not include any incentives for fishers to participate as their involvement is driven entirely by regulatory requirements.

During the initial phase of implementation in 2027, no specific collection targets are enforced, allowing time for the framework to be established and for stakeholders to adjust to the new requirements. However, by 2029, modest targets are introduced, starting with a collection rate of 25%. This target is designed to be achievable within the early stages of the programme, providing a foundation for future growth. Over time, the collection rate is expected to increase to 40% by 2038, reflecting a gradual scaling up of the program's ambitions. The increase in the collection rate over time is driven by a combination of improved infrastructure, heightened awareness among fishers, and the refinement of collection processes. The gradual approach allows for the scheme to evolve based on lessons learned and to progressively tighten its impact on reducing waste from commercial fishing gear.

Option 2 – ambitious

Option 2 represents a high-ambition EPR scenario expanding the programme's scope to include all types of fishing gear, including recreational gear. This comprehensive approach aims to address a broader range of sources contributing to marine waste, significantly increasing the programme's potential impact. To further encourage participation, this option introduces incentives for fishers, such as a label code scheme. Under this scheme, fishers who bring their EoL gear to a designated PRO location can receive discounts on the purchase of new gear. This incentive structure not only motivates compliance but also encourages responsible gear management.

The collection targets under this high-ambition scenario are more rigorous, with a goal of collection in 2029 commencing at 30% and rising over time to 50% in 2038. Additionally, the programme sets a recycling target, aiming to recycle 10% of collected gear in 2029 which increases over time to 20% in 2038. These targets reflect a commitment to drive change in gear disposal practices through increased collection and recycling.

In both scenarios, legacy gear is treated separately under an amnesty programme which is modelled under Scenario 2. Under Scenario 1, legacy gear is not treated and is assumed to be stored due to it not being in scope to be handled in this scenario. However, Scenario 2 includes legacy gear which is assumed to be starting at 5,000 tonnes in 2022 based on stakeholder engagement estimates. The legacy gear is assumed to have an amnesty programme between 2027 to 2029 for old fishing gear to be collected and disposed of without cost to the producer. This has been modelled by multiplying the assumed legacy gear by the costs of collection and disposal which amounts to EUR 3.1 million in 2027 and EUR 2.7 million in 2029. These costs are not included in the EPR scenario modelling due to it being a separate programme.

Modelling of Options

Option 1 and Option 2 are modelled in comparison to the baseline scenario. The baseline scenario will present the fishing gear market with its current trends projected forward by 10 years. However, since the EPR targets are expected to be implemented in 2029, the model is projected forward 10 years from target implementation to 2038. The baseline serves as a reference point to measure the impacts of the proposed options. Option 1 and Option 2's impacts will be modelled which include the number of products that are included in the EPR scheme based on plastic content, the amount of EPR fees paid and the increase in collection and recycling. The impacts of Option 1 and Option 2 are compared to the baseline scenario to highlight their potential benefits and drawbacks.

4. Assessment of EPR Design Options

The assessment of the two EPR models identified in the previous section of this report is done quantitatively. The assessment of EPR models takes into account the data available on the Irish fishing gear market and its end destinations. The quantitative assessment of the two EPR design options, in line with the European Commission's guidelines on conducting ex-ante impact assessments, of the two EPR models. In addition to the CBA, the potential impact of the Port Reception Facilities Directive on the proposed EPR models is also analysed qualitatively.

4.1 Modelling Methodology

4.1.1 Defining and Modelling the Baseline

Drawing on the evidence collected in task 1: Market Analysis of Fishing Gear and the stakeholder workshops in task 2: Identify and Assess Potential EPR Models for Fishing Gear, the mass flow for products in scope containing plastic content of the fishing gear was created. The evidence collected provided the groundwork for the baseline, or business-as-usual (BAU), scenario which serves as a quantitative benchmark to compare the EPR models against. The baseline considers the purchasing and disposal of fishing gear in Ireland that contains plastic in the absence of the EPR models which are being assessed. The baseline is modelled for a time horizon of 10 years from EPR model target implementation in 2029. The metrics used to project the baseline forward over the 10-year appraisal period is a growth rate of 1.5% which is an average growth rate based on the growth rate of Irish fish landings, fishing fleets and aquaculture. This growth rate was applied because it is directly correlated to the products in scope used in the aquaculture and fishing industry in Ireland.

The purpose of the baseline scenario is to provide a quantitative benchmark, as the "counterfactual" against which all policy options can be compared. It is important to note that the development of an accurate baseline is challenging, therefore assumptions were used to build the baseline where primary data was unavailable. Key assumptions are set out in Appendix Section A.7.0 of this report.

4.1.2 Defining EPR Options

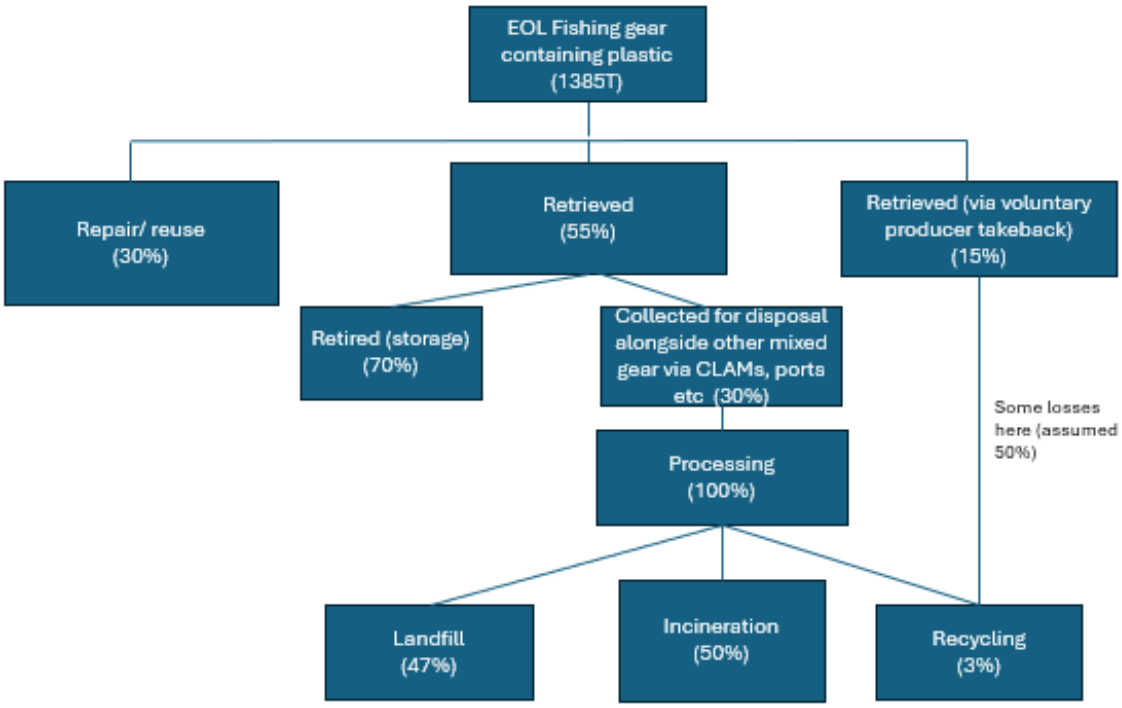
The two EPR scenarios being modelled are described in Table 3-4 which include Option 1 being a pragmatic approach and Option 2 being a high ambition approach. For each of the EPR scenarios, the change in product and waste mass flows was established as a result of implementing the respective EPR measures. The change in the fishing gear mass flows will depend on assumptions related to the design features of the EPR scenarios, which were developed based on the evidence collected earlier in the project and our extensive knowledge of EPR schemes and their associated impacts.

For the product scope under each EPR option, Option 1 includes gear for commercial use which was calculated based on desk-based research undertaken earlier in this report. Option 2 includes all gear which is inclusive of commercial and recreational gear. The recreational gear was assumed to be equal to 10% of the tonnage of commercial gear placed on the market. The cost coverage of the two options differs between providing incentives for fishers through a labelling code scheme. Lastly, the main difference between the two options are the collection and recycling targets. For Option 1, the collection targets are increasing from 25% to 40% over the course of the EPR scheme implementation. Whilst Option 2 has a collection increasing from 30% to 50% from 2029 to 2038 along with the recycling target increasing from 10% to 20%. These targets are modelled by changing the destination of the mass flows over time to result in accomplishing the collection or recycling target.

Once the resulting change in mass flows is estimated, we assessed the economic, social and environmental impacts for each EPR scenario, compared against the baseline.

The baseline mass flow is shown below which does not include abandoned, lost or otherwise discarded fishing gear (ALDFG).

Figure 4-1 Fishing gear EoL flow diagram



The end-of-life fishing gear containing plastic is a data point derived from the desk-based research completed earlier in this report. This data point is the beginning of the mass flow as it's the focus of the EPR options. Following the fishing gear placed on the market, it goes to being repaired/reused, retrieved or retrieved via voluntary producer takeback. It is assumed that the fishing gear that is repaired/reused stays within a closed-looped system and is not affected by the EPR options. The fishing gear that is retrieved via voluntary producer takeback is destined for recycling. It was stated by an industry expert that the gear retrieved via voluntary producer takeback is sent for recycling where a loss is assumed to be 50%. The 50% of the gear that is lost is distributed between landfill and incineration. The fishing gear that is retrieved is assumed to be collected for disposal alongside other mixed gear or destined for retirement. The fishing gear that is being retired is stored at the ports or in fishing storage facilities which was mentioned by an industry expert that this tonnage is estimated to be about 70% of total gear retrieved. Therefore, it is assumed that the remaining 30% of fishing gear is collected for disposal. The fishing gear that is collected for disposal is then processed and subsequently sent to landfill, incineration or recycling.

The landfill and incineration split are based on Ireland's national waste disposal split. The percentage of gear that is recycled is quite small mainly due to the lack of recyclers preparing, or bailing plastic and it would have to be exported as Ireland does not currently have the capacity to recycle plastic in fishing gear. This would indicate that it would be more costly to recycle the fishing gear than dispose of it through landfill or incineration.

The flow diagram sets the groundwork for the baseline mass flow as well as the two EPR scheme designs.

Following this, each scenario was modelled for a time horizon of 10 years from initiation, in line with the baseline. We applied Ireland's Department of Public Expenditure and Reform discount rate, of 4.0%, to all benefits and costs accrued in the future with the purpose of calculating the Net Present Social Value (NPSV) over 10 years for each scenario. This enables an informed recommendation of the preferred EPR option.

4.1.3 Identification of Costs and Benefits

The costs and benefits of the associated impacts of the shortlisted EPR schemes were identified which include environmental, economic and social impacts. The impacts are associated with the fishing gear

products and waste mass flows, and the different waste treatment operations in Ireland. The impacts modelled are included in the table below.

Table 4-1 Impacts modelled

Type of impact	Specific cost/benefit modelled
Economic	• Operational costs of managing and recycling fishing gear: collection (incl. separate collection), storage, sorting, disposal, preparation for reuse, and export for recycling costs. • EPR scheme costs including operational, compliance and monitoring costs.
Social	• Employment, including both job losses and creation in the waste management or recycling/repurposing industries
Environmental	• Reduction in waste sent to landfill and incineration. • Greenhouse gas emission savings (in t CO2e)

When we were unable to gather costs or data on the listed areas of impact, we utilised proxy data from previous EPR scheme models or assumptions which are referenced in the Appendix A.7.0.

4.1.4 Impact Model Methodology

The economic, social, and environmental impacts for each EPR scenario were assessed.

Economic Impacts

The economic impacts involved modelling the operational costs of managing fishing gear throughout the end-of-life phase and the EPR scheme costs. These costs were calculated on a per tonne basis from desk-based research, stakeholder engagement or proxy data. Proxy data is data used that is correlated, or related, to a specific indicator that does not have data available. It is used to estimate outcomes. The cost figure was then multiplied by the tonnages of the mass flow for each scenario in order to provide an estimate of the magnitude of costs on an annual basis which is detailed in Appendix A.7.0.

Social Impacts

The social impacts include job creation and job losses. This was done by utilising employment intensity multipliers (FTE jobs) for different areas of the end-of-life management of fishing gear including preparation for reuse, collection, landfill and incineration. To model employment in each year of the baseline scenario and in each of the policy scenarios, the employment intensity multiplier for each employment category was multiplied by the relevant modelled fishing gear flow to provide an estimated number of jobs. The jobs for the relevant flow were then compared to the baseline scenario in order to show a loss or creation of jobs.

Environmental Impacts

The environmental impacts of fishing gear EPR scheme is focused on the end-of-life treatment routes such as recycling, landfill or incineration. The emissions associated with the end-of-life phase were used by multiplying emissions from the specific phase by the tonnage of fishing gear going into that treatment route. However, when considering the focus of this project is on plastics in fishing gear, when accounting for the emissions from landfill and incineration, there are not any immediate GHG emissions from landfilling plastic. Therefore, only emissions from plastic going to incineration were utilised. It is important to highlight that the fishing gear destined for recycling is expected to be exported due to Ireland not having recycling capacity, and due to the lack of data and transparency of this part of the end-of-life phase, no emissions are associated with recycling in the model. The lack of emissions associated with

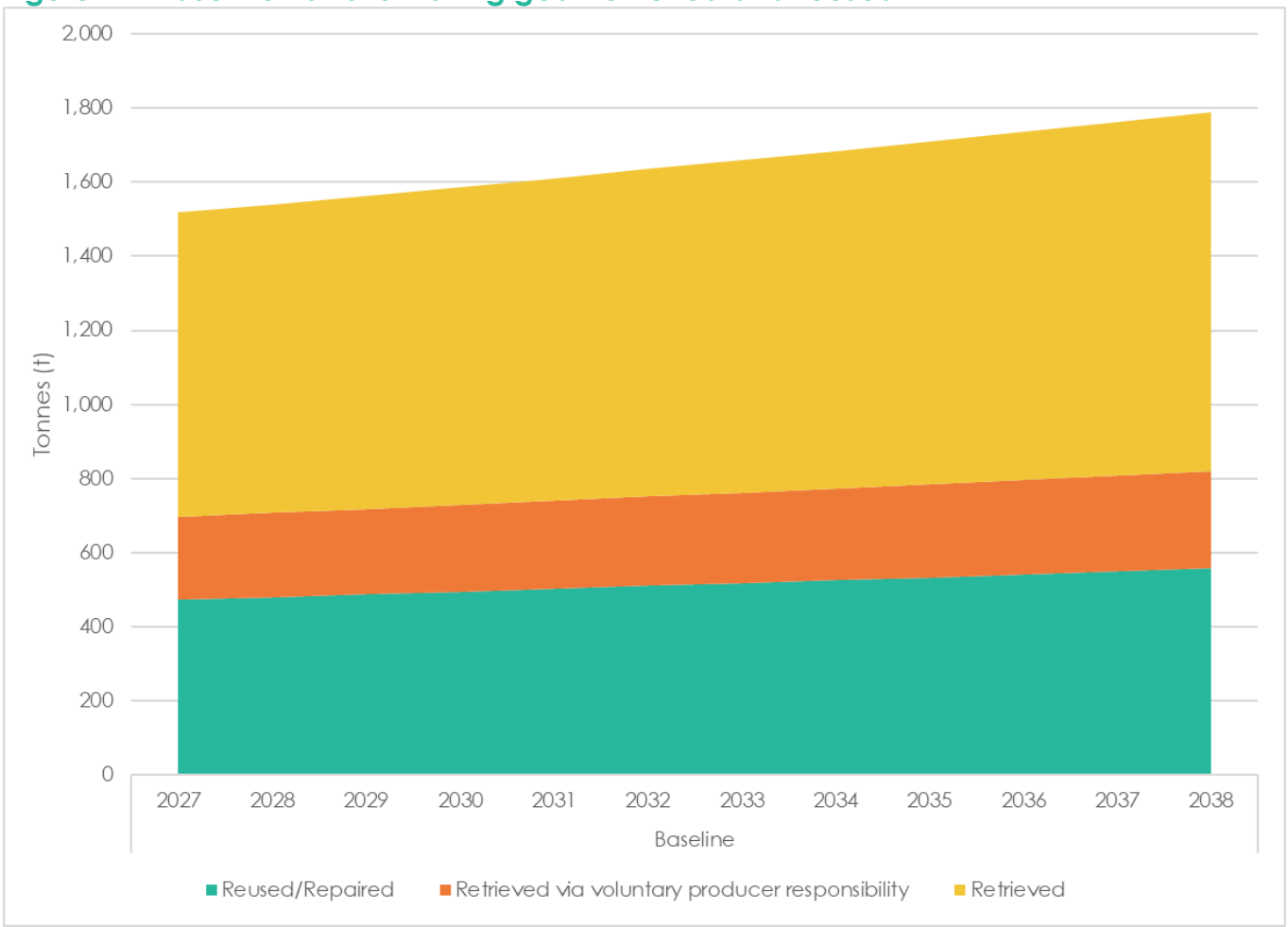
landfill is a limitation to this study as landfill emissions from plastic are negligible since it does not break down over time.

4.2 Baseline Flows

The baseline for this study was created based on the data discussed above and the desk-based research to understand the mass flows of the industry using a 1.5% growth rate. The graph below shows the baseline flows of the fishing gear in scope from 2027 to 2038. To reiterate, the EPR will be implemented in 2027 but the targets will be announced in 2029, so the model is projected to 2038 to show a 10-year forecast of EPR target implementation.

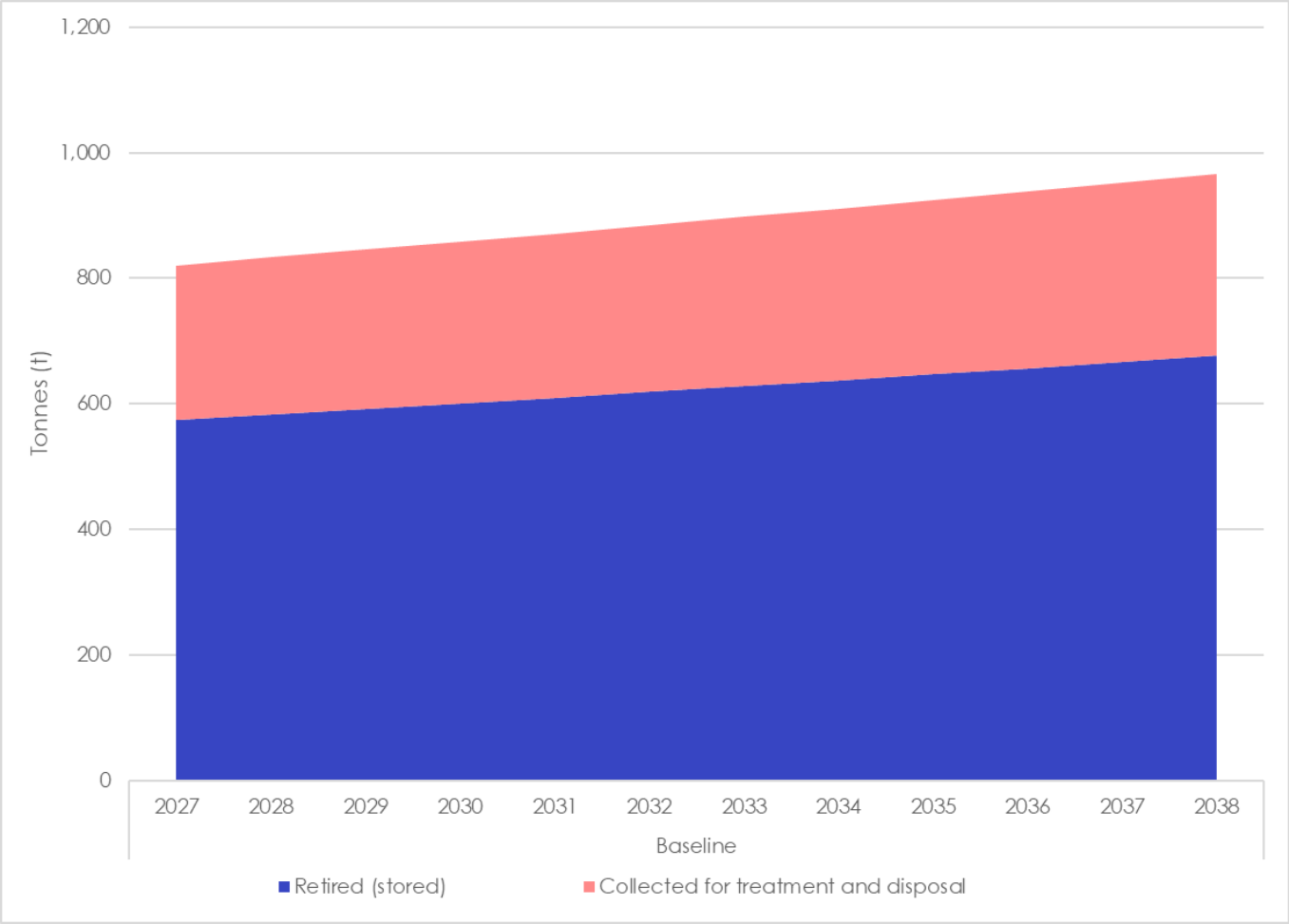
Figure 4-2 presents the future projections of baseline flows from 2027 to 2038 for fishing gear repaired and reused, as well as gear retrieved via voluntary producer schemes or otherwise based on the 1.5% growth rate assumption. These 3 flows comprise the entire end-of-life fishing gear placed on the market (except the ALDFG).

Figure 4-2 Baseline flows for fishing gear retrieved and reused



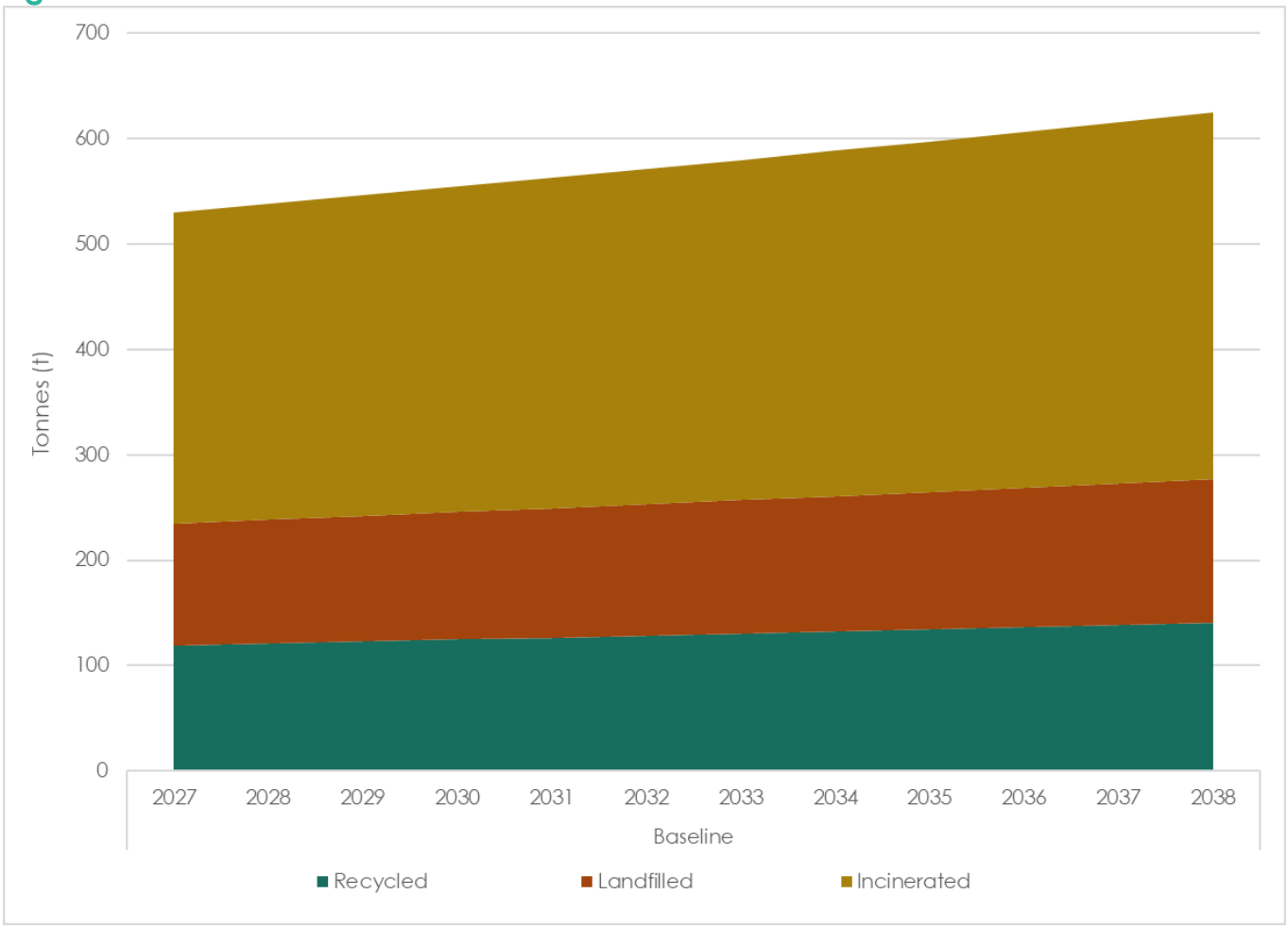
Part of the fishing gear retrieved is then collected for further treatment or disposal, while the rest is retired in storage, which adds to the stock of legacy gear. These flows are presented in Figure 4-3.

Figure 4-3 Baseline flows for gear collected for treatment and disposal, and retired gear



Finally, Figure 4-4, presents the baseline flows for gear recycled, incinerated and sent to landfill.

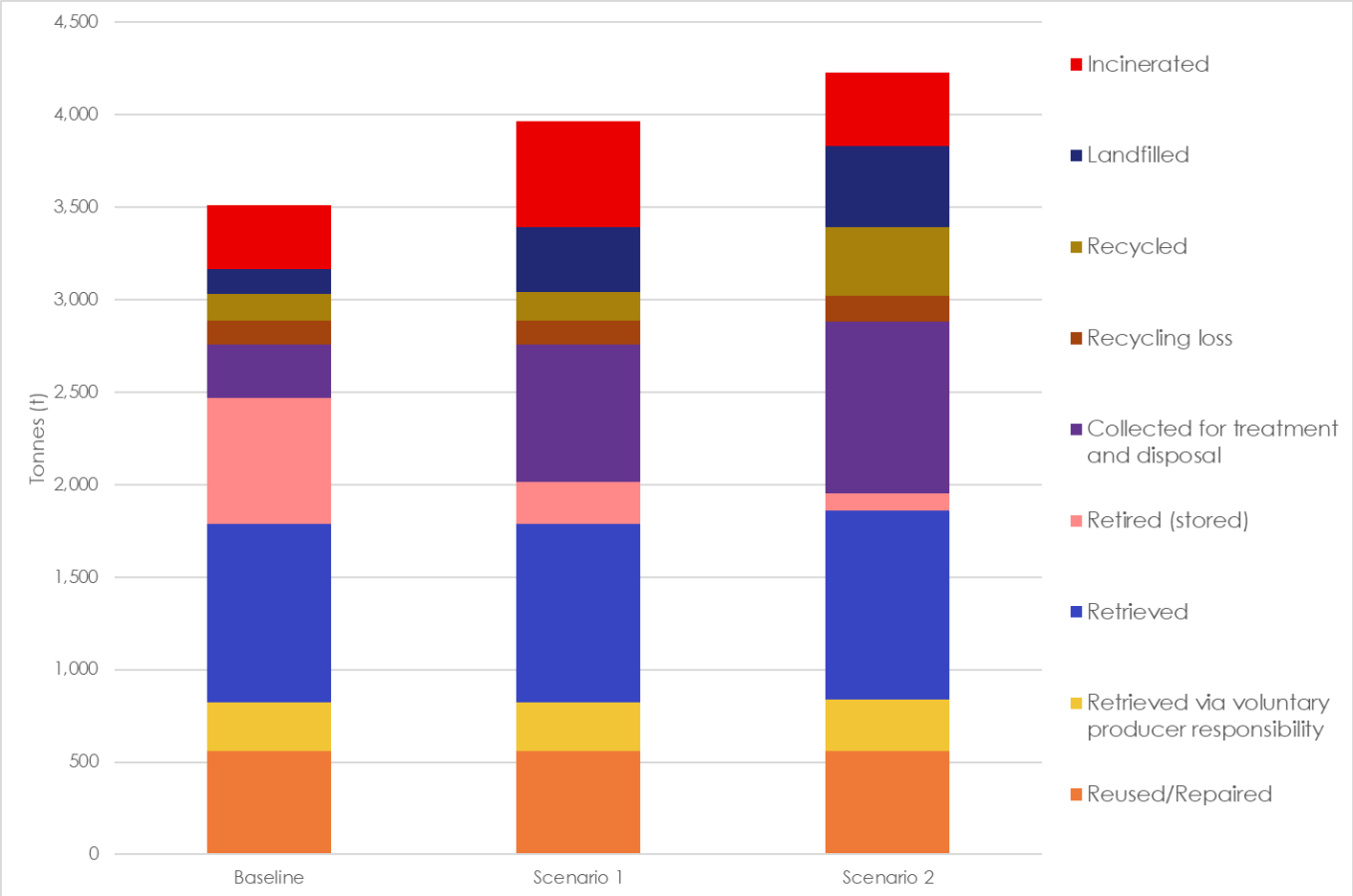
Figure 4-4 Baseline waste treatment flows



4.3 EPR Scenario Modelling

The two EPR options were modelled and compared to the baseline to show the impact of the EPR models. The chart below displays the flows compared to the baseline of fishing gear that is in scope for 2038.

Figure 4-5 Fishing gear flows in EPR scenarios (2038)



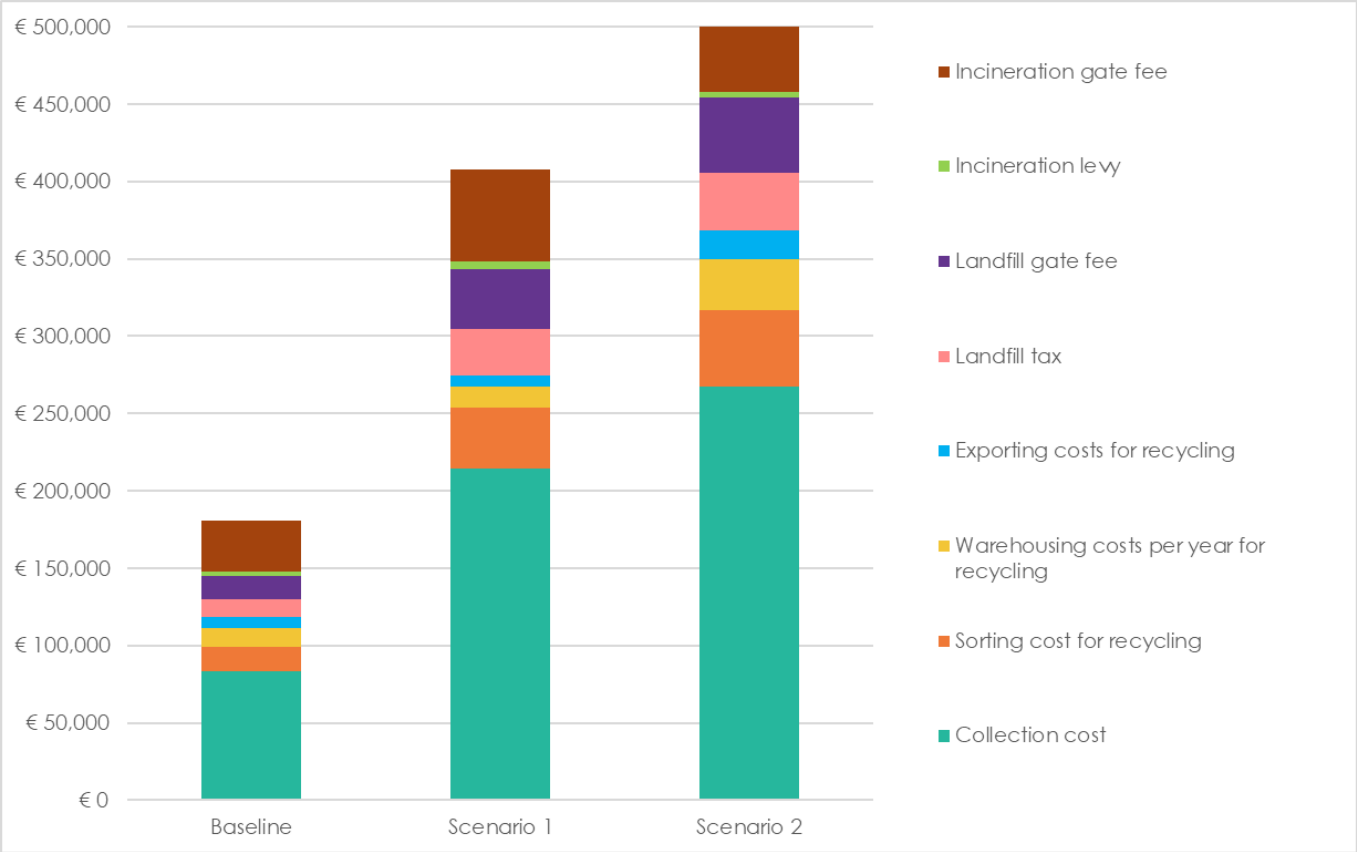
As illustrated in the graph above, the amount of fishing gear being retired sees a notable decrease in 2038 in both Scenario 1 and Scenario 2 when compared to the baseline. This reduction suggests a significant shift in how fishing gear is managed towards the end of its lifecycle. In parallel, the retrieval and collection of fishing gear for disposal have shown marked increases in both scenarios, indicating improved effectiveness in the capture and proper handling of end-of-life gear.

Additionally, there is a clear rise in the amount of fishing gear that is either reused or repaired in both scenarios. This trend reflects a growing emphasis on extending the lifespan of fishing equipment, which contributes to the overall reduction in waste and resource consumption. The increases in collection can be directly linked to the progressively stringent collection targets set in Scenario 1 and Scenario 2. In particular, Scenario 2 also sees an increase in recycling targets, further driving the enhancement of these practices. The introduction of these more ambitious targets has evidently played a crucial role in shifting behaviours and improving outcomes related to the management of fishing gear. This integrated approach to collection, reuse, repair, and recycling underscores the effectiveness of the policies implemented under both scenarios in reducing the environmental impact of fishing activities.

4.3.1 Economic Impacts

The economic impacts are shown in monetary terms, such as costs associated with the scenarios. Figure 4-6 displays the breakdown of the waste management costs in 2038 for the baseline, Scenario 1 and Scenario 2.

Figure 4-6 Breakdown of waste management costs in 2038



The breakdown of waste management costs shows that the collection costs in Scenario 2 is higher than Scenario 1 and the baseline in 2038, which is attributable to the ambitious collection target. Similarly, the costs for recycling in terms of sorting, warehousing and exporting are higher for Scenario 2 due to the recycling target. The fees for incineration are higher in Scenario 1 than in Scenario 2 because more collected material is going to incineration in Scenario 1 compared to Scenario 2 due to the lack of a recycling target.

Figure 4-7 presents the breakdown of EPR scheme costs for Scenario 1 and Scenario 2 in 2038. Scenario 2 has slightly higher operational costs, compliance costs and monitoring costs compared to Scenario 1 due to the inclusion of recreational gear within the scope of the EPR scheme under Scenario 2. In addition, the inclusion of recreational gear also includes a cost for the labelling scheme that would need to be introduced as an incentive mechanism for recreational fishers to participate in the EPR scheme. However, the inclusion of recreational fishers within the scope of the EPR scheme only generates a slight additional benefit in terms of diverting small amounts of waste from incineration to recycling and landfilling, which is displayed in Figure 4-8.

Figure 4-7 Breakdown of EPR scheme costs in 2038

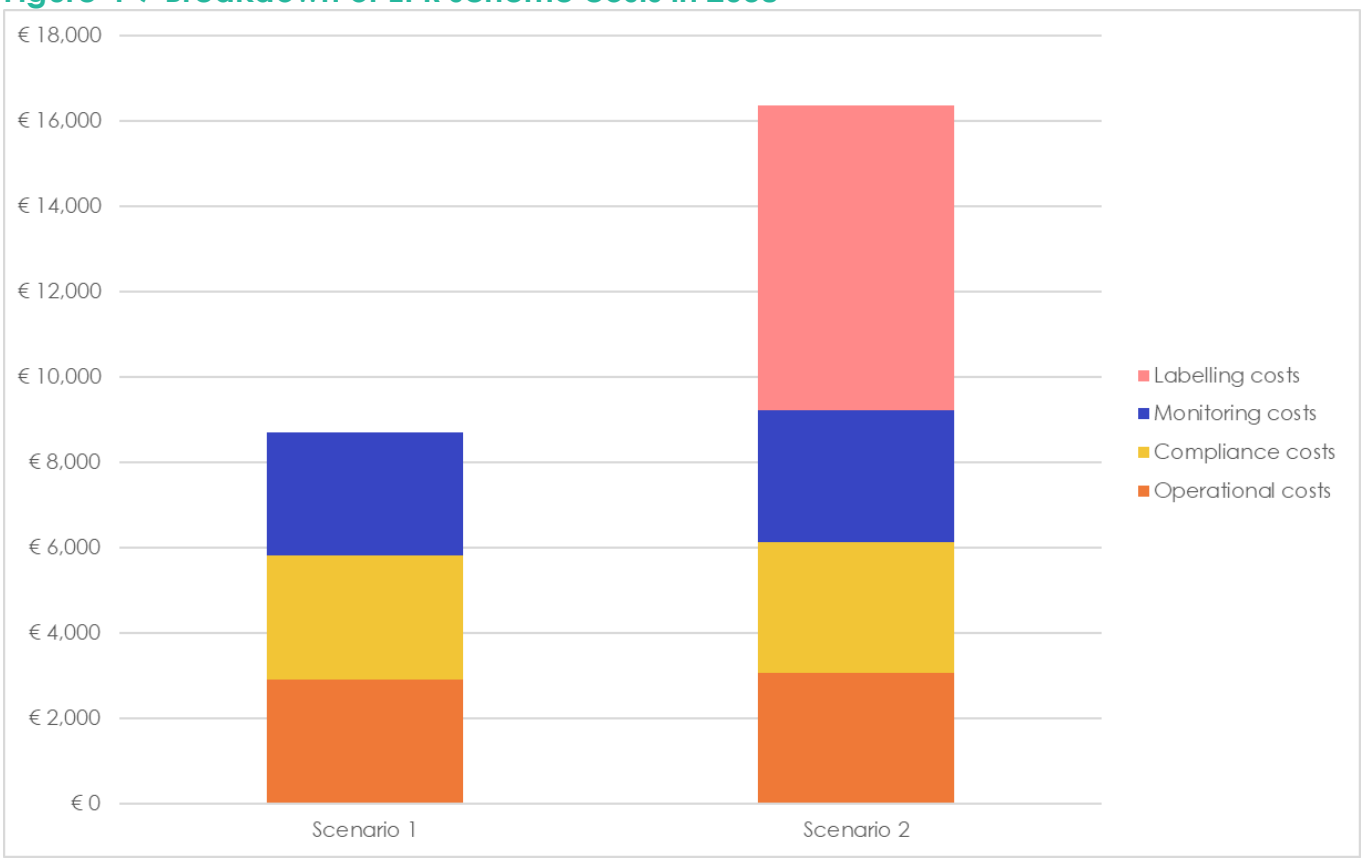


Figure 4-8 EoL treatment of recreational fishing gear in 2038

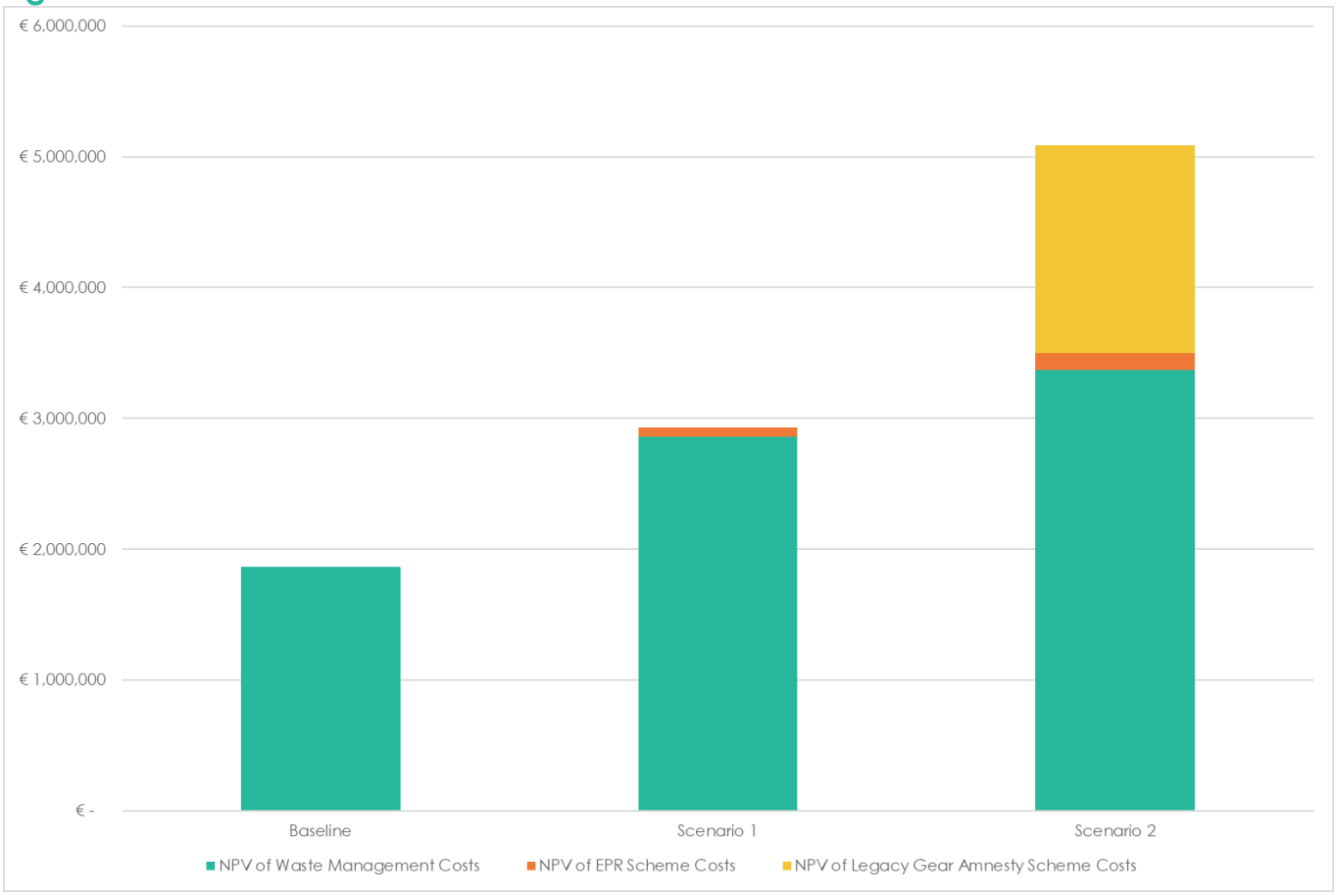
Under Scenario 2, there is also the cost of running the amnesty scheme for legacy gear for 3 years from 2027 to 2029. It was assumed that all materials collected through the amnesty scheme would be sent to incineration because the quality of the stock would not be high enough to be separated for recycling or reuse. It was also assumed that the amnesty programme would be able to retrieve 20% of the existing legacy gear stock. Given that there is no estimate available for the total amount of legacy gear in storage currently, it was assumed that the stock of legacy gear in 2021 was 5,000 tonnes, and each year the gear retired in storage is added to the stock of legacy gear. Under these assumptions, the estimated amount of legacy gear, the amount collected through the scheme, and associated costs of collection and disposal via incineration for 2027 to 2029 are presented in the table below.

Table 4-2 Legacy gear collection through the amnesty scheme and associated costs

	2027	2028	2029
Legacy gear in storage	8,512	7,426	6,347
Collected through amnesty scheme	1,702	1,485	1,269
Cost of collection	€ 490,284	€ 427,734	€ 365,589
Cost of disposal	€ 217,904	€ 190,104	€ 162,484
Total costs	**€ 708,189**	**€ 617,837**	**€ 528,072**

The economic impacts of the EPR scheme are displayed in terms of Net Present Value (NPV) which indicates how much an investment is worth throughout the modelling period, discounted to today's values. The figure below displays the NPV of the costs of EPR options in comparison to the baseline in today's costs.

Figure 4-9 NPV of costs under baseline and EPR scenarios

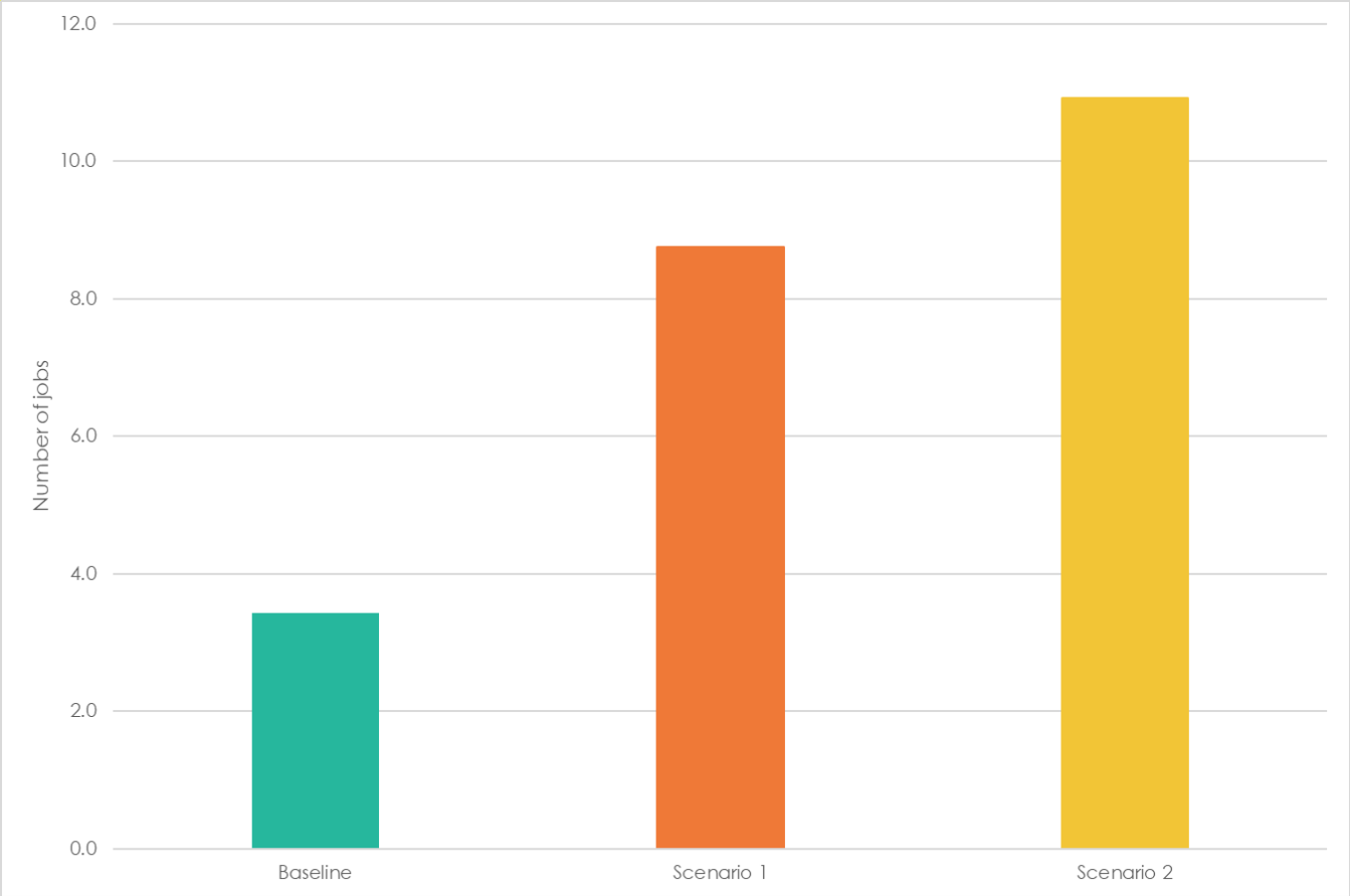


As shown, the NPVs of both EPR scheme scenarios are higher than the baseline due to the baseline not having an EPR scheme in place. The costs for waste management are also higher for both scenarios compared to the baseline due to the amount of fishing gear being collected and managed during the end-of-life phase. Scenario 2's NPV is higher than Scenario 1's NPV for both waste management costs and EPR scheme costs. The waste management costs include collection costs, sorting for recycling, warehousing costs per year for recycling, exporting costs for recycling, landfill tax, landfill gate fee, incineration costs and incineration gate fee. In addition, the EPR scheme costs include operational, compliance and monitoring costs. For Scenario 2, the EPR scheme costs include labelling costs as an incentive mechanism discussed earlier in the report. Finally, Scenario 2 also includes the cost of collecting and disposing of a part of the legacy gear stock using the amnesty scheme from 2027 to 2029.

4.3.2 Social Impacts

The social impacts of the two EPR schemes are estimated by the number of jobs created. The jobs created are shown as difference to the baseline scenario. Due to more collection and recycling occurring in Scenario 2, more jobs are created compared to Scenario 1.

Figure 4-10 Jobs created in 2038

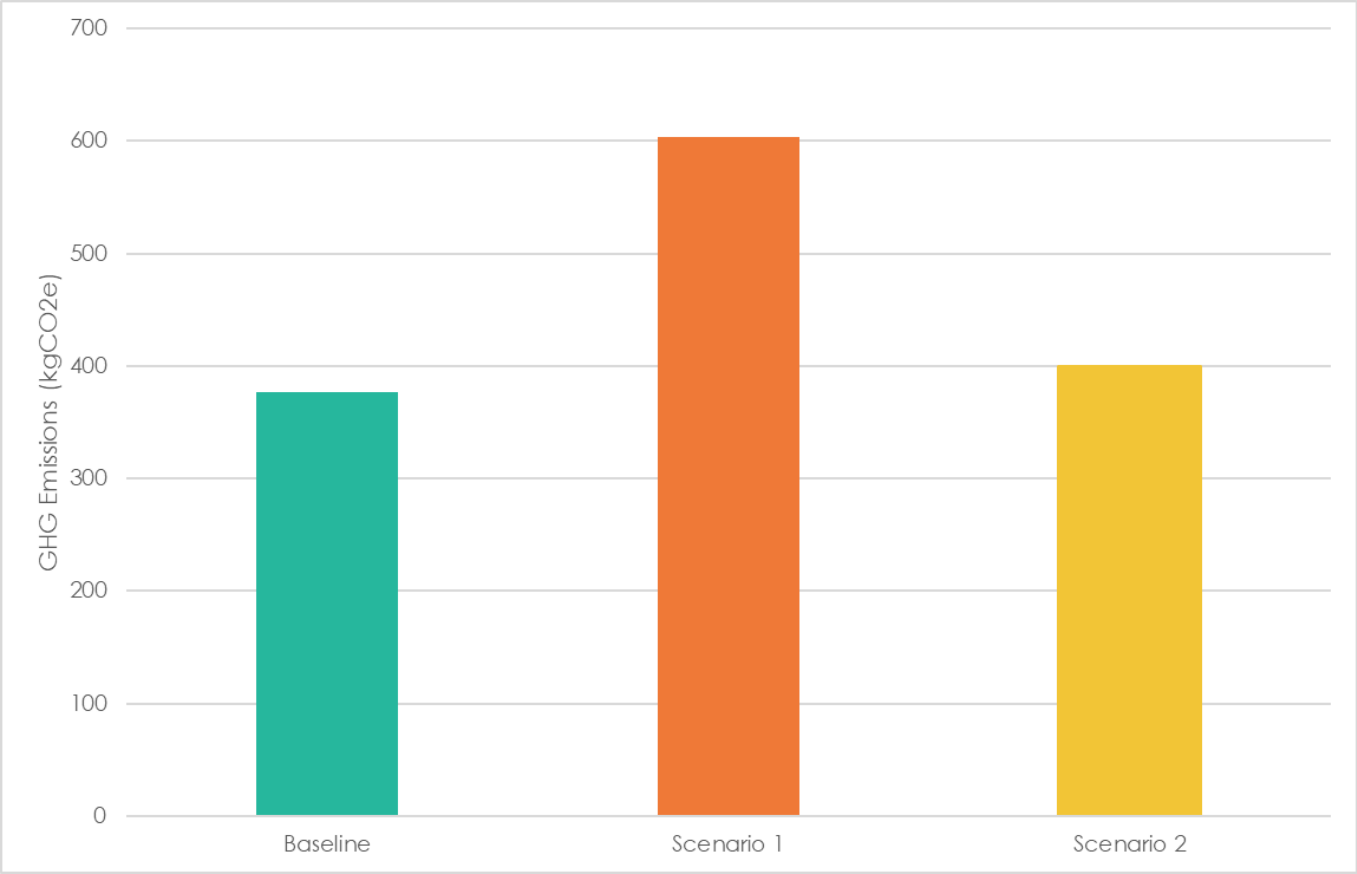


Scenarios 1 and 2 have a higher amount of jobs created than the baseline, with Scenario 2 creating the highest number of jobs. The largest number of jobs is created from prep for reuse and recycling as well as jobs created in collection. This is significant because it highlights that an EPR scheme will have positive social benefits.

4.3.3 Environmental Impacts

Lastly, the environmental impacts of each scenario are compared to the baseline in terms of GHG emissions created from incineration.

Figure 4-11 GHG Emissions in 2038



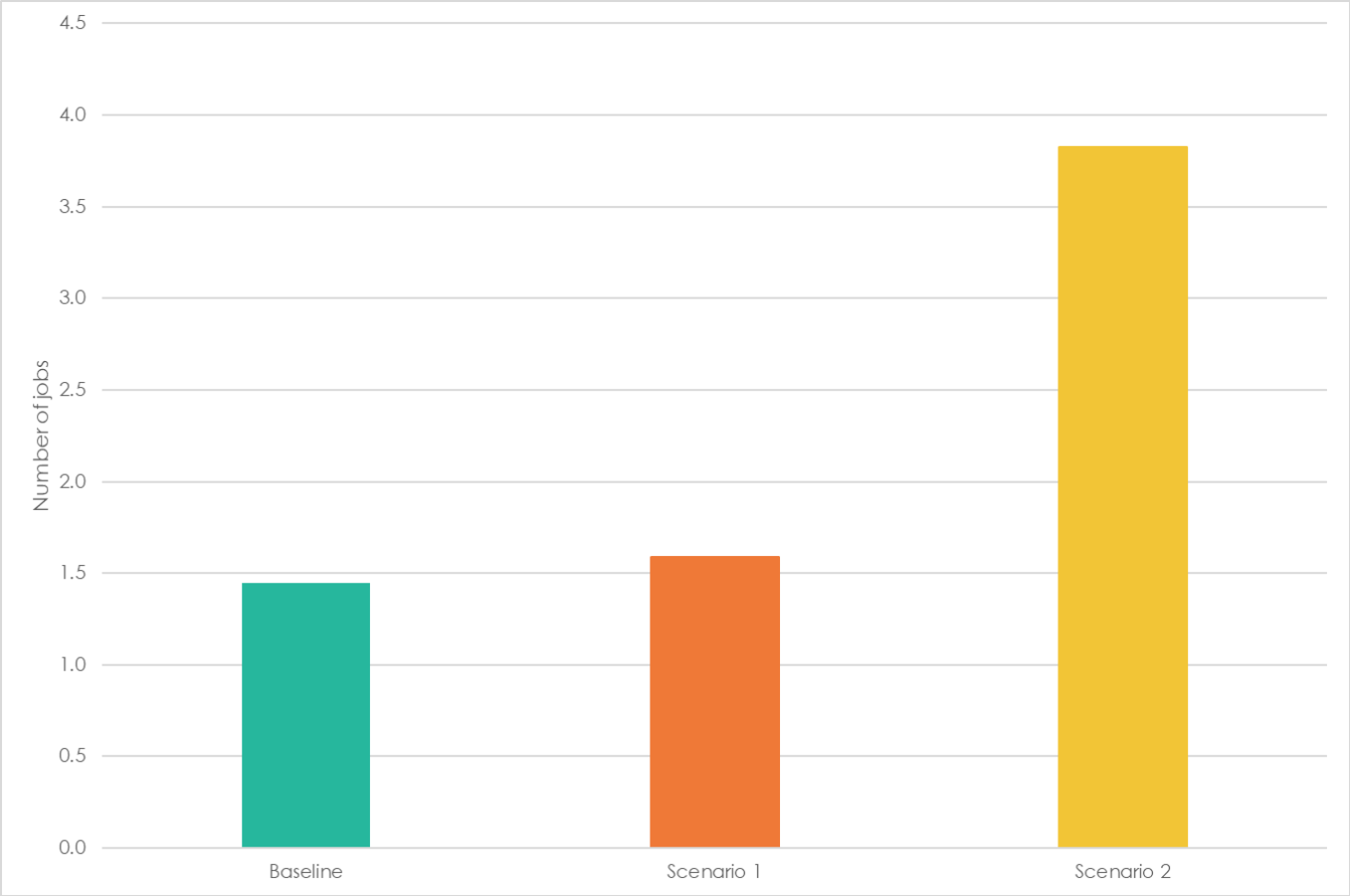
The figure above displays the GHG emissions from each scenario compared to the baseline scenario. Scenario 1 has higher GHG emissions than Scenario 2, mainly due to the higher amount of fishing gear being recycled in Scenario 2 and therefore, diverted from incineration. Scenario 2 has slightly higher GHG emissions than the baseline scenario due to the increased number of products in scope, such as recreational fishing gear, which increases the amount of gear going to EoL destinations such as incineration. However, if Scenario 2 did not include recreational fishing gear, the emissions would be lower than the baseline emissions due to the amount of gear being reused and recycled is increasing over time.

4.3.4 Impacts of Developing Domestic Recycling Infrastructure

Currently, most of the fishing gear collected for recycling in Ireland is subsequently exported for recycling as there is not much capacity for recycling fishing gear in Ireland at present. However, with the introduction of the EPR scheme for fishing gear, there will be additional fishing gear that will need to be sent to recycling, especially under Scenario 2. If domestic recycling infrastructure is developed in Ireland for recycling the fishing gear that would otherwise be exported, there would be significant benefits to the Irish economy in terms of value-added as well as creation of new jobs in the recycling sector.

Figure 4-12 presents the potential jobs that could be created by developing a domestic fishing gear recycling infrastructure in Ireland. It can be seen that the most benefit would be occurring under scenario 2 with about 2.5 additional FTE in 2038 due to the higher amount of gear sent for recycling under this scenario.

Figure 4-12: Potential jobs created from domestic recycling of fishing gear (2038)



However, domestic recycling of fishing gear would also increase the cost of waste management due to the higher cost of recycling fishing gear domestically (EUR 200 – EUR 250 per tonne[84]) compared to the cost of exporting fishing gear for recycling abroad (EUR 50 per tonne). In addition, for developing the recycling infrastructure, an initial capital investment of around EUR 2 million would be needed.[85]

4.3.5 Recommendation on the Preferred EPR Option

When considering the Irish government's priorities and objectives with the EPR scheme for incentivising producers to design more resource-efficient products and ensure a cost-effective and environmentally sound collection and end-of-life treatment, Scenario 2 emerges as a better policy option compared to Scenario 1 due to its comprehensive and ambitious approach to managing fishing gear throughout its lifecycle.

Scenario 2's higher collection and recycling targets demonstrate a strong commitment to reducing environmental impacts. The goal of collecting 30% to 50% of all EoL gear containing plastic, coupled with a recycling rate of 10% to 20%, sets a clear path toward significant waste reduction and resource recovery as well as creating additional jobs. The number of additional jobs created under Scenario 2 will increase even more compared to Scenario 1 if domestic recycling infrastructure is developed in Ireland for recycling fishing gear.

Moreover, scenario 2 also includes amnesty schemes for reducing the existing stock of legacy gears, which if not dealt with will create a significant barrier to the implementation of an EPR scheme for fishing gear in Ireland.

[84] Based on data from a plastic recycler in Ireland.
[85] Based on data from a plastic recycler in Ireland.

Overall, the ambitious scenario is extending product lifetimes, decreasing landfill, increasing recycling rates, creating new job opportunities and reducing greenhouse gas emissions in absolute terms. These aspects contribute to increased resource efficiency and the sustainability of the fishing industry.

However, the EPR scheme costs under the ambitious scenario are also significantly higher due to the inclusion of recreational fishers within the scope of the EPR scheme, when compared with the additional benefits that will be achieved from including recreational fishers. So given the small addition to benefits for a significant increase in costs of including recreational fishers within the scope of the EPR scheme, it might be better to exclude them from the scope, at least in the initial periods of the scheme.

Finally, it should be noted that it was not possible to capture all the benefits associated with the EPR scenarios because they cannot be adequately quantified due to the lack of data or intangibility. These benefits can include climate change mitigation benefits from reduced petroleum demand to make plastic, biodiversity impacts, air quality impacts, health impacts and a shift in jobs to circular economy supply chain activities around the world.

4.4 Analysis of the Impact of the Port Reception Facilities Directive

4.4.1 Overview of the Port Reception Facilities Directive

The Port Reception Facilities (PRF) Directive was revised in 2019 and aims to prevent the negative impacts of the discharge of waste from ships on the marine environment by improving the provisions to collect and manage the waste generated by ships at ports, including waste from fishing vessels.[86] The PRF Directive contains four key provisions relevant to the management of end-of-life fishing gear as well as passively fished waste, each of which is described further below.

1. **100% Indirect Fee**

Prior to the introduction of the PRF Directive, it was a common practice at many EU ports for fishing vessels and other ships to be charged based on the volume of waste delivered, with wide variations in how this was done, and the level of fees being charged in different Member States. This created an insufficient incentive to eliminate discharges of fishing gear and other wastes at sea. As a result, the PRF Directive, requires the implementation of a '100% indirect fee'. The 100% indirect fee is a mandatory fee that port users, including the fishing sector, are required to pay to the port regardless of whether they use the waste facilities provided. It therefore incentivises fishers to deliver their waste on shore to a port. The PRF Directive also requires that when calling at an EU port, ships must deliver all waste to the port facilities. An exemption to this rule is applied to ships with sufficient capacity to store the waste accumulated during their intended voyage until they reach the next port of call.

Article 8(2)(b) of the PRF Directive states that the indirect fee covers:

> *"(i) Indirect administrative costs;*
>
> *(ii) A significant part of direct operational costs (which represent at least 30% of the total direct costs for actual delivery of the waste".*

Article 8(4) The PRF Directive also states that the fee may be differentiated based on:

> *"(a) the category, type and size of the ship;*
>
> *(b) the provision of services to ships outside normal operating hours in the port; or*
>
> *(c) the hazardous nature of the waste".*

[86] European Union (2019) *Directive (EU) 2019/883 of the European Parliament and of the Council of 17 April 2019 on port reception facilities for the delivery of waste from ships, amending Directive 2010/65/EU and repealing Directive 2000/59/EC*. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0883

2. Fishing for Litter Initiatives

While the 100% indirect fee is intended to cover the cost of end-of-life fishing gear, Article 8(2)(d) of the PRF Directive states that individual Member States should bear the cost of the collection and treatment of passively fished waste.

> "In order to avoid that the costs of collection and treatment of passively fished waste are borne exclusively by port users, Member States shall cover, where appropriate, those costs from the revenues generated by alternative financing systems, including by waste management schemes and by Union, national or regional funding available"

This requires Member States and their ports to establish formal mechanisms for offsetting the costs of collection and treatment of passively fished waste, which is a critical aspect of successful FFL initiatives. In addition to covering the costs of collection and treatment, data on the quantities and types of passively fished waste must be monitored by Member States, with certain information reported to the Commission in standard methodologies and formats as per Implementing Regulation 2022/92.

3. Green-Ship Refund

The PRF Directive introduces the concept of a 'green-ship refund'. This requires ports to reduce fees for ships that are engaging with waste prevention and sustainable on-board waste management. Section 1 of the Annex to the EU Implementing Regulation 2022/91 outlines two mandatory criteria for green-ship refund, including:

> *"On-board segregation in accordance with Resolution MEPC.295(71) and ensured delivery to adequate port reception facilities that comply with Article 4(2)(d) of Directive (EU) 2019/883"; and*
>
> *"Environmentally sustainable purchasing policies (reduction of packaging materials such as bulk packaging and avoiding single use plastic)".* [87]

Several optional criteria for PRFs and port authorities to consider on a voluntary basis, and possible means for their verification are listed in Section 2 of the Annex to the EU Implementing Regulation 2022/91. It should be noted that the proportion of port dues rebate provided to green-ships remains at the discretion of EU ports.

4. Waste Reception and Handling Plans

Under the PRF Directive Member States are also required to revise their waste reception and handling plans at ports to ensure the separate collection of waste from ships to facilitate reuse and recycling.

Part 17 of the PRF Directive specifies that the separate collection of waste including *"derelict"* fishing gear is essential to ensure that where possible that it can be reused or recycled. It also highlights that on-board segregation of waste should be reflected by waste collection facilities provided by ports.

> *"Separate collection of waste from ships, including derelict fishing gear, is necessary to ensure its further recovery to enable it to be prepared for reuse or recycling in the downstream waste management chain and to prevent it from causing damage to marine wildlife and environments. Waste is often segregated on-board ships in accordance with international norms and standards, and Union law should ensure that these efforts of on-board waste segregation are not undermined by a lack of arrangements for separate collection on shore.".*

In addition, Article 4(2) of the PRF Directive states that:

> *"Member States shall ensure that:*

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[87] European Union (2022) *Commission Implementing Regulation (EU) 2022/91of 21 January 2022 defining the criteria for determining that a ship produces reduced quantities of waste and manages its waste in a sustainable and environmentally sound manner in accordance with Directive (EU) 2019/883 of the European Parliament and of the Council.* Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32022R0091

(a) the port reception facilities have the capacity to receive the types and quantities of waste from ships normally using that port, taking into account: (i) the operational needs of the port users; (ii) the size and geographical location of that port; (iii) the type of ships calling at that port; and (iv) the exemptions provided for under Article 9;

(b) the formalities and practical arrangements relating to the use of the port reception facilities are simple and expeditious to avoid undue delays to ships;

(c) the fees charged for delivery do not create a disincentive for ships to use the port reception facilities; and

(d) the port reception facilities allow for the management of the waste from ships in an environmentally sound manner in accordance with Directive 2008/98/EC and other relevant Union and national waste law."

The WFD (2008/98/EC) lays down the main waste management principles, including the waste hierarchy, which calls for the reuse and recycling of waste over other forms of waste recovery and disposal and requires the establishment of systems for the separate collection of waste.

Article 4(2)(d) of the PRF Directive goes on to state:

"Member States shall ensure separate collection to facilitate reuse and recycling of waste from ships in ports as required under Union waste law, in particular Directive 2006/66/EC of the European Parliament and the Council, Directive 2008/98/EC and Directive 2012/19/EU of the European Parliament and of the Council. In order to facilitate this process, port reception facilities may collect the separate waste fractions in accordance with waste categories defined in the MARPOL Convention, taking into account the guidelines thereof".

There are six annexes to the MARPOL Convention, each covering a different group of waste types. MARPOL Annex V, which entered into force on 1 March 2018, seeks to eliminate and reduce the amount of garbage being discharged into the sea from ships.

"Under MARPOL Annex V, garbage includes all kinds of food, domestic and operational waste, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically".[88]

The PRF Directive's reference to the WFD is particularly relevant for ship wastes pertaining to the separate collection and recovery targets for paper, metal, plastic, and glass, e.g., ship-generated waste from MARPOL Annex V.

4.4.2 Interaction With The SUPD

Article 8(9) of the SUPD states that Member States shall ensure that the producers of fishing gear containing plastic cover the costs of the separate collection of **waste fishing gear** containing plastic:

"With regard to the extended producer responsibility schemes established pursuant to paragraph 8 of this Article, Member States shall ensure that the producers of fishing gear containing plastic cover the costs of the separate collection of waste fishing gear containing plastic that has been delivered to adequate port reception facilities in accordance with Directive (EU) 2019/883 or to other equivalent collection systems that fall outside the scope of that Directive and the costs of its subsequent transport and treatment. The producers shall also cover the costs of the awareness raising measures referred to in Article 10 regarding fishing gear containing plastic."[89]

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[88] IMO (n.d.) *Prevention of Pollution by Garbage from Ships.* https://www.imo.org/en/OurWork/Environment/Pages/Garbage-Default.aspx

[89] EU (2019) *Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment*. Available at: https://eur-lex.europa.eu/eli/dir/2019/904/oj

Article 3(5) of the SUPD defines 'waste fishing gear' as

> *"any fishing gear covered by the definition of waste in point 1 of Article 3 of Directive 2008/98/EC, including all separate components, substances or materials that were part of or attached to such fishing gear when it was discarded, including when it was abandoned or lost"*.[90]

This suggests that the SUPD mandates the inclusion of abandoned or lost fishing gear within the scope of an EPR scheme for fishing gear. However, Article 8(8) of the SUPD specifies that these EPR schemes should only cover the costs associated with fishing gear containing plastic that has been placed on the market within each Member State.

> *"Member States shall ensure that extended producer responsibility schemes are established for fishing gear containing plastic placed on the market of the Member State, in accordance with Articles 8 and 8a of Directive 2008/98/EC"*.[91]

The SUPD also refers to the indirect fee and states in Part 23 that it should be

> *"supplemented by further financial incentives for fishermen to bring their waste fishing gear on shore to avoid any potential increase in the indirect waste fee to be paid"*.

Section 23 goes on to reference the introduction of an EPR Scheme

> *"for fishing gear and components of fishing gear containing plastic to ensure separate collection of waste fishing gear and to finance environmentally sound waste management of waste fishing gear, in particular recycling"*.[92]

It should also be noted that despite derelict fishing gear being referred to several times throughout the PRF Directive, there is no definition of this key term in the Directive and the terminology is not used in the SUPD.

4.4.3 Issues and Challenges

The PRF Directive, and its interaction with the SUPD, could result in several challenges which must be overcome, including the deployment and implementation of necessary collection infrastructure, the collection of fishing gear from fishers and the gathering of data and information. The specific challenges related to each of these areas are discussed in more detail below.

1. **Collection Infrastructure**

As mentioned above, the SUPD mandates that producers cover the costs associated with fishing gear containing plastic that has been placed on the market in the relevant Member States.[93] This excludes gear that does not contain plastic and any passively fished waste. To comply with the requirements of the PRF Directive and SUPD, ports may therefore need to provide three separate containers for collecting fishing gear: one for plastic-containing gear as required by the SUPD, another for non-plastic gear as per the PRF Directive, and a third for passively fished waste, the cost of which is to be borne by Member States under the PRF Directive. Some ports may have difficulty finding sufficient space to accommodate this many separate containers for fishers to use, however as a minimum it will be crucial to separate end-of-life gear and passively fished waste as the former has more recycling potential than highly contaminated/ degraded/ mixed waste from FFL.

To comply with the PRF Directive and the SUPD systems would need to be put in place to record the volume of these streams that have been collected and ensure that any financing is being used appropriately. In addition, the separate containers will need to be clearly labelled to minimize the risk of contamination of end-of-life fishing gear with passively fished waste and to prevent material leakage into the natural environment.

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[90] Ibid.
[91] Ibid.
[92] Ibid.
[93] Ibid.

Under the SUPD, the costs associated with the collection and treatment of end-of-life fishing gear are to be borne by producers, as per the mandatory EPR scheme. However, as mentioned above Article 8(2)(d) of the PRF Directive requires that costs of collection and treatment of passively fished waste are borne by Member States which *"shall cover, where appropriate, those costs from the revenues generated by alternative financing systems, including by waste management schemes and by Union, national or regional funding available"*.

Further consideration should be given as to the type of financing schemes that can be put in place to cover the cost of collecting and treating passively fished waste as if the costs of the FFL programme were to be added to the general waste management costs borne by port users, then it could effectively mean that fishermen are subsidising the costs of the FFL Scheme.

Equally significant is Part 29 of the PRF Directive which accepts that waste collected from port reception facilities in small ports can be included in the municipal waste stream.

> *"It can be challenging to adopt and monitor waste reception and handling plans for small non-commercial ports, such as mooring areas and marinas, which receive low traffic, consisting of recreational craft only, or which are only in use during part of the year. The waste from those small ports is normally handled by the municipal waste management system in accordance with the principles set out in Directive 2008/98/EC. In order not to overburden the local authorities and facilitate the waste management in such small ports, it should be sufficient that waste from such ports is included in the municipal waste stream and managed accordingly, that the port makes information regarding waste reception available to port users, and that the exempted ports are reported in an electronic system to allow for a minimum level of monitoring."*

Whereas the implementation of an EPR scheme for fishing gear, as mandated by the SUPD, may require an organisation with a commercial license to collect the end-of-life gear, or it could require the port to coordinate the collection of relevant fishing gear with its producers – if the producers opt to manage the collection and treatment themselves. Ports will need to establish clarity on the fishing gear collection process.

2. The Collection of Fishing Gear from Fishers

As noted earlier, ports may need to introduce three separate containers for the disposal of fishing gear, depending on whether it is passively fished waste, end-of-life gear, and whether it contains plastic. Sorting fishing gear based on these criteria can be time-consuming and resource-intensive for fishers, which may prove to be unpopular with the industry. However, source segregation is imperative to realise any potential value from the relevant materials (particularly nets), and fishers are best placed to do this. Incentives and/or legal requirements may therefore be needed to encourage their participation. In addition, there may be limited ship capacity to not only store fishing gear from other waste, but separately store the different types of fishing gear from each other to make it easier to dispose into the separate containers at the port. This may result in different streams of waste being mixed together at the port and possibly result in significant levels of contamination.

There also poses a significant risk that ships with enough capacity may decide to dispose of the waste at a non-EU port that potentially does not have these requirements in place and therefore enabling fishers to dispose of fishing gear as mixed waste.

Finally, transparency and communication with fishers is essential to ensure they are aware of the purpose for the 100% indirect fee and make use of the relevant waste disposal facilities at ports.

3. Data and Information Gathering

A report by the Clean Oceans Initiative highlights that the seemingly simple requirement of the PRF Directive that passively fished waste and end-of-life gear is reported on in both weight and volume overlooks the logistics involved in doing this. The report by Clean Oceans Initiative raises the following questions:

- *"Who weighs it and calculates the volume?*
- *How is it weighed? Is there a facility in every port and harbour to weigh retired gear? Who reports the data and where is it stored?*

- *Who has responsibility for collecting the data and quality checking same?".*[94]

4.4.4 Recommendation for the EPR Scheme Design

Based on our review of both the PRF Directive and the SUPD, producers should not be responsible for covering the cost of gear that they have not placed on the market. Therefore, we recommend that the preferred EPR option requires producers to only cover the cost of fishing gear that contains plastic that has been placed on the market in each Member State. We also recommend that the preferred EPR options excludes passively fished waste. However, we recognise that the separation of end-of-life gear from passively fished waste may be difficult in practice and that the resources and systems should be put in place to fund the separate collection of these two material streams. Given that the responsibility for the implementation of the PRF Directive, and the submission of plans and relevant data from ports currently rests with the Department of Transport, coordination between DECC, the EPA (and potentially other relevant departments such as the Department of Agriculture, Food and the Marine (DAFM) and Local Authorities) will be necessary to enable monitoring of the relevant data on material streams in scope of the EPR scheme.

[94] Clean Oceans Initiative (2020) *Capacity Study for Waste Management 2020: Opportunities for Retired Waste Fishing Gear and Passively Fished Waste (Marine Litter)*.

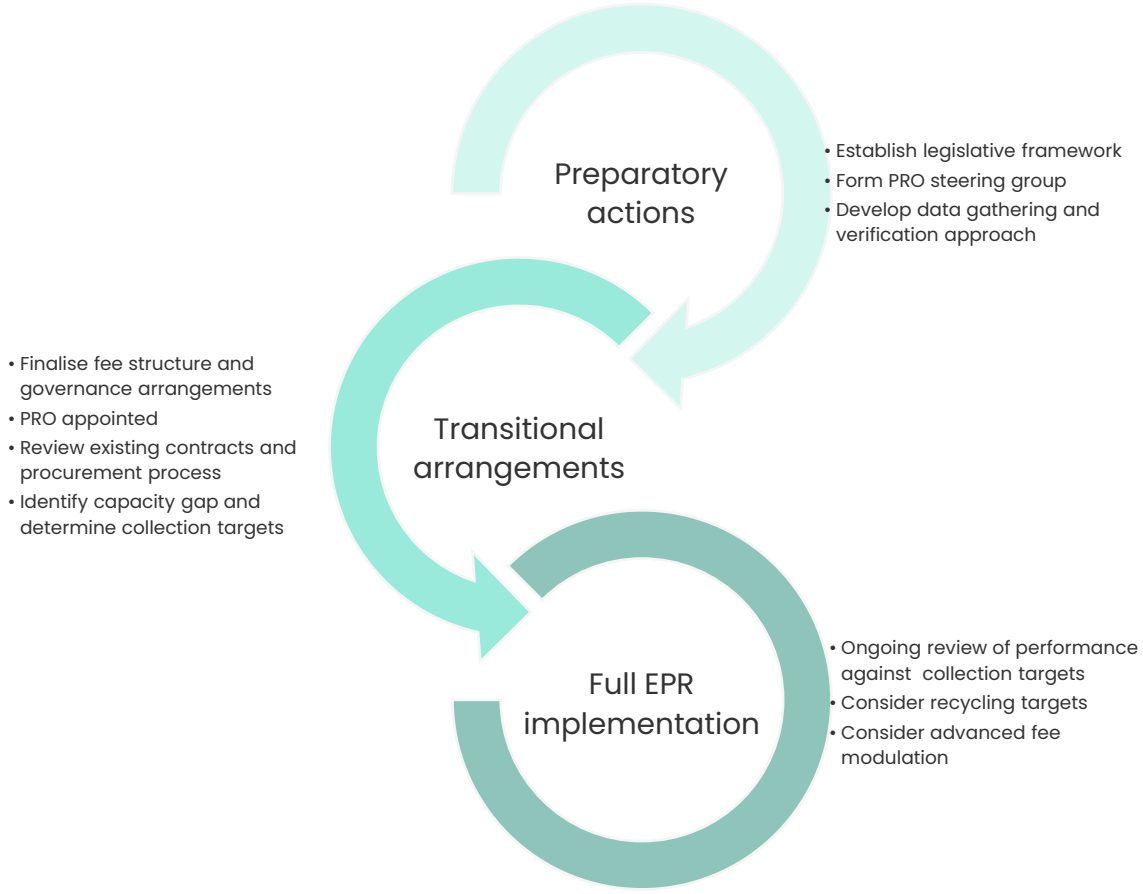
5. Roadmap for the Establishment of EPR for Fishing Gear

Based on findings from tasks 1,2 and 3, and on feedback from workshops with government and industry stakeholders, a range of actions were identified to support the implementation of the preferred option for an EPR model (see Section 4.4.4 above). The necessary actions are described further here, and a roadmap for the roll-out of EPR for fishing gear in Ireland is proposed.

A phased approach to implementation is recommended, with minimal EPR obligations introduced at the end of 2024 (as per the SUPD requirements), and gradually expanded over time until the PRO is operational by the end of 2025, and all elements of EPR have been rolled out (envisaged in 2028-29). This is aligned with the start then strengthen principle (see Section 3.3.2.4) and reflects the need to address the significant concerns with EPR at present raised by stakeholders in the course of this project (see Section 3.4).

Accordingly, three broad implementation phases are recommended – a preparatory phase (which is already underway), followed by a transitional period of partial EPR implementation, and finally full EPR implementation. During each phase, a range of activities must be undertaken to develop the key elements needed for the next. The timing and sequencing of these measures will be important to ensure that measures build on one another and that the new requirements on producers are not prohibitively burdensome in the short term. Figure 5-1 provides a diagrammatic representation of this phased approach with further detail in the sections that follow.

Figure 5-1 Phased implementation of EPR



5.1 Preparatory Actions

It is noted that DECC, alongside BIM and the EPA, is already in the process of undertaking several of the preparatory actions necessary for introducing EPR for fishing gear in Ireland. These are listed below, and reflect the work carried out in this study, which in turn has drawn upon and complemented a range of other research to date:

- A baseline for end-of-life fishing gear containing plastic in Ireland has been developed. While gaps in the data remain, estimates of the total amount of gear containing plastic placed on the market (PoM), and their current EoL treatment routes have been developed and costed as far as possible at present. Full and complete data are not a prerequisite for the implementation of EPR – indeed, the scheme itself will generate the necessary data to review and adjust the requirements over time. An understanding of the scale of legacy gear and the scale of repair and reuse activities at present are key information gaps – whilst the latter could be included in EPR reporting requirements, the former represents a significant source of material leakage at present, and may require additional sampling, audits, etc. to reliably estimate.
- The supply chain and market for fishing gear in Ireland has been mapped, identifying the key actors and roles of producers (as well as chandlers, fish farmers and fishermen, etc.) as well as ports and other waste operators. Key stakeholders have been engaged and there is ongoing communication with producers in particular, to raise awareness of upcoming obligations and secure their buy-in to the scheme. However, the industry has yet to coordinate to form a PRO through which EPR compliance can be managed, and further coordination with waste operators to identify waste management pathways and associated costs is required. Hence, these activities should be intensified prior to the end of 2024, and should continue into the initial phases of EPR implementation. The objective should be for industry to establish a PRO steering group, which, together with DECC, will provide an interim arrangement for EPR compliance until the industry-led PRO becomes operational. The PRO Steering Group should be independently led, with representation from all the relevant stakeholder groups to ensure that interests are aligned, and the scheme is well-coordinated. The Board of the Irish Farm Film Producers Group provides a potentially useful template in this regard, as it includes:
    - An independent chairperson;
    - Representatives of producers at a range of points in the supply chain (manufacturers, importers, distributors, retailers);
    - Representatives from the farming sector itself; and
    - Other independent experts.

Representatives of waste operators, as well as port authorities should also be included in the PRO steering committee.

- The legal framework for the implementation of EPR for fishing gear is already in place (S.I. 612/2022), laying out the scope and objectives for the scheme, and the key roles and responsibilities of various actors. A mechanism for setting collection targets is also already in place. While the scope, objectives, roles and functions of the PRO and obligations of producers will not change, further regulations may be needed, for example, to clarify the role of fishers (as end-users who must comply with certain disposal requirements, as well as in the capacity of producers if they are bringing gear onto the market for the first time, and to provide detail on the nature of any data gathering and reporting requirements.
- Further coordination with other relevant Departments (such as the Department of Agriculture, Food and the Marine (DAFM), the Department of Transport (DTAS) and the Department for Housing, Local Government and Heritage (DHLGH)) will be needed to ensure that the relevant stakeholders and systems for compliance are coordinated. In particular, coordination with ports on reporting against the PRF Directive and new reporting under the SUPD will need to be managed carefully, and the relevant data should be shared across Departments to ensure successful implementation.

- A framework for data gathering and monitoring of fishing gear PoM and collected/ treated in Ireland has not yet been developed, though the EU Implementing Act 2021/958 provides an initial template for this. To date, relevant data has largely been gathered through one-off surveys, with limited participation. The development of the data gathering and reporting structure and obligations to underpin the monitoring of the scheme's performance should draw on lessons learned from these activities. However, improved consistency in the application of relevant waste codes, the gear taxonomy, and the PRFD separate collection and reporting requirements will also be needed. The data gathering, reporting and monitoring framework should be developed with the baseline data gaps in mind, but also in such a way as to enable robust compliance with EU reporting requirements.

The outcomes of these preparatory actions should be threefold. Firstly, the revision of the existing regulations for EPR for fishing gear in Ireland to include additional details on producer obligations, roles and responsibilities, as well as deadlines by which the obligations must be met. Secondly, the establishment of a PRO steering group by industry representatives supported by DECC and BIM representatives to provide an interim arrangement by the end of 2024. Finally, the third outcome is the development of a clear data gathering and verification approach, together with relevant methods for calculation, reporting templates, verification procedures, and IT systems as needed to enable compliance with the SUPD reporting requirements.

5.2 Transitional Arrangements

The outcomes of the preparatory actions described above will enable partial implementation of EPR obligations for fishing gear in Ireland. Accordingly, the legislative framework should include the following transitional arrangements, potentially issued in the form of guidance where legislation is not appropriate:

- The governance structure for the scheme, identifying the nature, set up and governance of the PRO (a single not-for-profit entity), as well as the roles and responsibilities of producers, ports, municipalities and waste operators in operating the scheme, and that of regulators (DECC), enforcement agencies (the EPA and the Local Authorities), and other relevant governmental bodies and agencies (such as DAFM, DTAS, DHLGH, BIM) in monitoring and supporting compliance within the scheme and awareness raising activities.
- As part of the above, further communication around the requirement and a deadline for producers to form a PRO, and in the future, for producers to mandatorily comply with EPR requirements through the PRO (as set out in S.I. 612/2022). The criteria and process for accrediting the relevant PRO should be laid out accordingly, alongside any penalties for non-compliance (e.g., tax mechanism to cover costs of EoL fishing gear if producers fail to form a PRO, penalties if the PRO fails to meet its target, etc.), the PRO steering committee established at the end of the preparatory phase should act in a transitionary capacity till the relevant deadline for PRO establishment.
- A requirement for producers to register and report PoM data from the outset, as per the framework established at the end of the preparatory phase and appropriate deadlines. Given that the PRO will not yet have been fully established, provisions should be made for such reporting to initially be carried out by individual producers reporting to DECC and the PRO steering group. It is noted that there may be issues of commercial sensitivity to consider at this stage, so it is recommended that DECC manage the submissions of detailed data and provide aggregated data to the steering group. Once the PRO is established, all producer data should be managed by this body, with transparency and reporting to regulators and enforcers as needed. This data will be crucial to determine key outstanding elements of the scheme (such as the final fee structure, any thresholds for differentiated producer responsibility, final reporting requirements, etc.).
- A certain amount of leeway should also be provided for producers to get to grips with the new requirements before they become fully enforceable through penalties (e.g., if producers fail to register with the PRO, if producers fail to report or underreport tonnages PoM, etc.). For example, producers may not immediately be able to report data at the desired level of granularity, and should be allowed to report aggregate data, or to rely on PoM estimates based on sales in

previous years during the initial registration and data gathering phase. However, the expectations with regards to data gathering and monitoring in future years should be made clear as early on as possible, to ensure that producers have a clear direction of travel and can make the necessary adjustments to their own processes and systems efficiently. This will also limit the need for costly and time-consuming revisions in future years.

- A requirement for ports, Local Authorities and waste companies to gather the necessary data on EoL fishing gear separately collected, transported and treated, as well as estimates of the costs associated with these activities for plastic gear in particular. Coordination with DTAS, DAFM and DHLGH will be needed to enable this given their areas of responsibility and current data management arrangements.
- While producer fees in proportion to PoM data may not yet be chargeable at this stage, a registration fee should be payable by producers to cover at least some of the costs associated with administration of the transitional arrangements. Once the PRO becomes operational, the fee should include the full costs of scheme administration and awareness-raising activities, even if charging fees for collection, transport and treatment of waste is not yet possible to include.

These transitional regulatory arrangements will simultaneously allow the interim PRO steering group to start generating the data needed to determine indicative EPR fees and targets, and refine other requirements, whilst also providing producers with a certain degree of flexibility while they adjust their own internal systems to the new requirements.

Additionally, to enable full EPR implementation, the PRO steering group (and the PRO thereafter) will need to undertake a range of other activities during this transitional phase. In addition to the finalisation and communication of the fee structure and governance arrangements for the scheme, the flows of finance, materials and data within the scheme will need to be determined in the regulations and clarified through guidance, and updates to related regulations as needed. For example, this may necessitate changes in the current procurement procedures and contract specifications for waste management from ports and other collection points for fishing gear, as well as the ways in which waste operators report on performance, to ensure that the PRO is involved and satisfied as to the effectiveness of the systems they will be funding in the future.

It is anticipated that by the end of the transitional period, the industry-led PRO should be fully operational, building on the existing PRO steering committee. The process for inviting PRO applications (as per Regulation 6 in S.I. 612/2022), evaluating these and approving the PRO should therefore have been completed by both industry and the Minister during this time. A suitable amount of time and the necessary arrangements to allow for the PRO to establish itself, and for relevant workstreams, databases, etc. to be handed over to the PRO from the previous PRO steering committee should also be provided for.

Once the PRO is operational, a review of the existing capacity to treat EoL fishing gear containing plastic relative to the emerging data on quantities PoM, as well as potential for additional investments in new facilities and/or technologies should also be undertaken to support the development of national circular solutions.

5.3 Full EPR Implementation

At the end of the transitional period, the PRO should be fully operational, with systems for registration and data reporting, charging fees, and contracting with waste operators for the separate collection and treatment of waste gear established. Obligated producers should already be registered with the PRO, and reporting requirements should have been in place for at least a year to enable them to make the necessary changes to enable robust reporting and verification. Producers should already be covering costs associated with the scheme's administration, as well as awareness raising and consumer information activities.

The need for any improved collection systems and offtake arrangements should have been identified in the capacity review undertaken during the transitional phase. Potential solutions can then be procured as needed and relevant contracts awarded with input from the PRO. The final structure and level of fees to be charged to producers to cover the costs of collections, transport and treatment can be

determined on this basis, and producers can start to be charged to cover the costs of collection, transport and treatment of EoL fishing gear containing plastic in proportion to the tonnages they place on the market.

It is noted that till this stage, the process to set collection targets to drive the scheme's performance will remain unchanged, i.e., determined by the Minister each year based on volumes collected in the previous year, and possibly remaining at the current level of 100 tonnes. However, in order to drive the necessary improvements to enable the separate collection of fishing gear containing plastic for recycling, a more ambitious target for the collection of the relevant gear will be needed at this point. Given that compliance with this target will become the responsibility of the PRO, it would make sense for the target to be set as a proportion of the gear PoM for which the PRO is responsible, rather than based on volumes collected in the previous year. The capacity analysis carried out in the transitional phase will enable the Minister to determine to what extent a given target is likely to be feasible.

It is worth noting that given the phased approach described throughout, the timing for the determination of these targets is likely to coincide with the scheduled review of the SUP Directive by July 2027, which will include a study of the feasibility of establishing binding quantitative collection targets for waste fishing gear. National targets should be set with this in mind, and the relevant analysis should be carried out early enough to enable productive input to the target setting process at EU level.

At this point, the EPR scheme would be considered to be fully implemented. Ongoing review processes should be in place to reaccredit the PRO periodically, revise targets as needed, and adjust the scope of the regulations if the data highlights issues such as freeriding. Over time, collection targets should be expanded to include recycling targets as well, at which point advanced modulation of producer fees should also be considered to encourage design choices and switches towards gear with lower environmental impacts at EoL.

5.4 How to Deal with Legacy Gear

As noted throughout this report (see Sections 2.5.1, 0 and 3.4), the large volumes of legacy gear currently stored on land pose a significant challenge for the rollout of EPR. There is currently a lack of accurate information regarding the exact volume and types of legacy gear, making the most suitable methods to deal with this waste stream challenging to determine. Based on task 1, we understand that this is largely EoL gear that has been left on land, in harbours or stores in order to avoid costs of waste management, with no clarity on ownership and therefore responsibility. This type of waste sometimes ends up in the general waste stream and can be costly to manage. Given that this situation pre-dates the implementation of EPR, assigning the costs associated with the clean-up of legacy gear to obligated producers would be unfair and, given the volumes of waste involved, unfeasibly burdensome for many of them. At the same time, requiring the government to take full responsibility for this waste stream, at a cost to the taxpayer, could be similarly problematic.

Once the EPR scheme is operational, the provision of free collection services, and facilities for dismantling gear would provide a strong incentive for fishers to dispose of EoL gear more responsibly, instead of storing it to avoid waste management costs. In so far as some legacy gear is stored as 'backup' gear or for parts, the practice is not likely to be eliminated entirely, but should significantly reduce. However, until the EPR scheme is fully implemented and updated collection systems are designed and rolled out, the volumes of legacy gear will likely keep increasing.

As a result, a legacy gear amnesty programme is proposed during the transitional phase during which EPR is being fully implemented. Given that gear amnesty programmes have been tried in several ports in the past, with limited results, a more targeted, national programme is proposed here, accompanied by widespread awareness raising activities and supported by the relevant Departments (including DTAS, DAFM, DECC and DHLGH). Harbour masters should be involved in the design of the scheme to understand the lessons that can be learned from previous amnesty programmes. The amnesty scheme could also be used as a test bed to provide a degree of learning regarding best practice segregation and the challenges associated with recycling gear to help develop the system for managing EoL gear that the EPR scheme will fund.

As part of the programme, fishers and other end users of fishing gear for commercial purposes should be enabled to get legacy gear removed for free and/or skips made available to collect legacy gear near common storage sites or ports for a limited period of time. While no commitment has been made to fund such a programme, we would recommend that the programme should be funded by the government, with implementation spearheaded by DECC, in coordination with other key departments (DAFM, DTAS, DHLGH), agencies (such as BIM) and stakeholders (ports, Local Authorities, etc.). Volunteer-led clean ups and awareness raising sessions should also be organised as part of the programme, to inform end users about the upcoming EPR scheme and new collection options as well as any penalties that will be associated with non-compliant disposal behaviour in the future such as fly-tipping or abandoning EoL gear, and based on the standards that are established for presentation of gear for collection by the EPR scheme (see Section 3.2.2.4 for such requirements in Iceland, for example). Alternatively, incentives to participate in the scheme could be considered.

Producers and/ or the PRO steering group should be involved in these elements, helping to identify potential hotpots for the amnesty programme, and contributing towards the costs of awareness raising activities as part of the programme (and in line with their EPR obligations). Larger producers can also be required to offer repair services, take back and so on for any types of gear that may be valuable and for which they have the relevant expertise/ systems in place. The costs of the actual collections, transport and treatment of gear, as well as the organisation and implementation of the programme should be borne by government, however.

To keep these costs manageable, it is noted that the legacy gear amnesty programme is not envisioned to run on a continuous basis or country-wide throughout the transitional period of three years. A sub-set of major ports/ regions should be selected for roll out of the programme every quarter, with the programme lasting at least two weeks in each case, and with each port ideally being covered at least twice during the three-year implementation period – the timing and seasonality of these 'sessions' should be considered carefully to allow ample time for fishers and other relevant end-users to engage with it (bearing in mind periods of good weather, tide, seasons etc. during which fishers are likely to be at sea, the duration likely to be spent at sea, etc.). The programme should be designed to allow ample time for end users to engage with it.

The purpose of the amnesty programme will be to ensure that the existing stock of legacy gear is being tackled, at least to some degree, prior to the roll out of EPR. Additionally, the programme should be used to foster greater understanding of the scope and volume of legacy gear currently in existence (as this remains a key data gap), and to inform the initial development of collection and treatment routes for the future PRO to consider. Finally, the amnesty programme will also provide a valuable opportunity to engage with stakeholders and spread awareness of the upcoming EPR scheme and the role of end users within it.

The end of the amnesty programme should coincide with the roll out of new collection services, and the point at which producers are given financial responsibility for collection, transport and treatment of gear, as part of the full implementation of the EPR scheme. After this point, obligated producers (and the PRO acting on their behalf) will cover costs associated with the EoL management of any legacy gear remaining in storage.

5.5 Timing and Sequencing of Actions

Figure 5-2 below provides a timeline for the implementation of key activities in the three phases described above. The preparatory phase is proposed to progress till the end of 2024, with a focus on enhanced communications with producers and other key stakeholders to enable the establishment of the industry-led PRO steering committee, initiated and supported by DECC, by the end of the year. The identification of necessary revisions to the regulatory framework, including data gathering and reporting requirements should also commence in 2024, though the finalisation of these aspects can extend beyond this into the first quarter of 2025 if needed. Finally, the modalities of the legacy gear amnesty programme should also be determined as early as possible, though ideally this would be done with the input of the newly formed PRO steering committee.

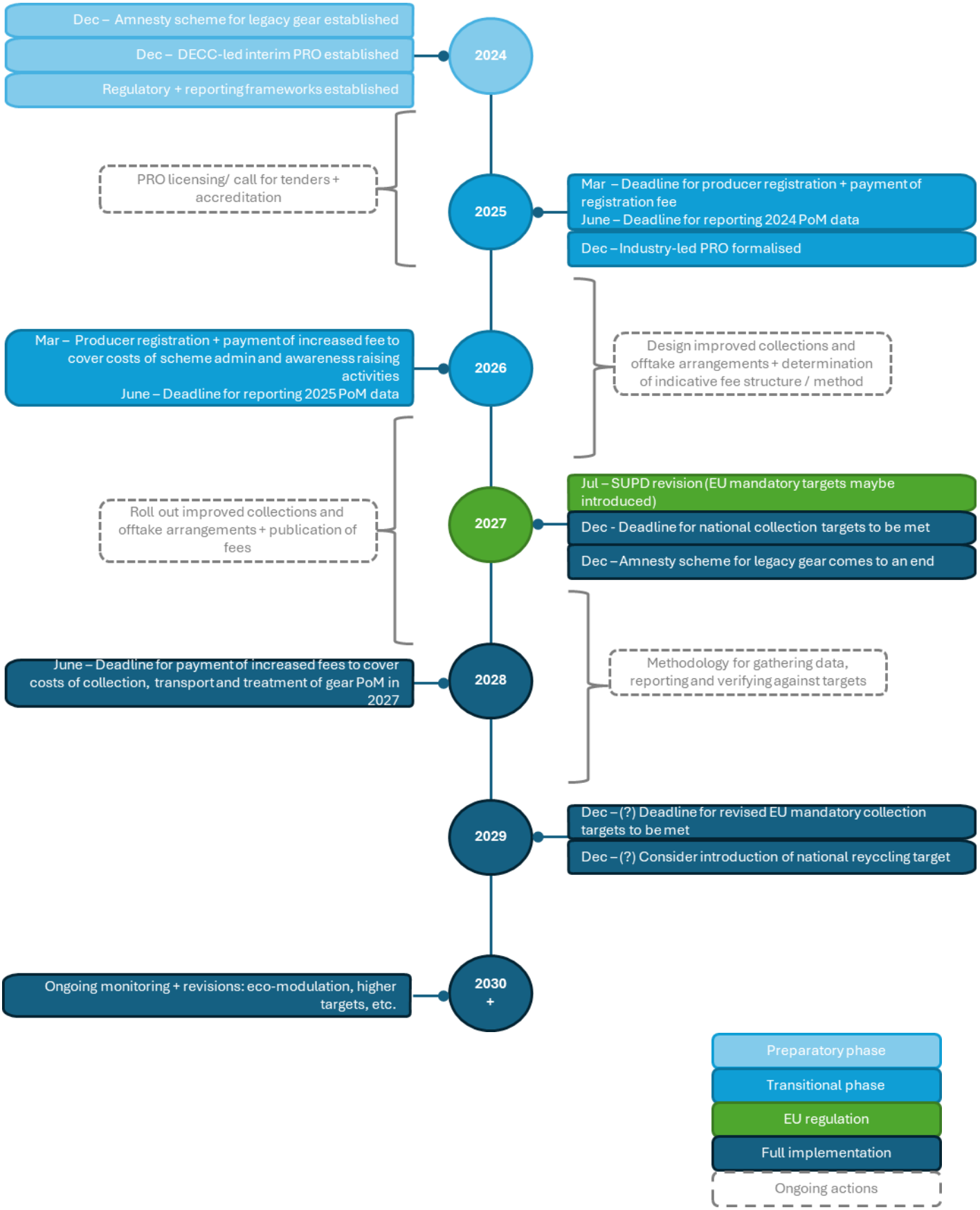
The transitional phase can then commence, with producers registering their activities and providing PoM data alongside an initial registration fee. The transitional phase is anticipated to last a minimum of two

years, reflecting the fact that the process of accrediting the PRO and operationalising it may take up to a year. Only after this can the PRO negotiate new contracts as needed, determine suitable fees and targets, and start to administer EPR requirements in full. During this time, it is anticipated that producers will be reporting data, and paying some fees (e.g., to cover scheme administration and awareness raising activity costs). In addition, they should be required to participate in the amnesty programme for legacy gear as described in the previous section.

The EPR scheme is expected to be fully implemented in 2028. By this time, national collection targets should have been established and consistently met by the EPR scheme, and any targets after 2027 should be established with due consideration of the revision to the SUP Directive and possible mandatory collection targets at the EU level due in July 2027. By 2028, producers should be covering the full costs associated with collection, transport and treatment of gear containing plastics that were placed on the market in 2027 in addition to the fees already paid during the transitional period. Accordingly at the end of 2027, the amnesty programme for legacy gear can be ended. In the event that mandatory EU collection targets are introduced in 2027, with a deadline for attainment of 2030, DECC should also consider whether it is appropriate to also start phasing in recycling targets for the gear collected at this time (in 2029).

Beyond 2030, DECC can consider the scope for improved performance requirements within the EPR scheme, for example, through the introduction of recycling targets (in addition to existing collection targets), and through the introduction of advanced modulation of fees to encourage recyclability, reusability, etc. in gear design. DECC's role should be limited beyond this point to monitoring performance and reapproving the PRO periodically, and carrying out evaluations and periodic reviews of the regulations as necessary (including, for example, specifying increased targets over time, changing the scope of the scheme to cover new materials/ products as needed, etc.).

Figure 5-2 Roadmap for implementation of EPR



Appendix

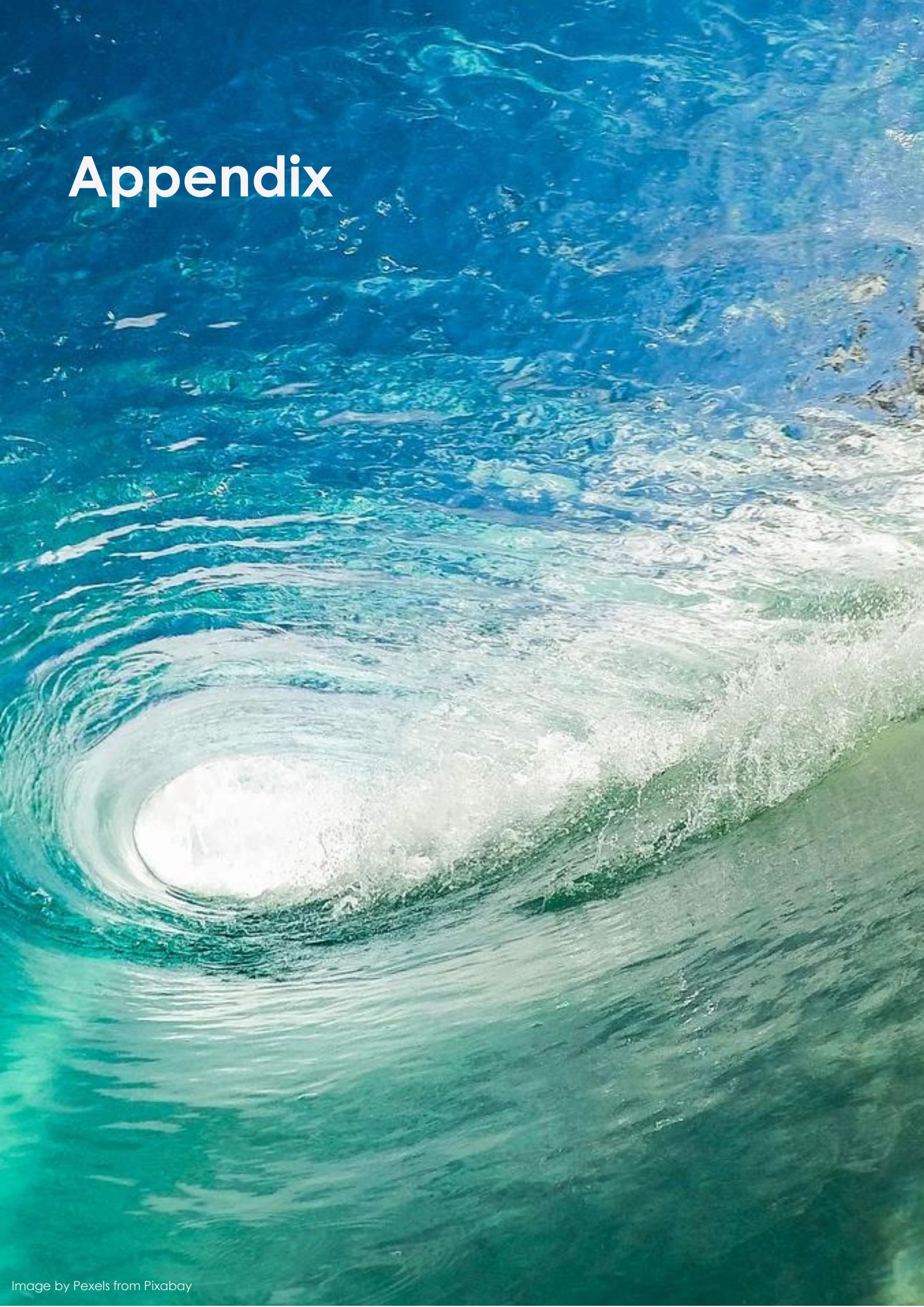


Image by Pexels from Pixabay

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A.2.0 Estimates of Fishing Gear Placed on the Market

Pots

Figure A2-1: Estimated plastic waste from plastic framed pots in 2024

Irish vessels operating pots as a primary gear							Total estimated plastic waste from pots in 2024 (tons)
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of pots operated per vessel	Estimated total number of pots	Estimated plastic weight of all pots by length category (tons)	Pot replacement rate (years)	Estimated plastic waste from pots in 2024 after replacement rate is accounted for (tons)	
<10m	696	300	208800	156.6	5	31.32	95.82
10-12m	61	500	30500	22.875	5	4.575	
12-18m	24	3000	72000	54	3	18	
18-24m	2	3000	6000	4.5	3	1.5	
Totals	**783**		**317300**	**237.975**		**55.395**	
Irish vessels operating pots as a secondary gear							
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of pots operated per vessel	Estimated total number of pots	Estimated plastic weight of all pots by length category (tons)	Pot replacement rate (years)	Estimated plastic waste from pots in 2024 after replacement rate is accounted for (tons)	
<10m	321	300	96300	261	10	26.1	
10-12m	45	500	22500	45.75	10	4.575	
12-18m	12	3000	36000	54	6	9	
18-24m	2	3000	6000	4.5	6	0.75	
Totals	**380**		**160800**	**365.25**		**40.425**	

Note: estimated values given during industry consultation and assumes total weight of plastic framed pots is **750kg**, assumes higher replacement rates among smaller operators and that replacement rates among secondary pot operators are 50% less than primary operators.

Other sources: (European Commission, 2020)

Figure A2-2: Estimated waste from steel framed pots in 2024

Irish vessels operating steel framed pots as a primary gear							Total estimated waste from steel framed pots in 2024 (tons)
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of pots operated per vessel	Estimated total number of pots	Estimated plastic weight of all pots by length category (tons)	Pot replacement rate (years)	Estimated plastic waste from pots in 2024 after replacement rate is accounted for (tons)	
<10m	696	300	208800	3132	5	626.4	1391.1
10-12m	61	500	30500	457.5	5	91.5	
12-18m	24	3000	72000	1080	3	360	
18-24m	2	3000	6000	90	3	30	
Totals	**783**		**317300**	**4759.5**		**1107.9**	
Irish vessels operating steel framed pots as a secondary gear							
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of pots operated per vessel	Estimated total number of pots	Estimated plastic weight of all pots by length category (tons)	Pot replacement rate (years)	Estimated plastic waste from pots in 2024 after replacement rate is accounted for (tons)	
<10m	321	300	96300	1444.5	10	144.45	
10-12m	45	500	22500	337.5	10	33.75	
12-18m	12	3000	36000	540	6	90	
18-24m	2	3000	6000	90	6	15	
Totals	**380**		**160800**	**2412**		**283.2**	

Note: estimated values provided during industry consultation and assumes steel framed pots weigh **15kg in total, 95% of which is the steel frame**, assumes higher replacement rates among smaller operators and that replacement rates among secondary pot operators is 50% less than primary operators

Other sources: (European Commission, 2020)

Purse Seine

Figure A2-3: Estimated plastic waste from purse seines in 2024

Irish vessels operating purse seines as a primary gear							Total estimated plastic waste from purse seines in 2024 (tons)
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of purse seines operated per vessel	Estimated total number of purse seines	Estimated plastic weight of all purse seines by length category (tons)	Purse seine replacement rate (years)	Estimated plastic waste from purse seines in 2024 after replacement rate is accounted for (tons)	
	7	3	21	40.3	5.0	8.1	
	0	3	0	0.0	5.0	0.0	
	1	3	3	11.5	5.0	2.3	
	2	4	8	30.7	5.0	6.1	
	1	4	4	15.4	5.0	3.1	
	2	4	8	30.7	5.0	6.1	
	13		**44**	**128.7**		**25.74**	
Irish vessels operating purse seines as a secondary gear							
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of purse seines operated per vessel	Estimated total number of purse seines	Estimated plastic weight of all purse seines by length category (tons)	Purse seine replacement rate (years)	Estimated plastic waste from purse seines in 2024 after replacement rate is accounted for (tons)	**28.43**
	0	3	0	0.0	10.0	0.0	
	1	3	3	11.5	10.0	1.2	
	0	3	0	0.0	10.0	0.0	
	0	4	0	0.0	10.0	0.0	
	0	4	0	0.0	10.0	0.0	
	1	4	4	15.4	10.0	1.5	
	2		**7**	**26.89**		**2.69**	

Note: estimates of pelagic trawl waste were produced using a net calculation by and assumes the total plastic weight of the gear and components is **3.8 tons**

Sources: (European Commission, 2020), (Marga et al, 2022)

Pelagic Trawl

Figure A2-4: Estimated plastic waste from demersal trawls in 2024

Irish vessels operating pelagic trawls as a primary gear							Total estimated plastic waste from pelagic trawls in 2024 (tons)
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of trawls operated per vessel	Estimated total number of trawls	Estimated plastic weight of all trawls by length category (tons)	Trawl replacement rate (years)	Estimated plastic waste from pelagic trawls in 2024 after replacement rate is accounted for (tons)	
<10m	32.0	3.0	96.0	61.5	5.0	12.3	104.1
10-12m	22.0	3.0	66.0	84.5	5.0	16.9	
12-18m	13.0	3.0	39.0	49.9	5.0	10.0	
18-24m	14.0	4.0	56.0	53.8	5.0	10.8	
24-40m	17.0	4.0	68.0	65.3	5.0	13.1	
40>m	19.0	4.0	76.0	73.0	5.0	14.6	
Totals	**117.0**		**401.0**	**388.0**		**77.6**	
Irish vessels operating pelagic trawls as a secondary gear							
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of trawls operated per vessel	Estimated total number of trawls	Estimated plastic weight of all trawls by length category (tons)	Trawl replacement rate (years)	Estimated plastic waste from pelagic trawls in 2024 after replacement rate is accounted for (tons)	
<10m	30.0	3.0	90.0	57.6	10.0	5.8	
10-12m	12.0	3.0	36.0	46.1	10.0	4.6	
12-18m	5.0	3.0	15.0	19.2	10.0	1.9	
18-24m	21.0	4.0	84.0	80.7	10.0	8.1	
24-40m	11.0	4.0	44.0	42.3	10.0	4.2	
40>m	5.0	4.0	20.0	19.2	10.0	1.9	
Totals	**84.0**		**289.0**	**265.1**		**26.5**	

Note: estimates of pelagic trawl waste were produced using a net calculation and assumes the total plastic weight of the gear and components is **3.8 tons**

Sources: (European Commission, 2020), (Marga et al, 2022)

Demersal Trawls

Figure A2-5: Estimated plastic waste from pelagic trawls in 2024

Irish vessels operating demersal trawls as a primary gear							**Total estimated plastic waste from demersal trawls in 2024 (tons)**
Vessel length category	Number of Vessels	Estimated number of trawls per vessel	Average combined weight of the trawls (tons)	Replacement rate (years)	Estimated plastic waste of demersal trawls in 2024 after replacement rate is accounted for (tons)	Total plastic waste of demersal trawls in 2024 after the number of vessels per length category is accounted for (tons)	
<10m	45	12	6	3	2	90.00	
10-12m	20	12	6	3	2	40.00	
12-18m	12	12	6	3	2	24.00	
18-24m	29	12	6	3	2	58.00	
24-40m	33	12	6	3	2	66.00	
Totals	**139**		**30**		**10**	**278**	
Irish vessels operating demersal trawls as a secondary gear							
Vessel length category	Number of Vessels	Estimated number of trawls per vessel	Average combined weight of the trawls (tons)	Replacement rate (years)	Estimated plastic waste of demersal trawls in 2024 after replacement rate is accounted for (tons)	Total plastic waste of demersal trawls in 2024 after the number of vessels per length category is accounted for (tons)	**382.00**
<10m	45	12	6	6.0	1	45.00	
10-12m	18	12	6	6.0	1	18.00	
12-18m	12	12	6	6.0	1	12.00	
18-24m	14	12	6	6.0	1	14.00	
24-40m	13	12	6	6.0	1	13.00	
40>m	2	12	6	6.0	1	2.00	
Totals	**104**		**36**		**6**	**104.00**	

Note: Plastic weights estimated using information provided by Pepe Trawls during consultation, assumes trawls operate 4 trawls per rig (e.g. 4 per quad rig) Estimate of 400kg of gear (plastic nets and ropes) per net. For groundfish gear it is heavier at around 600kg. Each vessel has 12 nets (4 in use plus carry 2 spare, then same for ground gear) 6x400 and 6 x500 = **6 tonnes of gear per demersal trawler**

Sources: (European Commission, 2020)

Beam Trawl

Figure A2-6: Estimated plastic waste from beam trawls in 2024

Irish vessels operating beam trawls as a primary gear							Total estimated plastic waste from beam trawls in 2024 (tons)
Vessel length category	Number of Vessels	Estimated number of trawls per vessel	Average combined weight of the trawls (tons)	Replacement rate (years)	Estimated plastic waste of beam trawls in 2024 after replacement rate is accounted for (tons)	Total plastic waste of beam trawls in 2024 after the number of vessels per length category is accounted for (tons)	
18-24m	1	6	3.6	2.0	7	3.60	36.0
24-40m	6	6	3.6	2.0	43	21.60	
18-24m	2	6	3.6	2.0	14	7.20	
Totals	**9**		**11**		**65**	**32.4**	
Irish vessels operating beam trawls as a secondary gear							
Vessel length category	Number of Vessels	Estimated number of trawls per vessel	Average combined weight of the trawls (tons)	Replacement rate (years)	Estimated plastic waste of beam trawls in 2024 after replacement rate is accounted for (tons)	Total plastic waste of beam trawls in 2024 after the number of vessels per length category is accounted for (tons)	
24-40m	1	6	4	2.0	7.2	3.60	
Totals	**1**	**6**	**4**		**7**	**3.6**	

Note: Plastic weights estimated using information provided by Pepe Trawls during consultation, assumes beam trawls for groundfish is heavier at around 600kg. Each vessel has 6 nets, 6 x600 = **3.6 tonnes of gear per demersal trawler**

Sources: (European Commission, 2020)

Fixed and Drift Nets

Figure A2-7: Estimated plastic waste from fixed & drift nets in 2024

Irish vessels operating drift & fixed nets as a primary gear							Total estimated plastic waste from drift & fixed nets in 2024 (tons)
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of drift & fixed nets operated per vessel	Estimated total number of drift & fixed nets	Estimated plastic weight of all drift & fixed nets by length category (tons)	Drift & fixed net replacement rate (years)	Estimated plastic waste from drift & fixed nets in 2024 after replacement rate is accounted for (tons)	
<10m	401	2	802	558	10	55.81	
10-12m	50	3	150	209	10	20.88	
12-18m	20	4	80	111	10	11.13	
18-24m	7	5	35	49	10	4.87	
24-40m	1	6	6	8	10	0.84	
Totals	**479**		**1073**	**935**		**94**	
Irish vessels operating drift & fixed nets as a secondary gear							
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of drift & fixed nets operated per vessel	Estimated total number of drift & fixed nets	Estimated plastic weight of all drift & fixed nets by length category (tons)	Drift & fixed net replacement rate (years)	Estimated plastic waste from drift & fixed nets in 2024 after replacement rate is accounted for (tons)	
<10m	298	2	596	414.7	20	20.74	
10-12m	38	3	114	158.7	20	7.93	
12-18m	14	4	56	77.9	20	3.90	
18-24m	5	5	25	34.8	20	1.74	
24-40m	4	6	24	33.4	20	1.67	
Totals	**359**		**815**	**720**		**35.98**	

Note: Estimated plastic weight of nets **1.39t,** nets used by vessels <10m assumed to be smaller and half the size of larger nets used by other vessels, estimated weight of these nets is **0.7t**

Sources: (Ziegler et al, 2003), (European Commission, 2020), (Anon, 2024)

Trammel Nets

Figure A2-8: Estimated plastic waste from trammel nets in 2024

Irish vessels operating trammel nets as a primary gear							Total estimated plastic waste from trammel nets in 2024
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of trammel nets operated per vessel	Estimated total number of trammel nets	Estimated plastic weight of all trammel nets by length category (tons)	Drift & trammel net replacement rate (years)	Estimated plastic waste trammel nets in 2024 after replacement rate is accounted for (tons)	
12-18m	1	4	4	6	10	0.56	
24-40m	1	6	6	8	10	0.84	
Totals	**2**		**10**	**14**		**1.4**	
Irish vessels operating trammel nets as a secondary gear							
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of trammel nets operated per vessel	Estimated total number of trammel nets	Estimated plastic weight of all trammel nets by length category (tons)	Drift & trammel net replacement rate (years)	Estimated plastic waste trammel nets in 2024 after replacement rate is accounted for (tons)	
<10m	2	2	4	5.6	20	0.28	
24-40m	1	6	6	8.4	20	0.42	
Totals	**3**		**10**	**14**		**0.70**	

Note: Estimated plastic weight of nets **1.39t,** nets used by vessels <10m assumed to be smaller and half the size of larger nets used by other vessels, estimated weight of these nets is **0.7t**

Sources: (Ziegler et al, 2003), (European Commission, 2020)

Longlines

Figure A2-9: Estimated plastic waste from longlines in 2024

Irish vessels operating longlines as a primary gear							Total estimated plastic waste from longlines in 2024 (tons)
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of longlines operated per vessel	Estimated total number of longlines	Estimated plastic weight of all longlines by length category (tons)	Longline replacement rate (years)	Estimated plastic waste from longlines in 2024 after replacement rate is accounted for (tons)	
<10m	68	30	2040	9	2	4	
10-12m	10	30	300	1	2	1	
18-24m	1	100	100	0	2	0	
Totals	**79**		**2440**	**11**		**5**	
Irish vessels operating longlines as a secondary gear							
Vessel length category	Number of registered Irish vessels in 2024	Estimated number of longlines operated per vessel	Estimated total number of longlines	Estimated plastic weight of all longlines by length category (tons)	Longline replacement rate (years)	Estimated plastic waste from longlines in 2024 after replacement rate is accounted for (tons)	
<10m	217	30	6510	28	4	7	
10-12m	18	30	540	2	4	1	
12-18m	15	50	750	3	4	1	
18-24m	2	100	200	1	4	0	
24-40m	1	200	200	1	4	0	
Totals	**253**		**8200**	**36**		**9**	

Note: Estimated plastic weight of a single longline is **4.3325kg**

Sources: (Coastal nets, 2024), (Rope services UK, 2024), (Saline fish, 2024), (The Short Blue Fleet, 2014), (Oceana, 2024

A.3.0 Estimates of Aquaculture Gear Placed on the Market

Salmon

Figure A3-1: Estimated plastic waste from salmon aquaculture in 2022

Irish salmon plastic waste estimates 2022						
Irish salmon production units	Tonnage of Irish salmon Produced in 2022	Estimated tons of salmon produced per pen area of a 120m pen	Estimated total number of salmon pens in Ireland	Estimated number of pens per production unit	Plastic waste per salmon pen after replacement rates for each componet are accounted for (tons)	Total estimated plastic waste from salmon farms in 2022 (tons)
13	11916	75.8	157	12	1.02	**161**

Estimated per cage salmon production		
Salmon pen size	120m pen	160m
Pen area	11,310	20,106
produced per pen	6.7	6.7
peroduced per	75,775	134,711
produced per pen	**75.8**	**134.7**

Note: Estimated plastic weight of a single salmon pen is 1.02t after replacement rates are accounted for, salmon production figures per cage use estimates by given Marine Scotland, 2022

Sources: (CES, 2024), (Marine Scotland, 2022)

Figure A3-2: Salmon pen plastic component breakdown

Salmon cage plastic components overview							
Salmon pen Components	**Number used per pen**	**Description**	**Procured item unit size**	**Frequency replaced (years)**	**Individual component weight**	**Estimated total weight of components (tons)**	**Estimated total weight of components after replacement rates are accounted for (tons)**
Cage collars/rings	2	Polarcirkel 500- 120	120m	15	between 6.9 / 8.9 tons depending on how many rings (2 or 3)	7.9	0.527
Cage net	1	120 circ/12m	23m deep	5	accounted for in the above 7.9 tones of the cage collars/rings		
Top net	1		120m	4			
Top net supports	16		5m	10			
Side Predator nets	0			8			
Feed pipes	1		100m	15	1900g	1.9	0.127
Cage mooring buoys	4		1000litre	10	145kg	0.58	0.058
Installations - submersible	6	dropper airlines	50m	5	16.67kg	0.02	0.00
rope coil for Slider ropes	1	20mm polypropylene	220m	3	39.81 kg	0.04	0.01
rope coil for water lines	2	16mm polypropylene	220m	3	25.52 kg	0.05	0.02
rope coil for Header ties	4	10mm polypropylene	220m	2	9.94 kg	0.04	0.02
rope coil for Tie ropes	1	14mm polypropylene	220m	2	19.49 kg	0.02	0.01
Hides for cleaner fish	2	2 barrels	45 gallon	7	7 kg	0.01	0.00
Hide ropes	2	16mm polypropylene	220m	2	25.52 kg	0.05	0.03
Kelp ropes	6	16mm polypropylene	220m	2	25.52 kg	0.15	0.08
Uplift	1	150mm layflat hose	30m	10	1.4kg per meter	0.04	0.00
Mooring leg ropes	3	assumed its 72mm rope	40m assumed	2	(2.3gk/m)	0.28	0.14
Navigational marker buoys	2	Navigational marker buoys	standard marker buoy assumed	10	1.2kg	0.00	0.00
					Total plastic weight	11.09	1.02

Sources: (CES, 2024), (Nexa Parts, 2024), (Rope services, 2024), (Gael force, 2024), (Fresh by design, 2024)

Oysters

Figure A3-3: Estimated plastic waste from oyster aquaculture in 2022

Irish oyster plastic waste estimates 2022						
Irish oyster production units	Tonnage of oyster produced	Estimated average oyster bag plastic weight (t)	Estimated total number of bags in operation in Ireland	Estimated total plastic weight of all oyster bags	Average oyster bag replacement rate	Total estimated plastic waste from oyster production in 2022 (tons)
164	11121	0.00075	2000000	1500	4	**375**

Sources: (MTA, 2019), (European Commission, 2020)

Mussels (Suspended Culture - Rope)

Figure A3-4: Estimated plastic waste from suspended mussel aquaculture in 2022

Irish suspended mussle culture plastic waste estimates 2022						
Irish rope mussel production units	Tonnage of mussels produced	Total kg of plastic used per ton of mussel	Total tons of plastic used per ton of mussels	Total estimated plastic used in Irish rope mussel production 2022 (tons)	Gear replacement rate (years)	Total estimated plastic used in Irish rope mussel production 2022 after accounting for replacement rates (tons)
54	12,921	23.2	0.0232	299.7672	see table below	**45**

Components used in Irish suspended mussel culture			
Components	**Quantity used (kg/tonne)**	**Replacement rate (yrs)**	**kg/tonne per annum**
Ropes	13	20	0.65
Buoys	4.4	20	0.22
Pegs	3.5	10	0.35
Mesh socks	2.3	1	2.3
Total input weight of plastic	**23.2**		**3.52**

Sources: (European Commission, 2020) (Meyhoff Fry, 2012, BIM pers. comm.)

Mussel (Seabed – Bottom Cultured)

Figure A3-5: Estimated plastic waste from seabed mussel aquaculture in 2022

Irish seabed cultured mussel plastic waste estimates 2022 assuming bag is only full of mussels						
Irish seabed cultured mussel production units	Tonnage of mussels produced	Estimated mussel tonnage produced per bag	Total number of mussel bags in use	Plastic weight per mussel bag	Mussel bag replacement rate	**Total estimated plastic weight of all mussel bags in 2022**
25	6864	1	6864	0.00075	1	**5.148**
Irish seabed cultured mussel plastic waste estimates 2022 assuming bag is filled 50% with mussels and 50% mud and shell						
Irish seabed cultured mussel production units	Tonnage of mussels produced	Estimated mussel tonnage produced per bag	Total number of mussel bags in use	Plastic weight per mussel bag	Mussel bag replacement rate	**Total estimated plastic weight of all mussel bags in 2022**
25	6864	0.5	13728	0.00075	1	**10.296**

Sources: (Smartlift, 2024), (Seafish & Epsilon Aquaculture Ltd, 2008)

Other Bottom Culture

Figure A3-6: Estimated plastic waste from other seabed aquaculture in 2022

Other Irish seabed culture plastic waste estimates 2022 assuming bag is 100% full of produce						
Other Irish seabed culture production units	Tonnage produced	Estimated tonnage produced per bag	Total number of culture bags in use	Plastic weight per bag	bag replacement rate	**Total estimated plastic weight of all other culture in 2022**
12	399	1	399	0.00075	1	**0.30**
Other Irish seabed culture plastic waste estimates 2022 assuming bag is filled 50% with produce and 50%						
Other Irish seabed culture production units	Tonnage produced	Estimated tonnage produced per bag	Total number of culture bags in use	Plastic weight per bag	bag replacement rate	**Total estimated plastic weight of all other culture in 2022**
12	399	0.5	798	0.00075	1	**0.60**

Sources: (Smartlift, 2024), (Seafish & Epsilon Aquaculture Ltd, 2008)

Seaweed (Rope Culture)

Figure A3-7: Estimated plastic waste from seaweed aquaculture in 2022

Irish suspended seaweed culture plastic waste estimates 2022						
Irish suspended seaweed production units	Tonnage of seaweed produced	Total kg of plastic used per ton of seaweed	Total tons of plastic used per ton of seaweed	Total estimated plastic used in Irish suspended seaweed production 2022 (tons)	Gear replacement rate (years)	Total estimated plastic used in Irish rsuspended seaweed production 2022 after accounting for replacement rates (tons)
10	493	30.96	0.03096	15.26	10	1.53

Components used in Irish suspended seaweed		
Components	**Unit**	**Input per functional unit**
Anchoring bouy	kg	6.56
bouys	kg	5.68
Longline (c1)	kg	3.45
Longline (c2	kg	1.63
Longline (d1/d2)	kg	7.96
Longline (d3)	kg	5.68
Total input weight of plastic		**30.96**

Sources: (Thomas et al, 2021), (European Commission, 2020) (Meyhoff Fry, 2012)

A.4.0 Strategic Review

A.4.1 Long List of Countries

Table A4-1 Long list of countries

Country	Status of Extended Producer Responsibility (EPR)
Norway	Proposed mandatory scheme and active voluntary collection scheme
Iceland	Active voluntary scheme (as alternative to mandatory advance fees)
Denmark	Active mandatory scheme (in transition period, some elements under consultation)
Sweden	Active mandatory scheme (in transition period)
Finland	Active mandatory scheme (in transition period)
Austria	Legislation in place
Ireland	Legislation in place
France	Legislation in place
Spain	Legislation in place
USA	Voluntary – regional
Canada	Voluntary – regional
Netherlands	Legislation in place
Estonia	Legislation in place
England	Reviewing policy options
Scotland	Reviewing policy options
Germany	Voluntary
South Korea	Voluntary

A.4.2 Target Questions for Research

Table A4-2 Questions included in the strategic review

Questions asked for the strategic review
Has EPR been implemented? What is the date of implementation?
Description of the scheme
What are the products covered by EPR scheme?
Who are the producers in scope?
What is the type of EPR model used?
What is the main objective of the scheme?
What costs are covered by producers within the scheme?
What is the fee structure for producer contributions?
What are the reporting requirements for producers?
What are the enforcement and governance arrangements?
Is the scheme mandatory or voluntary?
Are there any exemptions or is there any differentiation for any types of producers?
What are the potential unintended consequences?
What evidence of impacts are there?
What supplementary measures may be needed to support implementation?

A.5.0 Findings from the Deep Dive

A.5.1 Norway

Table A5-1 Deep Dive of Norway

Content	Detail 
Full name	Three relevant initiatives identified: • There is currently a voluntary scheme for fishing gear collection, recycling and disposal, operated by Nofir. • The Norwegian Plastics Strategy proposes to introduce a mandatory EPR scheme (planned to be implemented from 2025). • There is currently a requirement for commercial fishers to report lost fishing gear.
Summary of sector profile	Norway is the second largest global exporter of seafood (by value) and Norway's fishing and aquaculture industries are a major sector in the country's economy.[95] In 2022 the seafood industry in Norway accounted for a total value creation of NOK 109 billion (€9.33bn/ £8.02bn). Of this, the value creation in the seafood industry's core business was over NOK 71 billion (€6.07bn/ £5.22bn) in 2022, while NOK 38 billion (€3.25bn/ £2.80bn) were indirect effects.[96] Furthermore, a total of 86,000 people were employed in the seafood industry in 2022. Five counties (Nordland, Vestland, Troms and Finnmark, Møre and Romsdal and Trøndelag) accounted for almost 90% of value creation, having had direct value creation of between NOK 11 - 16 billion (€934m– €1.36bn/ £809m– £1.18bn). The largest was Nordland, which had more than NOK 20 billion (€1.70bn/ £1.47bn) in value creation and indirect effects.[97] In recent years, two reports on extended producer responsibility for plastic fishing gear in Norway have been carried out by Mepex on behalf of the Norwegian Environment Agency. The latest was published in 2022 and estimates that about 6,200 tonnes of fishing gear suitable for commercial fishing was put on the market in 2020.[98] For recreational fishing the same value was estimated to be about 430 tonnes.[99] According to a report by the Nordic Council of Ministers 8,492 tonnes of all fishing gear was estimated to be imported in 2020 and 3,211 tonnes was exported. 'Fishnets made up of man-made fibres' made up the largest proportion of imports and exports at 7,105 tonnes and 3,183 tonnes respectively. Of the 7,105 tonnes of 'fishnets, made up of manmade fibres' imported, 'ready-made fish nets made of synth/art textile materials (excluding polyamide and ethylene), not cages/pots' made up 3,972 tonnes (approx. 56%). This was followed by 'ready-made fish nets made of polyamide multifilament, omissions/ pots' which made up 2,087 tonnes (approx. 30%) of imports. The following categories made up the remaining 1,387 tonnes of imported fishing gear:

[95] Systemiq (n.d.) *Achieving Circularity (Chapter 2: A circularity approach can change the trajectory.* Available at: https://www.systemiq.earth/reports/achieving-circularity/for-durable-plastics/chapter-2/fanda/
[96] Nofima (2023) *The ripple effects of the seafood industry.* Available at: https://nofima.com/results/five-counties-account-for-90-of-value-creation-in-the-norwegian-seafood-industry
[97] Ibid.
[98] Nordic Council of Ministers (2022) *Quantification and environmental pollution aspects of lost fishing gear in the Nordic countries*. Available at: https://www.diva-portal.org/smash/get/diva2:1729769/FULLTEXT01.pdf
[99] Ibid.

	• 'Fishhooks' (587 tonnes were imported and nothing was exported); • 'Fishing reels' (64 tonnes were imported and 1 tonne was exported); and • 'Line fishing tackle n.e.s; fish landing nets, butterfly nets and similar nets; decoys and similar hunting or shooting requisites (excl. decoy calls of all kinds and stuffed birds of heading 9705)' (736 tonnes were imported and 27 tonnes were exported).[100]
Scope	**Scope of proposed EPR scheme:** • Fishing gear that contains plastic and is used in the commercial fishing and aquaculture sector is proposed to be within scope of the EPR scheme.[101] This may be extended to include fishing gear that contains plastic and is used for recreational fishing.[102] • It is proposed that producers responsible for equipment containing plastic from fisheries, aquaculture and recreational fishing will be required to comply with any EPR requirements. **Scope of the voluntary scheme:** • Fishing gear that has come to the end of its life is within scope of the voluntary scheme currently operated by Nofir. This includes trawl nets, ring netting, gillnets, ropes, fish farming nets, tarpaulins, cleaning fish shelters and sludge from fishing and fish farming activities.[103] • The voluntary scheme places no obligations on producers however, key actors include fishers and port operators who partake in the Nofir scheme. o Fishers are required to dispose of any fishing gear within scope of the voluntary scheme to the collection points offered by Nofir. o Port operators who partake in the scheme offered by Nofir will be required to have an area dedicated to the collection of end-of-life fishing gear. **Scope of reporting requirement on lost fishing gear:** • Commercial fishers are required to report any lost commercial fishing gear (or parts of commercial fishing gear) to the Directorate of Fisheries.
Status/ date of implementation	**Proposed EPR scheme:** Proposed to be implemented by 1 January 2025. [104] **Voluntary scheme:** Established in 2008.[105] **Reporting requirements on lost fishing gear:** Introduced in 1980, amended in 2022.[106]

[100] Nordic Council of Ministers (2022*) Quantification and environmental pollution aspects of lost fishing gear in the Nordic countries*. Available at: https://www.diva-portal.org/smash/get/diva2:1729769/FULLTEXT01.pdf
[101] Norwegian Ministry of Climate and Environment (2022) *Norwegian Plastics Strategy*. Available at: https://www.regjeringen.no/contentassets/ccb7238072134e74a23c9eb3d2f4908a/en/pdf/norwegian-plastics-strategy.pdf
[102] Miljo-direktoratet (2022*) Produsenter får større ansvar for produktene som avfall.* Available at: https://www.miljodirektoratet.no/aktuelt/nyheter/2022/november-2022/produsenter-far-storre-ansvar-for-produktene-som-avfall/
[103] Nofir (n.d.) *Homepage*. Available at: https://nofir.no/en/
[104] Norwegian Ministry of Climate and Environment (2022) *Norwegian Plastics Strategy*. Available at: https://www.regjeringen.no/contentassets/ccb7238072134e74a23c9eb3d2f4908a/en/pdf/norwegian-plastics-strategy.pdf
[105] Nofir (n.d.) *Homepage*. Available at: https://nofir.no/en/
[106] Ministry of Industry and Fisheries 9(2021) *Regulations relating to the implementation of fishing, catching and harvesting of wild living marine resources (Harvesting Regulations)*. Available at: https://lovdata.no/dokument/SF/forskrift/2021-12-23-3910/KAPITTEL_16#KAPITTEL_16

The nature of obligations on producers	**Proposed EPR Scheme:** A report by the Norwegian Environment Agency proposes that "duties regarding product design, reuse, collection, waste treatment, achieving a material recycling rate and reporting are placed on the manufacturer".[107] In most cases, the producers must meet their obligations by being a member and paying a fee to an approved return company that takes care of the obligations on the producers' behalf (i.e., a PRO). Under certain conditions, manufacturers can fulfil their obligations on their own. In addition, the manufacturer is required to achieve a material recycling rate and/or collection rate in relation to the amount the producer puts on the market or the amount of waste that occurs. This obligation ensures the collection of the 'most problematic' waste.[108] **Voluntary scheme:** Producers do not participate in the voluntary scheme in any way and hence under the voluntary scheme there are currently no obligations on producers. Fishers however are required to dispose of any fishing gear within scope of the voluntary scheme to the collection points offered by Nofir. **Reporting requirements on lost fishing gear:** Commercial fishers are required to report any lost or found fishing gear to the Directorate of Fisheries (this also applies to parts of equipment, such as trawl ropes). The commercial fishers must report information such as the type and amount of equipment, as well as the location where the equipment was last seen.[109] There is no obligation on recreational fishers to report lost gear, however, they are encouraged to also report any lost or found fishing gear to the Directorate of Fisheries.[110]
Cost coverage	**Proposed EPR Scheme:** The producers should cover the necessary costs of sorting, collection and subsequent transport and treatment for the products they put on the market, in addition to the cost of reporting requirements and communication and awareness raising work (which the Norwegian Environment Agency refer to as 'attitude-building work'). The level of compensation for the actors who ensure collection, transport and treatment etc. are determined in private law agreements between the return companies and the players.[111] **Voluntary scheme:** Under the voluntary scheme the collection, transportation and treatment of fishing gear is funded through material revenue and EU funding. Following €680,000 of funding under the EU Eco-Innovation Programme, the scheme expanded and now collects and recycles discarded equipment from fishing and aquaculture around Europe and in Turkey (called EUfir).[112] Fishers and/or port operators are responsible for washing and disinfecting the nets and disposing to the fishing gear at dedicated collection points provided by Nofir. **Reporting requirements on lost fishing gear:** The scheme enables the Directorate of Fisheries to record and monitor the quantities of lost commercial and recreational fishing gear and target clean up and retrieval activities at hotspot areas. Producers are not required to contribute towards the scheme, instead, and as discussed further below, the fishing industry bear 50% of the costs – this includes maintaining the reporting and monitoring system, administrative costs, and the costs of clean up and disposal.

[107] Norwegian Environment Agency (n.d.). *Further development of producer responsibility in Norway*. Available at: https://www.miljodirektoratet.no/sharepoint/downloaditem/?id=01FM3LD2SZGGWDWVNUHVDKGVGJV7LHTYV4
[108] Ibid.
[109] Directorate of Fisheries (n.d.) *Reporting lost gear for commercial fishermen.* Available at: https://www.fiskeridir.no/Areal-og-miljo/Marin-forsoepling/meld-fra-om-tapt-redskap/Meld-fra-om-tapt-redskap-yrkesfiske
[110] Directorate of Fisheries (n.d) *Recreational fishing app.* Available at: https://www.fiskeridir.no/Fritidsfiske/Meld-tapt-og-funnen-reiskap
[111] Norwegian Environment Agency (n.d.) *Further development of producer responsibility in Norway*. Available at: https://www.miljodirektoratet.no/sharepoint/downloaditem/?id=01FM3LD2SZGGWDWVNUHVDKGVGJV7LHTYV4
[112] European Commission (n.d.) *A European system for collecting and recycling discarded equipment from the fishing and fish farming industry*. Available at: https://cordis.europa.eu/project/id/304305/en

Fee mechanism	**Proposed EPR Scheme:** No information is available on the fee mechanism for the proposed EPR scheme, though proposals indicate that producer fees will cover the costs of collections, and subsequent transport and treatment in addition to awareness raising activities in proportion to amounts of fishing/ aquaculture gear containing plastic PoM by the producers. Overlaps with the waste fees payable to port reception facilities have also been identified for further consideration at this stage. **Voluntary scheme:** Nofir is not funded by producer fees. Instead, it operates more as a collection and recycling system. The fractions containing nylon or metals have a positive market value, with nylon making up the majority of gear collected. These material (and resulting product) revenues, together with grants, fund the scheme. Nofir can offer considerable savings to those disposing of fishing gear. For example, in 2015 it was reported that a large 20 tonne net would usually cost around €5,600 to landfill and another €1,400 to transport.[113] By contrast, these materials are collected for free by Nofir. As such, no fee is paid by fishermen at the point of collection, and this creates an incentive to deliver to the scheme as the alternative disposal routes generally charge a fee for disposal. In some cases, it has been reported that Nofir may pay to collect material depending on both the quality and the transport distance required.[114, 115] Nylon is the most valuable material and hence fishers may receive a payment for this. **Reporting requirements on lost fishing gear:** According to a report by the Nordic Council of Ministers the fishing industry contributes more than 50 per cent of the funding to national annual clean-up, through a fee.[116]
Eco-modulation	**Proposed EPR Scheme:** Details as to whether the EPR scheme for fishing gear will include eco-modulation is not yet available. However, a report by the Norwegian Environment Agency proposes that "the scheme gives the manufacturer incentives to reduce this cost by making products that are more durable and easy to reuse and recycle", indicating that some form of eco-modulation could be expected to be implemented.[117] **Voluntary scheme:** As mentioned above, fishers may receive a payment for some materials however no further information is available on the payment structure offered by Nofir. **Reporting requirements on lost fishing gear:** N/A
Data reporting and verification	**Proposed EPR Scheme:** No information is available on any data reporting requirements under the proposed EPR scheme. However, it's expected that the following data/ information will need to be collected in some form[118]: • the number and/or weight of fishing gear containing plastic placed on the market;

[113] Personal communication with Øistein Aleksandersen, CEO of NoFir (2015) via Publications Office of the European Union (2022) *Study to support preparation of the Commission's guidance for extended producer responsibility scheme*. Available at: https://op.europa.eu/en/publication-detail/-/publication/ecb86ea2-932e-11ea-aac4-01aa75ed71a1/language-en

[114] Publications Office of the European Union (2022) *Study to support preparation of the Commission's guidance for extended producer responsibility scheme*. Available at: https://op.europa.eu/en/publication-detail/-/publication/ecb86ea2-932e-11ea-aac4-01aa75ed71a1/language-en

[115] Rijkswaterstaat WVL/BN REM (2021) *How to come to a more circular (management) system of fishing gear in the OSPAR-region*. Available at: https://www.noordzeeloket.nl/publish/pages/189036/report-how-to-come-to-a-more-circular-management-system-of-fishing-gear-in-the-ospar-region_.pdf

[116] Nordic Council Ministers (2020) *Main Report – A network to reduce marine litter and ghost fishing.* Available at: https://pub.norden.org/temanord2020-509/temanord2020-509.pdf

[117] Norwegian Environment Agency (n.d.) *Further development of producer responsibility in Norway*. Available at: https://www.miljodirektoratet.no/sharepoint/downloaditem/?id=01FM3LD2SZGGWDWVNUHVDKGVGJV7LHTYV4

[118] Ibid.

	• the estimated costs (incurred by municipalities/ port reception facilities (PRFs) participating in collections who may be remunerated within the EPR scheme); and • the relative share of fishing gear containing plastic collected. **Voluntary scheme:** Each year, since 2011, Nofir publish the weight of fishing gear that the scheme collected in each country that they operate in.[119] **Reporting requirements on lost fishing gear:** Commercial fishers are required to report their losses through the web-based tool FishInfo (FiskInfo).[120]
Scheme operation	**Proposed EPR Scheme:** Details regarding the operation of the proposed EPR scheme beyond those described above are not yet available. **Voluntary scheme:** The Nofir (Norwegian fishery recycling) project was established in 2008 to collect and recycle discarded fishing gear in Norway and has expanded significantly since its establishment. Nets must be washed and disinfected before being recycled (this is carried out at Nofir collection points, with further sorting and decontamination at pre-treatment facilities) and other types of gear can be collected as they are. Nofir have regional collection facilities established in Norway and fishermen or ports can also request collections of gear via the Nofir website once they have amassed a certain quantity.[121] **Reporting requirements on lost fishing gear:** Since 1980, it has been obligatory for commercial fishers to report any lost fishing gear either to the Directorate of Fisheries or the coast guard. Commercial fishers are required to report any loss (or found) fishing gear via the web-based tool FishInfo (FiskInfo).[122] The Directorate of Fisheries in Norway then conduct annual operations to recover as much lost gear as possible. The documented losses serve as the foundation for identifying priority areas during the yearly cleanup efforts along the Norwegian coast.[123] According to a report by the Nordic Council of Ministers cleaning operations focus on cages and hooks because of the risk of ghost fishing, but many other gears such as nets and fishing line are retrieved as well.[124]
Waste infrastructure	**Proposed EPR Scheme:** Details regarding the waste infrastructure required to support the proposed EPR scheme are not yet available, however it has been noted that the port reception facilities (PRF) Directive[125] requirements are still to be implemented and will likely form a key part of the collection infrastructure to be funded by producers. **Voluntary scheme:** • **Collection:** Fishing gear within scope of the voluntary scheme is collected separately from other materials. The Nofir scheme only covers a limited number of ports, and on-demand collection can only be organised if enough material is amassed. Norway has a very large number of fishing ports. Most of these have varying and sometimes little capacity for receiving scrapped and broken fishing gear, and what is not managed by Nofir may be managed by fishermen, ports and local waste management operators, going to landfill or

[119] Nofir (n.d.) *Sustainability*. Available at: https://nofir.no/en/barekraft/
[120] Directorate of Fisheries (n.d.) *Reporting lost gear for commercial fishermen.* Available at: https://www.fiskeridir.no/Areal-og-miljo/Marin-forsoepling/meld-fra-om-tapt-redskap/Meld-fra-om-tapt-redskap-yrkesfiske
[121] Rijkswaterstaat WVL/BN REM (2021) *How to come to a more circular (management) system of fishing gear in the OSPAR-region.* Available at: https://www.noordzeeloket.nl/publish/pages/189036/report-how-to-come-to-a-more-circular-management-system-of-fishing-gear-in-the-ospar-region_.pdf
[122] Directorate of Fisheries (n.d.) *Reporting lost gear for commercial fishermen.* Available at: https://www.fiskeridir.no/Areal-og-miljo/Marin-forsoepling/meld-fra-om-tapt-redskap/Meld-fra-om-tapt-redskap-yrkesfiske
[123] Directorate of Fisheries (n.d.) *Marine Litter.* Available at: https://www.fiskeridir.no/English/Coastal-management/Marine-litter
[124] Nordic Council of Ministers (2022) *Quantification and environmental pollution aspects of lost fishing gear in the Nordic countries*. Available at: https://www.diva-portal.org/smash/get/diva2:1729769/FULLTEXT01.pdf
[125] Directive (EU) 2019/883 – port reception facilities for the delivery of waste from ships

	incineration. In contrast, the national system developed through the EPR scheme is intended to provide fishers across Norway with a disposal route for their fishing gear.[126] • **Transportation & treatment:** The material collected is transported to facilities in Lithuania where it undergoes dismantling and preparation for recycling.[127] The prepared materials are then sold all over the world for reprocessing.[128] For example, Aquafil facilities in Slovenia process nylon collected from fishing nets.[129] The secondary material, Econyl, is incorporated into new products such as clothes, furniture and carpets.[130] **Reporting requirements on lost fishing gear:** Since the beginning of the 1980s the Directorate of Fisheries has conducted annual retrieval surveys in the most important fishing areas. The surveys are reliant on the real-time reports of lost fishing gear with locations, which are reported electronically via the Directorate of Fisheries. The surveys have concentrated mainly on gill nets, traps and pots, because these gears are assumed to have the largest impact in terms of ghost fishing. In addition, large amounts of lines, seines, and other articles related to fisheries such as ropes, wires and anchors, have been retrieved.[131]
Scheme performance	**Proposed EPR Scheme:** N/A **Voluntary scheme:** In 2023 Nofir reported that 8,212 tonnes of fishing and fish farming gear was collected in 2023 from Norway, Iceland, the Faroe Islands, Denmark and Great Britian. The largest proportion, 6,308 tonnes, was collected in Norway. Of the 8,212 tonnes collected 6,153 tonnes was sent for material recycling (~75%). Data on the proportion of fishing gear collected in Norway that is consequently sent for recycling is not available, however the proportions are likely to be similar.[132] **Reporting requirements on lost fishing gear:** In 2023 the annual clean-up retrieved 37,000 metres of nets, in addition to thousands of metres of lines, ropes and warps.[133]
Unintended consequences	No unintended consequences have been identified. However, it should be noted that Nofir only measure the recycling rate against the tonnage of fishing gear collected, and not the total tonnage placed on the market by manufacturers per year.
Supplementary measures	**Proposed EPR Scheme:** No details have been published as to whether the introduction of a EPR scheme for fishing gear would require the implementation of supplementary measure such as deposits, traceability or certification. **Voluntary scheme:** No supplementary measures have been introduced to support the voluntary scheme operated by Nofir. **Reporting requirements on lost fishing gear:** No supplementary measures have been introduced to support the requirement for commercial fishers to report any lost fishing gear.

[126] Nordic Council Ministers (2020) *Main Report – A network to reduce marine litter and ghost fishing.* Available at: https://pub.norden.org/temanord2020-509/temanord2020-509.pdf
[127] Nofir (n.d.) *Our solutions.* Available at: https://nofir.no/vare-losninger/
[128] Nordregio (n.d.) *Green growth in Nordic regions: 50 ways to make it happen.* Available at: https://archive.nordregio.se/en/Publications/Publications-2016/GREEN-GROWTH-IN-NORDIC-REGIONS-50-ways-to-make-/Blue-growth-/A-circular-approach-to-blu/index.html
[129] Recycling today (2019) *How abandoned fishing nets are recycled into nylon.* Available at: https://www.recyclingtoday.com/news/abandoned-fishing-nets-recycled-into-nylon
[130] An.no (2018) *Øistein and NoFir transform old yarn into new bathing suits.* Available at: https://www.an.no/iris-salten/industri/okonomi-og-naringsliv/oistein-og-nofir-forvandler-gammelt-garn-til-nye-badedrakter/s/5-4-907861
[131] Directorate of Fisheries (n.d.) *Marine Litter.* Available at: https://www.fiskeridir.no/English/Coastal-management/Marine-litter
[132] Nofir (2024) *Breaks all records: - Unbelievable!* Available at: https://nofir.no/knuser-alle-rekorder-ikke-til-a-tro/
[133] World Fishing & Aquaculture (2023) *Norway's fishing gear clean-up breaks records.* Available at: https://www.worldfishing.net/nov-2023-greener-fishing/norways-fishing-gear-clean-up-breaks-records/1489729.article

Anything else of interest?	• In terms of total tonnage of fishing gear containing plastic waste (i.e., beyond those managed by Nofir), Deshpande et al (2020) estimates that around 4,000 tonnes of plastic waste from derelict fishing gear is collected across Norway annually, of which 24% is landfilled, 21% is incinerated for energy recovery, and 55% is sent to recyclers for further processing.
	• Following initial operations in Norway, Nofir received EU funding (€680k) under the Eco-Innovation Programme to expand its operations into other Member States, calling the project EUfir.[134,135]
	  o EUfir collected 910 tonnes of fishing gear over the three years of the eco-innovation project.[136] This material was collected from Iceland, Scotland, Ireland, Denmark and the Netherlands and it is understood that collections of material from Norway in part subsidised Nofir's activities in these countries.
	  o During the project, Nofir collected 501 tonnes from Iceland, 340 tonnes from Scotland, 14 tonnes from Ireland, 22 tonnes from Denmark and 33 tonnes from the Netherlands.[137]
	  o An LCA report was produced looking at the impacts of the EUfir programme, based on the average output composition of 76% PA6 (nylon), 13% PP, 9% PE, 2% lead and 1% steel.[138]
	• Nofir continues to operate beyond Norway in 2022 also collected fishing gear in Iceland, Faroe Island, Denmark and the UK.[139]

[134] European Commission (n.d.) *Eco-innovation.* Available at: https://ec.europa.eu/environment/eco-innovation/projects/en/projects/eufir
[135] European Commission (n.d.) *A European system for collecting and recycling discarded equipment from the fishing and fish farming industry.* Available at: https://cordis.europa.eu/project/id/304305/en
[136] NoFir and Life Cycle Engineering (2016) *Life Cycle Assessment of EUfir system.* Available at: https://nofir.no/wp-content/uploads/2023/10/20160118_EUFIR__LCA_summary_report.pdf
[137] Ibid.
[138] Ibid.
[139] NoFir (n.d.) *Sustainability*. Available at: https://nofir.no/en/barekraft/

A.5.2 Iceland

Table A5-2 Deep dive of Iceland

Content	Detail 
Full name	A collection and recycling scheme for fishing gear is currently operated in Iceland by Fisheries Iceland (SFS). However, it should be noted that Article 8 Processing Charge Act No. 162/2002 gives the government powers to introduce an advanced disposal fee, which was a key lever in the setting up of the voluntary collection system. The system was set up to avoid the fees that would have been due under this law.
Summary of sector profile	Fishing is an economically important sector to Iceland. In 2021/22, the seafood industry contributes 8.1% to the GDP directly (€2.11bn/ £1.81bn), and 25% if indirect effects are taken account of (€6.53bn/ £5.62bn)).[140,141] The total catch of Icelandic vessels in 2023 was 1.375 million tonnes which was valued as 197 billion ISK (€1.3bn/£1.1bn) at first sale. The largest proportion of this was from the value of demersal catch. The value of demersal catch was 126 billion ISK (€844m/£722.7m) of which cod was the most valuable at 81 billion ISK. In 2022, around 707 thousand tonnes of marine products were exported from Iceland, 9% increase from 2021. The export value was 352 billion ISK (FOB [142]) (€2.34bn/£2.02bn) which is 18.3% more than the previous year. Of this around 141 billion ISK (€937m/£808m), or 40%, was due to the export of cod and cod products.[143] The number of Icelandic fishing vessels was 1,535 at the end of 2023. Of these, 39 were trawlers, 678 decked vessels and 818 undecked vessels. The number of fishing vessels has been steadily decreasing in the last decades for all vessel sizes except those over 1,500 gross tonnage, which have increased somewhat.[144] According to a report by the Nordic Council of Ministers, 486 tonnes of fishing gear was imported into Iceland in 2020, while 99 tonnes was exported. 'Fishnets made up of man-made fibres' made up approximately 77% (374 tonnes) of fishing gear imports and 79% (78 tonnes) of exports.[145] This was followed by: • 'Line fishing tackle n.e.s; fish landing nets, butterfly nets and similar nets; decoys and similar hunting or shooting requisites (excl. decoy calls of all kinds and stuffed birds of heading 9705)': 57 tonnes were imported, and 11 tonnes were exported. • 'Fishhooks': 50 tonnes were imported, and 10 tonnes were exported; and • 'Fishing reels': only 5 tonnes were imported.

[140] Responsible Fisheries (n.d.) *Icelandic Fisheries.* Available at: https://www.responsiblefisheries.is/media/1/icelandic-fisheries-press-kit-mai-2021-enska.pdf
[141] Based on a GDP of around 28.07 billion U.S. dollars in 2022 according to Statista (n.d.*) Iceland: Gross domestic product (GDP) in current prices from 1987 to 2028.* Available at: https://www.statista.com/statistics/398966/gross-domestic-product-gdp-in-iceland/
[142] The FOB price includes the cost of the goods, as well as various expenses incurred until the goods are loaded onto the vessel, such as packaging, loading, and inland transportation to the port of departure.
[143] Statistics Iceland (2023) *The export value of marine products increased by 18.3% in 2022.* Available at: https://statice.is/publications/news-archive/fisheries/fisheries-catch-and-exports-in-2022/
[144] Statistics Iceland (2024) *The number of fishing vessels continues to decrease.* Available at: https://www.statice.is/publications/news-archive/fisheries/fishing-vessels-2023/
[145] Nordic Council of Ministers (2022) *Quantification and environmental pollution aspects of lost fishing gear in the Nordic countries*. Available at: https://www.diva-portal.org/smash/get/diva2:1729769/FULLTEXT01.pdf

Scope	The predecessor of Fisheries Iceland, National Association of Icelandic Fishermen, entered into an agreement with the Recycling Fund in August 2005 for the processing of fishing gear waste made of synthetic materials. Fishing gear made of synthetic materials was therefore exempt from the advance recycling fee, which was otherwise to be levied by law on 1 September 2005. The agreement entered into force on 1 January 2006. With the agreement, the organisation undertook to operate or negotiate with a third party the operation of an approved reception centre for recovery of fishing gear waste made of synthetic materials and for its processing. The scheme operated by Fisheries Iceland therefore collects and processes fishing gear made of synthetic materials (including nets, rope, twine, floats, cables, tackle, etc.). Fishing gear made of synthetic materials refers to fishing gear specified in Annex XVII to Act No. 162/2002 in Icelandic law, as subsequently amended which states that:[146] • Fishing gear waste must be dry (6% maximum moisture content) and sorted according to type. • The fishing gear waste must be free of all foreign items, foreign materials and impurities such as sand, oils, fish and marine vegetation. • The fishing gear waste must be free of all accessories such as floats, lead, rubber, chains and wires. The scheme places no obligations on producers. Key actors include the fishers, port operators and Fisheries Iceland and several producers which operate reception centres at their facilities to facilitate takeback.[147]
Status/ date of implementation	The agreement which obligated the Federation to operate or reach an agreement with a third party to operate a certified collection station for recyclable fishing gear waste made of synthetic materials and ensure that such waste was recycled came in to force in 2006.[148]
Part of wider strategy/policy documentation?	Article 8 Processing Charge Act No. 162/2002, which gives the government powers to introduce an advanced disposal fee on fishing gear containing plastic, was a key lever in the setting up of the voluntary collection system. The voluntary system was set up to avoid the fees that would have been due under this law.
The nature of obligations on producers	Under the voluntary scheme there are no obligations on producers. The only requirement on fishers is that they dispose of any fishing gear within scope of the voluntary scheme to the collection points offered by Fisheries Iceland. However, several producers do participate in the operation of reception centres for end-of-life gear.
Cost coverage	The functioning of the Icelandic system for fishing gear does not use producer fees for quantities of gear placed on the market. Instead, the industry association, Fisheries Iceland who works collaboratively with several fishing gear producers, is responsible for providing the collection and recycling of fishing gear, the cost of which is covered from the recycling revenue and from transport charges to fishing vessels. Once prepared, the material is transported to a collection centre in Iceland with the transport cost paid for by the vessel owner. Alternatively, for small vessel owners using major harbours some collection containers are provided where material can be deposited free of charge. The average cost to vessel owners is

[146] Fisheries Iceland (n.d.) *Homepage*. Available at: https://csr.sfs.is/fishing-gear/
[147] Fisheries Iceland (n.d.) *Fishing gear recycling.* Available at: https://samfelag.sfs.is/endurvinnsla-veidarfaera/
[148] Fisheries Iceland (n.d.) *Homepage*. Available at: https://csr.sfs.is/fishing-gear/

	around 85-110 €/t of fishing gear which is similar to the price of disposal through landfill. The cost to vessel owners varies based on transport distance required.[149] In addition, there is a time cost for the cleaning and sorting required from vessel crews. However, it is in the interest of the fishing industry to recycle fishing gear and meet the targets as the operation of this scheme is currently cheaper than estimated under an advance disposal fee system.[150] The proposed disposal fees varied by specific category of synthetic fishing gear products, but for most categories would have been around ISK 24,000 per tonne (~€159).[151,152]
Fee mechanism	In Iceland, fishing gear made containing plastic manufactured in Iceland or imported is included in the legislation for an advance disposal fee under the Icelandic Recycling Fund (IRF). An advance disposal fee is a charge applied at the point of import of material, based on tariff codes, to cover the cost of end-of-life treatment. Whilst legislated, this system is not currently employed as the Fisheries Iceland[153] manages fishing gear waste in lieu of an advance disposal fee. Several producers of fishing gear in Iceland participate in the scheme by providing no-cost disposal centres for the recovery of used fishing gear, which must be provided in a clean and decontaminated state. Fishers depositing gear that does not meet the standard may be charged additional fees, as may foreign parties/ agents/ owners of foreign vessels using the reception centres. Operators of reception facilities are responsible for subsequent sorting and transfer of the waste to appropriate treatment centres.
Eco-modulation	There is currently no eco-modulation in Iceland.
Data reporting and verification	Fisheries Iceland reports back annually to the Recycling Fund on the results of the recycling programme. Performance of the scheme is based on estimated quantity of material placed on the market combined with an understanding of the lifespan of different types of fishing gear.
Scheme operation	The scheme is currently operated by Fisheries Iceland. When fishing gear reaches end-of-life and needs to be recycled, vessel crews undertake the process of cleaning and separating the materials. Mainly, sand and large pieces of contamination or biofouling are removed, and wire and rope are separated from nets. As mentioned above, once prepared, the material is transported to a collection centre in Iceland with the transport cost paid for by the vessel owner. The cost to vessel owners varies based on transport distance required. Alternatively, for small vessel owners using major harbours some collection containers are provided where material can be deposited free of charge. A range of manufacturers also offer reception facilities for obsolete gear for their consumers. Around 15 such centres operate around the country.[154]

[149] Rijkswaterstaat WVL/BN REM (2021) *How to come to a more circular (management) system of fishing gear in the OSPAR-region*. Available at: https://www.noordzeeloket.nl/publish/pages/189036/report-how-to-come-to-a-more-circular-management-system-of-fishing-gear-in-the-ospar-region_.pdf

[150] Ibid.

[151] Georg Haney (2019) *Recycling of fishing gear in Iceland*. Available at: https://web.archive.org/web/20201026032521/http:/cnogear.org/news/english/recycling-of-fishing-gear-in-iceland

[152] Úrvinnslusjóður (2022) *Annex XVII*. Available at: https://www.urvinnslusjodur.is/media/log-og-reglur/220331-Log-nr-162-2002-med-sidari-breytingum.pdf

[153] This represents a merger of two previous associations in Iceland's fishing industry - The Federation of Icelandic Fishing Vessel Owners (LÍÚ) and the Federation of Icelandic Fish Processing Plants. The new combined organisation (SFS) was founded in 2014.

[154] Samtök fyrirtækja í sjávarútvegi (n.d.) *Fishing gear recycling*. Available at: https://samfelag.sfs.is/endurvinnsla-veidarfaera/

Waste infrastructure	Most of the waste collected is transported mainly to Lithuania, Netherlands and Denmark to be processed. Some is also sent for further sorting to Nofir. There is an open market for recycling companies to compete for the material. However, at the moment the Danish firm Plastix receives most of the material exported.[155,156] This is then recycled, or transported onwards to other reprocessors for recycling. The cost of shipping from Iceland to Denmark (~95€/t) is paid by the receiving recycler and no gate fee is charged.[157]
Scheme performance	At present, the government is satisfied with this system but could require fishing gear to be covered by the advance disposal fee in future if the scheme's performance declines. Fisheries Iceland gains from taking responsibility for this waste management as they can operate the system at a lower cost than via the government's advance disposal fee. In the instance that the industry fails to achieve recycling targets in future, or to provide adequate coverage in terms of obligated producers or products, advance disposal fees could be applied to fishing gear in Iceland. It is understood that the modulation of these fees would need to be revised and decided should this happen and that end-of-life costs would be taken into account. However, at present there is no producer fee and hence no fee modulation within the Icelandic system. According to Fisheries Iceland Environmental Report (published in 2017) almost 90% of fishing gear received by the country's ports was sent for recycling in 2016 (see Table A5-2-1: Disposal of fishing waste organised by Fisheries Iceland in 2016 (kg)). As shown in Table A5-2-1: Disposal of fishing waste organised by Fisheries Iceland in 2016 (kg), approximately1,297,331 kg was collected, 1,165,051 kg was sent for recycling (which, in practice, will include energy from waste) and 132,280 kg was sent to landfill.[158]

Table A5-2-1: Disposal of fishing waste organised by Fisheries Iceland in 2016 (kg)

Material Type	Quantity	Recycling	Landfill
PE/PP/PEP trawls	517,731	517,731	-
PA Multifilament midwater trawls	132,620	132,620	-
PA Multifilament seine material	380,250	380,250	-
Net cuttings PA Monofilament	42,250	42,250	-
PA impregnated line	36,000	-	36,000
PES PE + PAA head and foot ropes and cables	18,000	12,400	5,600
Floats	4,800	4,800	-
Rockhoppers	90,680	-	90,680
Scrap iron	75,000	75,000	-
Total	1,297,331	1,165,051	132,280

[155] The Danish Plastics Federation (n.d.) *Plastix A/S*. Available at: https://plast.dk/en/members/plastix-as/
[156] Personal Communication with Gudlaugur Sverrisson, Operational Manager, Icelandic Recycling Fund (2019) via Publications Office of the European Union (2022) *Study to support preparation of the Commission's guidance for extended producer responsibility scheme*. Available at: https://op.europa.eu/en/publication-detail/-/publication/ecb86ea2-932e-11ea-aac4-01aa75ed71a1/language-en
[157] Ibid.
[158] Fisheries Iceland (2017) *Resource Utilisation and Environmental Footprint (FI Environmental Report)*. Available at: https://sfs.overcastcdn.com/documents/Environmental_report_2017.pdf

Unintended consequences	No unintended consequences have been identified. However, it should be noted that Fisheries Iceland only measures the recycling rate against the tonnage of fishing gear collected, and not the total tonnage placed on the market by producers. It is also important to note that the system does not address lost or abandoned fishing gear, only fishing gear that has reached the end-of-life and are disposed of by fishers.
Supplementary measures	No details have been published as to whether the introduction of a EPR scheme for fishing gear would require the implementation of supplementary measure such as traceability or certification. However, the threat of the government enacting the advanced disposal fee is used to maintain the performance of the existing scheme.[159]

[159] Nordic Council Ministers (2020) *Main Report – A network to reduce marine litter and ghost fishing.* Available at: https://pub.norden.org/temanord2020-509/temanord2020-509.pdf

A.5.3 Sweden

Table A5-3 Deep dive of Sweden

Content	Detail 
Full name	Ordinance (2021:1001) on producer responsibility for fishing gear[160]
Summary of sector profile	In 2021, Swedish produced 177,000 tonnes of fish, with 92% of the tonnage coming from fishery production and the remainder from farmed production (aquaculture).[161] The total value of fish landings from fisheries products was €41 million (£35.24m) in 2021 and €10.1 million (£8.68m) for aquaculture production (values are deflated using the GDP deflator with a base year of 2015).[162] In 2022, the value of Swedish imports for fisheries and aquaculture products was approximately €5.6 million (£4.81m) and 874,000 tonnes, while the total exports in 2022 were €4.8 million (£4.13m) and 787,000 tonnes.[163] The number of people employed in fisheries, aquaculture and processing in 2021 was 3,512 people, with over half of those people employed in processing.[164] The number of fishing vessels was 990 as of 31 December 2022. This has been decreasing every year since 2015.[165] In 2022, 86% of vessels in the Swedish fishing fleet were under 11 meters in length.[166] In 2022, the number of vessels with active gear is 218 (includes trawls, waders, seines, scraping gear), and passive gear is 772 (includes nets, traps, cages, hooks and lines).[167] In addition, in 2022, fishing gear on the Swedish fishing fleet comprised of 43% traps, 32% gill nets and entangling nets, 21% trawls, 2% hooks and lines, 2% other.[168] The volume of fishing gear placed on the market in 2020, based on production, imports and exports was estimated to be approximately 548 tonnes; 64% of this volume was made up of 'nets, including line fishing tackle nets, fish landing nets, butterfly nets and decoys'.[169] Line fishing nets, landing lets, butterfly nets and decoys made up 65% of the import and export tonnages.[170]
Scope of EPR	The stated objectives of the scheme are to increase collection, reuse and recycling and reduce littering of fishing gear that contains plastic that are used in fisheries or

[160] Ministry of Climate and Business (2021) *Ordinance (2021:1001) on producer responsibility for fishing gear.* Available at: https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-20211001-om-producentansvar-for_sfs-2021-1001/
[161] EUMOFA (Based on Eurostat-COMEXT data)(2023) *Country Profile: Sweden – Import-Export.* Available at: https://eumofa.eu/en/sweden
[162] Ibid.
[163] Ibid.
[164] OECD.Stat (2024) *Employment in fisheries, aquaculture and processing.* Available at: https://stats.oecd.org/Index.aspx?datasetcode=FISH_EMPL#
[165] Swedish Agency for Marine and Water Management (2023) *Swedish sea-fisheries during 2022.* Available at: https://www.scb.se/publication/50596
[166] EUMOFA (Based on Eurostat-COMEXT data)(2023) *Country Profile: Sweden – Import-Export.* Available at: https://eumofa.eu/en/sweden
[167] Swedish Agency for Marine and Water Management (2023) *Swedish sea-fisheries during 2022.* Available at: https://www.scb.se/publication/50596
[168] EUMOFA (Based on Eurostat-COMEXT data)(2023) *Country Profile: Sweden – Import-Export*. Available at: https://eumofa.eu/en/sweden
[169] Nordic Council of Ministers (2023) *Quantification and environmental pollution aspects of lost fishing gear in the Nordic countries*. Available at: https://www.norden.org/en/publication/quantification-and-environmental-pollution-aspects-lost-fishing-gear-nordic-countries
[170] Ibid.

	aquaculture. Regardless of the amount of plastic content in the fishing gear, it is subject to producer responsibility. Companies that professionally produce, import, or sell fishing gear that contains plastic in Sweden are obligated. Producers who are not based in Sweden but sell gear in Sweden are required to appoint an authorised representative to act on their behalf. The obligation is therefore applied to anyone who: 1. brings fishing gear into Sweden, 2. manufactures fishing gear in Sweden, or 3. from a country other than Sweden and who sells fishing gear to an end user in Sweden. Excluded are fishers only involved in activities related to searching for fish, releasing, deploying, towing, and picking up fishing gear, taking catches on board, transshipment, preservation on board, preparation on board, transfer, placing in cages, fattening, and landing of fish and fishery products. In terms of types of fishing gear in scope, the regulation shall not be applied to waste consisting of fishing gear lost at sea or littered and subsequently collected within the framework of a project financed by public funds. The regulation shall not be applied to fishing gear covered by the regulation (2022:1276) on producer responsibility for electrical equipment, if the electrical equipment cannot be removed from the fishing gear in a simple way. Further guidance: https://www.naturvardsverket.se/en/guidance/extended-producer-responsibility-epr/extended-producer-responsibility-for-fishing-gear/
Status/ date of implementation	There have been obligations on producers since 2023. This has included requirements to register and report from 2023. This will be implemented, in full, from 2025, with requirements on producers to engage with or provide themselves with a producer responsibility organisation (PRO). From 2025, fees will start being collected and targets will apply from 2027.[171]
Part of wider strategy/policy documentation?	Not part of a wider strategy or policy.
The nature of obligations on producers	Producers who intend to place fishing gear on the market from 1 January 2023 must register from November 2022, providing the following information to the Swedish EPA: • Name of producer • Contact details • Personal or corporate identification number Producers will be required to report their plastic fishing gear placed on the market data to the Swedish EPA annually, from 31 March 2023.

[171] Swedish Environmental Protection Agency (2024) *Extended Producer Responsibility for Fishing Gear.* Available at: https://www.naturvardsverket.se/en/guidance/extended-producer-responsibility-epr/extended-producer-responsibility-for-fishing-gear/#:~:text=If%20your%20company%20produces%20or,report%20other%20information%20as%20well.

	Producers are obliged to comply by joining a producer responsibility organisation (PRO) to meet the requirements contained in the regulation. The PROs must register with the Swedish EPA and the producers must notify the Swedish EPA how it intends to fulfil the obligation by November 2024 (if it intends to release gear onto the market from 1 January 2025). Producers registered with a PRO will pay financial contributions to the PRO to compensate the PRO for fulfilling its requirements on its behalf. There is a 20% minimum collection target for the total weight of fishing gear placed on the market by 2027, which PROs will be 'effectively contributing to' from 2025.
Cost coverage	Coverage includes collection, sorting, transport, handling, awareness raising for proper end-of-life management. Fees are not yet in place, but the legislation states that they must be varied to account for reuse and recyclability.
Fee mechanism	Producers pay compensation to the producer responsibility organisation (PRO) that is hired on their behalf. A PRO for fishing gear must collect waste from fishing gear intended for professional use in easily accessible locations, and free of charge. PROs must also work together with municipalities that currently provide fishing gear collection and transport services to provide these services and pay fees to municipalities to cover the necessary costs of doing so. The PRO sets the producer contribution based on the weight of fishing gear placed on the market by the producer, and the reusability and material recyclability of the fishing gear. To ensure that this is considered, producer responsibility organisations must create routines for internal checks. Routines for internal control must also be created to ensure the quality of the data that producer responsibility organizations must annually submit to the Swedish Environmental Protection Agency and to ensure that the requirements of the EU regulation (1013/2006) on the transport of waste are met. PROs are also responsible for making consumers aware of: 1. how fishing gear should be handled when it becomes waste, 2. how fishing gear should be handled to reduce the amount of lost gear, and 3. the negative environmental impacts of littering or other inappropriate disposal of fishing gear.
Eco-modulation	Anticipated - the legislation requires that producer responsibility organisations (PROs) calculate the fee based not only on the reported weight of plastic fishing gear placed on the market but also the reusability and material recyclability of the gear.
Data reporting and verification	Producer reporting needs to contain information on fishing gear placed on the Swedish market during the immediately preceding calendar year and must be stated by weight. Producers must report to the Swedish EPA annually, from 31 March 2023, via the EPA's e-service, providing information on the sum (in kilograms) of: • The full weight of fishing gear placed on the market consisting solely of plastics; and • The full weight of fishing gear consisting of plastic and other materials. Municipalities are also required to report on the costs associated with collections and removal of waste from fishing gear, as well as the weight, in kilograms, of the waste consisting of fishing gear transported and collected separately by the municipality during the preceding calendar year.

Scheme operation	The producer responsibility scheme is due to come into operation from 2025. The Swedish Environmental Protection Agency is the scheme administrator and enforces the compliance of the PROs and producers. The legislation allows for multiple producer responsibility organisations (PROs) to be set up, and all obligated producers must register with a PRO and pay relevant fees for fishing gear placed on the market (PoM). They work in collaboration with the municipalities, Swedish Agency for Marine and Water Management, the Swedish Board of Agriculture and the Sotenäs Symbiosis Centre to fulfil the assignment given by the Swedish Government on the collection and recycling of end-of-life gear. There are several ongoing developments while the system is being set up - Sweden has created a government-funded collection system for end-of-life fishing gear on land called Fiskereturen (The Fishing Tour) which has collected 700 tonnes of EoLFG since 2019.[172] The Fisheries Association Norden is responsible for the recycling of ALDFG and EoLFG in ports on the Swedish west coast. It acts as a logistics centre where gear is accepted and pre-treated. Materials are collected at participating ports, most commonly lobster traps and trawls, often in their own containers or on pallets, as well as containers provided by FF Norden.[173] FF Norden collects the nets and net equipment individually at ports and coordinates and takes over the transport for subsequent recycling and disposal if non-recyclable material.[174] The operational area for the national collection scheme so far has covered the west coast and southern Sweden. This is due to expand to northern Sweden in 2024.[175]
Waste infrastructure	Sotenäs Marine Recycling Centre (SMRC) operates Sweden's only recycling centre for fishing gear and focusses on collecting and processing marine plastic litter, including ALDFG. Here, the gear is sorted, and plastic components are separated. Plastic is sent to the plastics recycler Plastix in Denmark.[176] In Sweden, law stipulates that containers for the collection of ALDFG must be available and free to use in ports; the Baltic Harbour Study indicated that this is not common practice in reality. [177]
Scheme performance	The scheme is yet to be fully implemented, fees will start to be collected from 2025 and be used to cover the collection costs. Currently, other collection schemes (such as Fiskereturen) are government and partner funded, but are aiming to be producer financed in future, as the economic value of the material recyclate is not high.[178] As mentioned above, collection efforts are in place in Sweden, for example Fiskereturen (The Fishing Tour) has collected 700 tonnes of fishing gear since the

[172] The Fishing Tour (2024) *Fiskereturen*. Available at: https://www.fiskereturen.se/
[173] Bertling, R. and Nühlen, J. (2019) *Recycling of Abandoned, Lost and Discarded Fishing Gear (ALDFG) and End-of-Life Fishing Gear (EOL): Sub-studies on logistics requirements and economic viability.* Available at: https://www.umsicht.fraunhofer.de/content/dam/umsicht/de/dokumente/forschung-fuer-markt/kunstoffe-in-umwelt/wwf-studie-verlorene-fischernetze-umsicht.pdf
[174] Ibid.
[175] Circnets (n.d.) *Blue Circular Nets: Promoting collection and recycling of end-of-life (EOL) fishing gear in the European North.* Available at: https://www.interreg-npa.eu/media/51yfsue1/circnets-presenatation-in-arendal-ghost-gear-conference.pdf
[176] Van Nijen (2021) *How to come to a more circular management system of fishing gear in the OSPAR region.* Available at: https://www.noordzeeloket.nl/en/publications/?zoeken=true&zoeken_term=How+to+come+to+a+more+circular+management+system+of+fishing+gear+in+the+OSPAR+region&zoeken_trefwoord=
[177] Bertling, R. and Nühlen, J. (2019) *Recycling of Abandoned, Lost and Discarded Fishing Gear (ALDFG) and End-of-Life Fishing Gear (EOL): Sub-studies on logistics requirements and economic viability.* Available at: https://www.umsicht.fraunhofer.de/content/dam/umsicht/de/dokumente/forschung-fuer-markt/kunstoffe-in-umwelt/wwf-studie-verlorene-fischernetze-umsicht.pdf
[178] Van Nijen (2021) *How to come to a more circular management system of fishing gear in the OSPAR region.* Available at: https://www.noordzeeloket.nl/en/publications/?zoeken=true&zoeken_term=How+to+come+to+a+more+circular+management+system+of+fishing+gear+in+the+OSPAR+region&zoeken_trefwoord=

	scheme started in 2019. Gear is diverted to Sotenäs Marine Recycling Centre for sorting and processing.[179]
Unintended consequences	SMRC was established to address the problem of the stockpiling of discarded fishing gear left in harbours not being processed due to a lack of recycling infrastructure. However, it remains the only sorting facility that handles fishing gear in the country.[180] A lack of infrastructure and end markets for the material could lead to an accumulation of discarded material in harbours.
Supplementary measures	No details have been published as to whether the introduction of a EPR scheme for fishing gear would require the implementation of supplementary measure such as traceability or certification.

[179] The Fishing Tour (2024) *Fiskereturen*. Available at: https://www.fiskereturen.se/
[180] Bertling, R. and Nühlen, J. (2019) *Recycling of Abandoned, Lost and Discarded Fishing Gear (ALDFG) and End-of-Life Fishing Gear (EOL): Sub-studies on logistics requirements and economic viability*. Available at: https://www.umsicht.fraunhofer.de/content/dam/umsicht/de/dokumente/forschung-fuer-markt/kunstoffe-in-umwelt/wwf-studie-verlorene-fischernetze-umsicht.pdf

A.5.4 Ireland Farm Plastics Recycling

Table A5-4 Deep dive of Ireland

Content	Detail 
Full name	Waste Management (Farm Plastics) Regulations 2017[181]
Summary of sector profile	The contribution of agriculture to Ireland's GDP was approximately €5.28 billion (£4.54bn) in 2023.[182] Around 90% of beef, lamb and dairy produce is exported annually. Almost 101,000 people were employed in the agricultural sector in 2022 (includes forestry and hunting)[183] at approximately 135,000 farms.[184] The market for farm plastics products decreased in 2022 by 15% to 20,466 tonnes, which can be attributed to increase in fertiliser costs and drought.[185] The market for silage film alone decreased by 3,335 tonnes between 2021 and 2022 (reaching 18,225 tonnes in 2022). In addition, the combined netting and twine market in 2022 decreased substantially by 14% to 2,242 tonnes.[186] The overall market for farm plastic products has fallen significantly in recent years, decreasing by15% in 2022 from the previous year to 20,466 tonnes.[187] The Irish Farm Film Producers' Group (IFFPG) collects farm film plastics as part of the national compliance scheme for the Farm Plastics Regulation. In 2022, the IFFPG collected 36,524 tonnes (88% collection rate) of silage wrap and sheeting waste, 1,117 tonnes (22% collection rate) of netting and twine waste and 1,087 tonnes of farm plastics packaging (collected through their sister company Farm Plastics Recycling CLG).[188]
Scope of EPR	Products covered include sheeting, netting, bale twine, bale wrap or bale bags composed mainly of polyolefins, including polyethylene, polypropylene or polyvinyl chloride, which is or are suitable for use for the holding, storage or conservation of fodder.[189] The regulation was amended in 2017 to include netting and twine.[190] Obligated producers include all those who import or manufacture farm film plastics for supply to suppliers or end users in Ireland. There is no evidence of exemptions for any producers who place these products on the market. There are no obligations on producers of farm plastic products that aren't listed in the regulations (above).

[181] Waste Management (Farm Plastics) (Amendment) Regulations 2017 (S.I. No.396/2017). Available at: https://www.irishstatutebook.ie/eli/2017/si/396/made/en/print#:~:text=These%20Regulations%20amend%20the%20Waste,i.e.%20netting%20and%20bale%20twine.
[182] Trading Economics (2023) *Ireland GDP from Agriculture*. Available at: https://tradingeconomics.com/ireland/gdp-from-agriculture
[183] OECD.Stat (2024) *Employment by activities and status (ALFS)*. Available at: https://stats.oecd.org/Index.aspx?datasetcode=FISH_EMPL#
[184] Teagasc (n.d.) *Agriculture in Ireland.* Available at: https://www.teagasc.ie/rural-economy/rural-economy/agri-food-business/agriculture-in-ireland/#:~:text=The%20agri%2Dfood%20sector%20is,more%20than%20160%20countries%20worldwide.
[185] Irish Farm Film Producers' Group (2023) *Operational Report 2022.* Available at: https://farmplastics.ie/wp-content/uploads/2023/08/IFFPG-OperationalReport2022-May23-v4.pdf
[186] Ibid.
[187] Ibid.
[188] Ibid.
[189] Ibid.
[190] Waste Management (Farm Plastics) (Amendment) Regulations 2017 (S.I. No.396/2017). Available at: https://www.irishstatutebook.ie/eli/2017/si/396/made/en/print#:~:text=These%20Regulations%20amend%20the%20Waste,i.e.%20netting%20and%20bale%20twine.

Status/ date of implementation	Implemented in 1997, amended in 2001 and then further in 2017.[191]
Part of wider strategy/policy documentation?	In 1997, the Farm Plastics Regulation was introduced to require suppliers of farm plastic products to fund recycling. Ireland has six producer responsibility initiatives that are based on the 'polluter pays' principle, for packaging, batteries, WEEE, end-of-life vehicles and farm plastics. Each of these are embedded in Ireland's Waste Action Plan for a Circular Economy.[192]
The nature of obligations on producers	The Farm Plastics Regulation requires any manufacturer or importer of specific farm plastic products to contribute to collection and recycling costs. They can do this through: • Participation in an approved recycling scheme; or • Self-comply by offering a deposit return scheme or similar (there are currently no companies self-complying). The conditions for "approved recovery schemes" in the regulations are fairly high level: "An approval under sub-article (1) may be subject to such conditions as the Minister may specify, including conditions relating to – a) measures to be undertaken by the approved body or by producers certified by that body, with regard to the recovery of farm plastics waste. b) targets to be achieved by the approved body with regard to the recovery of farm plastics waste. c) determination and verification of the effects of measures undertaken with regard to the recovery of farm plastics waste and d) the nature and frequency of information (including financial accounts) to be submitted by the approved body to the Minister or to such other person as may be specified by the Minister." The most common way of complying with the scheme is through membership with the Irish Farm Film Producers' Group – the national farm plastics recycling compliance scheme. Members must complete monthly and annual return forms to comply with the reporting requirements of the regulation. A producer recycling contribution is also paid by members. Suppliers of farm plastics (who are not producers) are also required to register and report data (but not in the case of farm plastics PoM by producers who are part of an approved recycling scheme). There are no formal requirements set out in the regulations on farmers themselves. However, the IFFPG does set requirements for farmers who bring materials to their bring centres or who present materials for collection. Silage plastics/wrap should be loose, clean and dry; non-silage plastics should be segregated by plastic type, bagged and presented for recycling. Fertiliser bags should have inner liners removed and bagged separately; drums should be triple rinsed.[193]

[191] Waste Management (Farm Plastics)(Amendment) Regulations 2017 (S.I. No.396/2017). Available at: https://www.irishstatutebook.ie/eli/2017/si/396/made/en/print#:~:text=These%20Regulations%20amend%20the%20Waste,i.e.%20netting%20and%20bale%20twine.
[192] Department of the Environment, Climate and Communications (2020) *Waste Action Plan for a Circular Economy*. Available at: https://www.gov.ie/en/publication/4221c-waste-action-plan-for-a-circular-economy/
[193] Irish Farm Film Producers' Group (n.d.) *Frequently Asked Questions.* Available at: https://farmplastics.ie/faq/

Cost coverage	Collection, sorting, processing, further transportation, awareness raising measures. 70% of the operational costs are covered by the producer contributions. 30% of the costs are also covered by a collection fee charged to farmers at bring centres and farmyard collections. It is notable that in the regulations, collections are meant to be provided by producers free of charge (in the case of DRS implementation), though this is not stipulated for producers meeting their obligations through an approved recycling scheme. Farm Plastics Recycling (FPR) CLG was established in 2010 by the scheme to ensure that a national farm plastics packaging wastes recycling service was provided to farmers (for fertilizer bags, feed bags & drums). FPR works in tandem with IFFPG during the bring-centre programme and is funded through a combination of farmer collection charges and Repak subsidy.
Fee mechanism	The Producer Recycling Contribution is paid by members of the IFFPG at a rate of €286 per tonne for farm plastics placed on the market, as of 23 January 2023. In terms of the standard roll of wrap, the contribution increased from €4.16 to €6.24 per roll (excl. VAT) in 2023.[194] The IFFPG is 70% funded by the recycling levy charged to producers and importers of farm plastic film products, and 30% funded by a weight-based collection charge to farmers. [195] Farmers are also charged a collection fee to fund the system. A label code is issued to farmers at the time of purchase of wrap and sheeting and confirms that the producer recycling contribution was applied to the product. Farmers who present a valid label code at the time of collection can avail of lower charges. In 2023, collection costs were as follows: • One Tonne Farm Plastics at Bring-centre: o With label code: €70 o Without label code: €190 • One Tonne Farm Plastics at Farmyard: o With label code: €120 o Without label code: €220 In the case of netting and twine waste, it is collected in half tonne sized bags at bring-centres, with the €5 per bag charge retained in 2022.[196]
Eco-modulation	Fees are not modulated for producers, but they are differentiated by type of product as described above. The only differentiation with fees is for consumers of farm plastics when they are charged for collection. Differentiation is based on the type of farm plastic being collected, netting and twine waste costs €5 per half-tonne bag with all other materials costing varying amounts depending on how there are presented. Materials presented at the bring-centre cost €70 with a label code and €190 without a label code. Materials collected from the farmyard cost €120 with a label code and €220 without a label code.[197] Label codes are designed to prove compliance of a product with the farming regulation (i.e., the producer contribution has been paid).

[194] Irish Farm Film Producers' Group (2023) *Operational Report 2022.* Available at: https://farmplastics.ie/wp-content/uploads/2023/08/IFFPG-OperationalReport2022-May23-v4.pdf
[195] Ibid.
[196] Irish Farm Film Producers' Group (n.d.) *Nationwide Bring Centres.* Available at: https://farmplastics.ie/bring-centres/
[197] Irish Farm Film Producers' Group (2023) *Operational Report 2022.* Available at: https://farmplastics.ie/wp-content/uploads/2023/08/IFFPG-OperationalReport2022-May23-v4.pdf

Data reporting and verification	Currently IFFPG members must complete monthly and annual return forms to comply with the regulation. This includes reporting on the volume by weight of production, sales, purchases and exports of specified farm plastics products. There are no reporting requirements on farmers.
Scheme operation	Producers can comply with the regulation either by self-complying (by offering a deposit return scheme) or by joining a compliance scheme. Currently, there are no producers self-complying, and the vast majority fulfil their obligations through membership with the IFFPG – the national farm plastics recycling compliance scheme. Producers pay the fee annually to cover 70% of the costs for operation. The IFFPG is then responsible for the collection, sorting and forwarding of the material. IFFPG's current approval requires that as a minimum a 70% collections target for wrap and sheeting waste is met each year (calculated based on 70% of the average annual volume of silage wrap and sheeting placed on the market during the previous 3 years).[198] Materials are collected twice a year at bring centres (235 of these in operation annually) or through farmyard collections. Silage plastics/wrap should be loose, clean and dry; non-silage plastics should be segregated by plastic type, bagged and presented for recycling. Fertiliser bags should have inner liners removed and bagged separately; drums should be triple rinsed. [199] Farm Plastics Recycling (FPR) CLG was established in 2010 by the scheme to ensure that a national farm plastics packaging wastes recycling service was provided to farmers (for fertilizer bags, feed bags & drums). FPR works in tandem with IFFPG during the bring-centre programme and is funded through a combination of farmer collection charges and Repak subsidy.
Waste infrastructure	There are 235 bring centres operated twice annually, the IFFPG claims that most farms should be within approximately 6 miles of a bring centre.[200] Farmyard collections can also be organised at a separate cost to the farmers. The IFFPG asks that materials are presented separately. The IFFPG sent 30,336 tonnes of silage wrap and sheeting waste for recycling in 2022. 44% of the total recycled was reported as being sent to Irish recyclers, the remainder was exported to recyclers elsewhere in Europe. Currently a third of all waste collected is supplied to two Irish recyclers: Enva, Carrickmacross, Co. Monaghan and Sabrina, Littleton, Co. Tipperary.[201]
Scheme performance	36,524 tonnes of wrap and sheeting waste collected for recycling, which equated to an 88% collection rate, in 2022.[202] Additionally, the scheme collected 1,091 tonnes of netting and twine waste, and 1,087 tonnes of farm plastics packaging wastes such as fertiliser bags and drums. There was a 23% collections target for netting and twine in 2023 but no target for drums. [203] Collections have increased by almost 7,000 tonnes per annum in the last 5 year (23%). Key drivers for increased collections include the abolition of the milk quota, better grassland management and more farmers using the service year on year.

[198] Irish Farm Film Producers' Group (2023) *Operational Report 2022.* Available at: https://farmplastics.ie/wp-content/uploads/2023/08/IFFPG-OperationalReport2022-May23-v4.pdf
[199] Irish Farm Film Producers' Group (n.d.) *Frequently Asked Questions*. Available at: https://farmplastics.ie/faq/
[200] Ibid.
[201] Irish Farm Film Producers' Group (2023) *Operational Report 2022.* Available at: https://farmplastics.ie/wp-content/uploads/2023/08/IFFPG-OperationalReport2022-May23-v4.pdf
[202] Ibid.
[203] Ibid.

Unintended consequences	A 2009 study identified the Irish border counties as a key issue for enforcement as there is no producer responsibility initiative for farm plastics.[204] Therefore, illegal export of collected waste farm plastic was an issue. This highlighted evidence that waste was being brought into Northern Ireland under a green list waste classification when it should be categorised as amber list waste. This may also be applicable to fishing gear waste if a similar scheme for fishing gear was to be introduced. Recommendations included that the material be treated in accordance with the TFS regulations in order to ensure a level playing field for waste collectors and operators and compliance. Global events such as the decision by the Chinese to ban plastic waste imports, Covid and more recently the war in Ukraine have increased the cost of recycling significantly. Last year, the Irish Rural Association called for a full investigation into the farm plastic industry in Ireland after having discovered a "serious amount of stockpiling" in contractors' yards.[205]
Supplementary measures	Farmers are incentivised to participate in the scheme for several reasons, including that recycling is more cost effective than landfilling the waste (with the landfill levy at €85 per tonne not including gate fees). The IFFPG has no statutory enforcement powers, but it supports local authorities who are remitted with enforcing the Farm Plastics Regulations through its compliance officers. It also does this through the use of a label code traceability scheme, which sees farmers who present valid codes at collections availing of reduced charges. The presence of codes on products also enables enforcement officers to more easily determine whether a product is compliant or not.

[204] Department of the Environment, Climate and Communications (2021) *Review of the Producer Responsibility Initiative Model in Ireland.* Available at: https://www.gov.ie/ga/foilsiuchan/7b468-review-of-the-producer-responsibility-initiative-model-in-ireland/
[205] O'Brien, A. (2024) *Farmers facing price hikes for plastic recycling.* Available at: https://www.agriland.ie/farming-news/farmers-facing-price-hikes-for-plastic-recycling/

A.5.5 Denmark

Table A5-5 Deep dive of Denmark

Content	Detail
Full name	Proposed decree on extended producer responsibility for fishing gear that contains plastic.[206]
Summary of sector profile	The fishing industry plays a significant role in Denmark's coastal and rural economy. In 2022, the total catch landed by Danish vessels in Danish ports amounted to 458,210 tonnes with a total value of over €399 million (£342.95m).[207] In 2022, the fishing fleet consisted of 1,841 vessels. Small vessels (less than 10m) represent the bulk of the fleet (at 78%), while vessels longer than 24 meters account for just over 3% yet represent more than 70% of the total gross tonnage (mostly consists of large pelagic trawlers). In 2022 the number of fishing enterprises also amounted to 595, providing jobs to 1,503 people, of which 776 were employed full-time. Skagen is Denmark's largest fishing port, in 2023 56% of the total amount of fish landed in Denmark was landed in Skagen, (412,000 tons were landed). In 2022, 51% were landed in Skagen.[208] In addition, the total inland catch in 2022 was 103 tonnes and valued at almost €907,000 (~£779,600). The main commercial inland fishing areas in Denmark include Lake Arresø and the estuaries of Ringkøbing Fjord, Nissum Fjord, Limfjord, Randers Fjord and Isefjorden/Roskilde Fjord.[209] In terms of the aquaculture industry, the main species farmed in Denmark is rainbow trout (Onchorhynchus mykiss), which constitutes over 70% of the total production, which in 2022 amounted to 48,757 tonnes in volume and €175.7 million (£151m) in value. Farming takes place mainly in the Limfjord in the northern part of Jutland, but also in the Skagerrak and Kattegat. In 2022 there were 609 employees in the sector, of which over 73% were employed full-time.[210] In 2022, Denmark imported fish and seafood is valued at €3.3 billion (£2.84bn). Norway was the main source of these imports (33%), followed by Sweden (5%), and Germany (4.6%). Imports arrive either from foreign fishing vessels landing their catch in Danish fishing ports or from fish landed abroad that is then brought to Denmark by ship or lorry.[211] In 2022, exports of fish and seafood reached a total value of €4 billion (£3.45bn). The majority of these were destined for EU countries, with Germany as the largest single market, receiving 16% of the total value, followed by France (8%). Outside of the EU, the largest importer was China, with 11% of total value. The main exports included salmon, cod, shrimp, fishmeal and fish oil, as well as freshwater fish and various shellfish.[212]

[206] Hoerings Portalen (n.d.) *Hearing on executive order on extended producer responsibility for fishing gear that contains plastic.* Available at: https://hoeringsportalen.dk/Hearing/Details/68285
[207] Eurofish (n.d.) *Denmark*. Available at: https://eurofish.dk/member-countries/denmark/
[208] The Fishing Daily (2024) *Skagen Harbour continues to grow as Denmark's largest fishing port.* Available at: https://thefishingdaily.com/latest-news/skagen-harbour-continues-to-grow-as-denmarks-largest-fishing-port/
[209] Eurofish (n.d.) *Denmark*. Available at: https://eurofish.dk/member-countries/denmark/
[210] Ibid.
[211] Ibid.
[212] Ibid.

	On 1 May 2024 the Danish government announced that it will be putting DKK112 million (€15m / £12.89m) into five funds "which will help make Denmark one of the leading nations in the green transformation of the fishing and aquaculture industry".[213] The following grants schemes are available: • DKK 39.3 million (€5.26m/£4.5m) for investments in coastal fishing. • DKK 50.3 million (€6.7m/£5.8m) for the green transition of fisheries. • DKK 10.9 million (€1.5m/£1.25m) for the development of green transition in aquaculture. • DKK 7 million (€938,450/£802,650) for investment in green transition in aquaculture. • DKK 5.3 million (€710,530/£607,750) for efforts against marine waste. According to a report by the Nordic Council of Ministers 3,174 tonnes of fishing gear was imported into Denmark in 2020, while 1,573 tonnes was exported. 'Fishnets made up of man-made fibres' made up approximately 71% (2,262 tonnes) of fishing gear imports and 68% (1,073 tonnes) of exports.[214] This was followed by: • 'Fishing reels': 743 tonnes were imported and 470 tonnes were exported; • 'fishhooks': 87 tonnes were imported, and 4 tonnes were exported; and • 'Line fishing tackle n.e.s; fish landing nets, butterfly nets and similar nets; decoys and similar hunting or shooting requisites (excl. decoy calls of all kinds and stuffed birds of heading 9705)': 82 tonnes were imported, and 26 tonnes were exported.
Scope of EPR	Scope of the relevant scheme: Fishing gear made of plastic. Fishing gear that contains plastic is divided into two categories: 1) commercial fishing gear and; 2) other fishing gear. • The decree defines commercial fishing gear as "towed fishing gear that contains plastic, including trawls, seines, scrapers and seines". • The decree defines fishing gear as "any item or piece of equipment used for fishing or aquaculture, to track, catch or farm marine biological resources, or which floats on the surface of the sea and is used for the purpose of attracting, catching or farming such marine biological resources". Scope of producers obligated: Manufacturers of or importers of fishing gear that contains plastic. Except for non-industrial manufacturers of fishing gear that contain plastic, and persons who engage in fishing as defined in Article 4, No. 28, of Regulation (EU) No. 1380/2013 of the European Parliament and of the Council. Article 4, No. 28 of Regulation (EU) No. 1380/2013 of the European Parliament and of the Council defines 'fishing activity' as "*means searching for fish, shooting, setting, towing, hauling of a fishing gear, taking catch on board, transhipping, retaining on board, processing on board, transferring, caging, fattening and landing of fish and fishery products*".[215] This exemption essential means that individuals conducting 'fishing activity' (as defined by Regulation (EU) No. 1380/2013) in a non-commercial capacity are not required to comply with any proposed EPR requirements.

[213] Ministry of Food, Agriculture and Fisheries (2024) *Three-digit million amount will contribute to the sustainable development of Danish fisheries and aquaculture*. Available at: https://fvm.dk/nyheder/nyhed/nyhed/trecifret-millionbeloeb-skal-bidrage-til-baeredygtig-udvikling-af-dansk-fiskeri-og-akvakultur

[214] Nordic Council of Ministers (2022) *Quantification and environmental pollution aspects of lost fishing gear in the Nordic countries*. Available at: https://www.diva-portal.org/smash/get/diva2:1729769/FULLTEXT01.pdf

[215] European Union (2013) *Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC*. Available at: https://eur-lex.europa.eu/eli/reg/2013/1380/oj

Status/ date of implementation	Proposed. The consultation on the 'Decree on extended producer responsibility for fishing gear that contains plastic' closed on 8 February 2024. The consultation proposes that the requirement for clean-up, take-back, and environmental treatment of end-of-life fishing gear made of plastic will apply from 31 December 2024.
Part of wider strategy/policy documentation?	To align with the Single-Use Plastics Directive which mandates that EU Members States establish a EPR scheme for fishing gear containing plastic by 2025.[216]
The nature of obligations on producers	The decree states that manufacturers of commercial fishing gear or 'other fishing gear' after 31 December 2024 must at their own expense arrange for the take back of the fishing gear 'when they are used up' and ensure that these are handled separately in accordance with the regulations. Manufacturers must arrange for take back of fishing gear at end-of-life based on its allocation from the Danish Producer Responsibility. This can either be done through a collective scheme or by establishing a take-back scheme directly. The first period for compliance is 31 December 2024 to 31 August 2026. Then periods are annual starting from 1 September 2026. First allocations awards will be announced 1 September 2024, then 1 June each year after that. Allocations are based on a manufacturer's market share which is the manufacturer's annual share of the total quantities of commercial or other fishing gear marketed in the previous calendar year (which manufacturers are required to report on). This is then multiplied by a unit fee to determine the total fee payable by a manufacturer – fee rates for fishing gear have not yet been announced.
Cost coverage	For registration in the producer register a one-time fee of DKK1,000 must be paid to the Danish Producer Responsibility organisation. If the producer is already registered in the producer register in accordance with one of the following orders, a one-off fee of DKK 500 must be paid: • Order on batteries and accumulators and end-of-life batteries and accumulators. • Order on the handling of waste in the form of motor vehicles, the collection of environmental contributions and the payment of scrapping compensation. • Order on placing electrical and electronic equipment on the market as well as handling waste from such equipment. • Order on extended producer responsibility for filters for tobacco products that are disposable plastic products. • Order on registration and reporting of packaging. Danish Producer Responsibility can also charge a fee per hour used if a producer or collective arrangement gives rise to extraordinary administration in connection with the provision of collateral. For administration of the allocation scheme for end-of-life commercial fishing gear, producers pay an annual fee to Danish Producer Responsibility. The fee is calculated in relation to the amount of commercial fishing gear that was marketed in the previous calendar year. The fees must correspond to the actual costs incurred by Danish Producer Responsibility.

[216] EU (2019) *Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment*. Available at: https://eur-lex.europa.eu/eli/dir/2019/904/oj

	Collective schemes must collect contributions from members of the scheme to cover costs of collection of commercial and other fishing gear and waste treatment of collected gear and information material for end users.
Fee mechanism	This is discussed above in further detail. The producer essentially pays a fee to the Danish Producer Responsibility for administration of the allocation scheme. Producer are required to set up and operate their own take-back scheme or participate in a collective scheme whereby they pay contributions to cover the cost of collection and treatment.
Eco-modulation	The Decree proposes to introduce fee modulation. Products are divided into three groups dependent on whether they meet four criteria for durability, reusability, repairability and recyclability. • Group 1: Meets all criteria above (good eco-design); • Group 2: Meets three of the criteria; and • Group 3: Meets two or fewer of the criteria. Producers with products in group 3 pay an extra cost of 20% of the operational costs for waste management of their products in group 3. This is paid to the collective scheme to cover waste management costs for products in group 1. The criteria for commercial fishing gear and other fishing gear vary slightly. **Commercial fishing gear** • Durability: A product meets the criterion if the product has an expected durability of at least 8 years for the expected use. Reusability: A product meets the criterion if it is expected that a minimum of 10 percent of the product's weight (the product's weight is exclusive of lead) can be recycled when the entire fishing gear is used up. The expected recyclability of the individual product is based on previous documented experience with the recyclability of similar products. Repairability: A product meets the criterion if the product can be repaired. Repairable means that the product can be taken apart and the individual components of the tool are replaceable. • Recyclability: A product meets the criterion if a minimum of 80 percent of the product's weight consists of mono-material that can be recycled after expected use. **Other fishing gear** • Durability: A product used for breeding fish and shellfish in marine areas (aquaculture fishing gear) meets the criterion if the product has an expected shelf life of at least 8 years for the use of the fishing gear. Products other than the above meet the criterion if the product has an expected shelf life of at least 12 years for fishing gear use. • Reusability: A product that constitutes a net, line, line or hook line of 100 hooks (or more) for fishing meets the criterion if a minimum of 50 percent of the product's weight is expected to be recyclable at end-of-life. The remaining operational costs for waste management of products in group 1 are distributed according to this group's producers' shares of marketed quantities. A product used for raising fish and shellfish in marine areas (aquaculture fishing gear) meets the criterion if a minimum of 10 percent of the product's weight is expected to be recyclable when it is used up. Products other than the above meet the criterion if a minimum of 30 percent of the product's weight is expected to be recyclable when it is used up.

	• Repairability: A product meets the criterion if the product can be repaired. Repairable means that the product can be taken apart and the individual components of the tool are replaceable. • Recyclability: A product that constitutes a net, line, line or hook line of 100 hooks (or more) for fishing meets the criterion if at least 80 percent of the product's weight consists of mono-material that can be recycled after expected use. A product used for raising fish and shellfish in marine areas (aquaculture fishing gear) meets the criterion if a minimum of 80 percent of the product's weight consists of mono-material that can be recycled after expected use. Products other than the above meet the criterion if a minimum of 30 percent of the product's weight consists of mono-material that can be reused after expected use.
Data reporting and verification	Starting on 31 March 2025, the Danish Producer Responsibility must report the following to the Danish EPA every year: • Total amount of commercial fishing gear and other fishing gear that producers have marketed in previous calendar year. • Total quantity of end-of-life commercial and other fishing gear that manufacturers have taken back and handled separately. • Achieved share of recycling of recovered end-of-life commercial fishing gear. There are also the following reporting requirements on producers: • Producers who market commercial fishing gear from 31 March 2024 until 31 December 2024 must report information to Danish Producer Responsibility on the quantity of commercial fishing gear that the producer expects to market in 2024. • Producers who market commercial fishing gear and other fishing gear must report information to Danish Producer Responsibility on the amount of fishing gear that contains plastic that the producer has marketed in the previous year by 31 March 2025 and thereafter once a year by 31 March at the latest. • Producers who start marketing commercial fishing gear and other fishing gear after 31 December 2024 must report information to Danish Producer Responsibility on the expected amount of fishing gear containing plastic, marketed for the concerned calendar year. Producers must report quantities in kg and separately for 1) commercial fishing gear and 2) other fishing gear. Producers are also required to self-monitor their fulfilment of the requirements laid out the in Decree. Collective schemes must publish the following information on their website: • Ownership • Producers in the scheme • Indicative financial contributions to cover operational costs in the scheme from producers per ton of marketed product as well as parameters for any discounts. • The collective scheme selection procedure for waste management operators.

Scheme operation	The Decree states that a takeback scheme for commercial fishing gear and 'other fishing gear' that the manufacturer has placed on the market can be carried out in one of two ways: • The manufacturers collect the end-of-life commercial fishing gear and/or 'other fishing gear' from the end user. • The end users return the used commercial fishing gear and/or 'other fishing gear' to the manufacturers or to a place or area designated by the manufacturer. § 13 of the Decree states that a producer must take back the amount of used-up commercial fishing gear that is allocated to them by the Danish Producer Responsibility. Producers will be assigned a port whereby they must collect all used-up commercial fishing gear that is handed over to the producer by the port. Appendix 2 of the Decree outlines 16 ports which are included in Danish Producer Responsibility's allocation to manufacturers of commercial fishing gear. The Danish Producer Responsibility seeks to allocate ports based on which of the ports the producer has registered as the port (or one of the ports) where the producer has business activity. The Danish Producer Responsibility has the power to require producers to collect end-of-life fishing gear from other ports listed in the Appendix of the Decree other than where the producers have their business activities.
Waste infrastructure	As mentioned above, the Decree outline 16 ports which will be allocated to manufacturers of commercial fishing gear. The scheme is not yet active and therefore additional collection schemes may be set up at other ports across Denmark. At this stage it is not clear whether subsequent sorting will be required or where and how the waste will be treated.
Scheme performance	Producers will be obligated to take back used fishing gear that contains plastic from 31 December 2024, and hence the scheme's performance cannot be assessed yet.
Unintended consequences	No unintended consequences have been referred in the literature.
Supplementary measures	No detailed have been published as to whether the introduction of a EPR scheme for fishing gear would require the implementation of supplementary measure such as traceability or certification.
Anything else of interest?	Based in Denmark Plastix is one of the major players in the end-of-life recycling of fishing gear in Europe.[217] Plastix is a Danish cleantech company who recycle used fishing equipment into plastic raw materials. [218]

[217] Glaukos (2021) *Report on Market Studies.* Available at: https://glaukos-project.eu/wp-content/uploads/2021/03/Glaukos-Report-on-market-studies_for-publication.pdf
[218] Plastix (n.d.) *Homepage*. Available at: https://plastixglobal.com/

A.6.0 Stakeholder Engagement

A.6.1 Industry Stakeholders

In task 1 of this project, as reported in Eunomia/Poseidon's *"Fishing Gear Extended Producer Responsibility Scheme - Market Analysis Report"* from June 2024, around 30 business operating as gear 'producers' in fishing and aquaculture sectors and additional research of other businesses operating across Ireland had been identified based on an earlier BIM study (including producers, suppliers, chandlers). The various stakeholders were separated into 3 stakeholder Tiers in agreement with DECC and BIM during task 1, based on the significance of the business within the Irish market and whether they had not previously been interviewed to discuss the topic of EPR schemes within the Irish fishing gear industry.

Tier 1 Stakeholders

Identified in task 1 of this project as High Priority stakeholders, these stakeholders have been contacted during task 1, irrespective of whether they have responded to the BIM survey, to arrange an interview (face to face or remote) and followed up if a response was not received.

Table A6-1: Tier 1 Stakeholders

Final Tier	Entity Name	Entity Type
1	Byrne Nets	inshore gear supplier
1	Swan Net Gundry	pelagic gear supplier
1	Mowi	Aquaculture gear supplier
1	GK Nets	demersal gear & net supplier
1	KT Nets	pelagic gear & net supplier
1	PePe Trawls	demersal gear & rope supplier
1	Triskell Seafood Ltd	aquaculture & shellfish gear supplies
1	JFC Marine	aquaculture & shellfish gear supplies
1	Gem Plastics	aquaculture all

Tier 2 Stakeholders

Identified in task 1 of this project as priority stakeholders, these stakeholders have been contacted during task 1, sent reminders to complete the BIM survey and offered a phone discussion.

Table A6-2: Tier 2 Stakeholders

Final Tier	Entity Name	Entity Type
2	Inishowen Celtic Iron	inshore gear supplier
2	Alisha Mary Fisheries	inshore gear supplier
2	Atlantic Weave	inshore gear & net suppliers
2	Cavanagh Nets	inshore gear & nets supplier
2	Carry mc Carry nets	twine manufacter
2	Marine Suppliers	chanderly
2	Sheehans Fishing Company Limited	Chandlery, Aquaculture & Demersal Gear Supplies
2	Kehoe Marine Supplies Ltd	chanderly
2	CH Marine	chanderly
2	Union Chandlery	chanderly
2	Breizon	inshore gear (shrimp pot) supplier, sell to SNG
2	Viking Marine	chanderly
2	Simpson O'Brien Chandlery Ltd	chanderly
2	Mooney Boats	chanderly & boat building
2	O'Sullivans Marine	chanderly & marine parts
2	Wire Ropes Ltd	Fishing ropes (mainly steel)
2	Silver Strand Rope Works Ltd	Fishing & aquaculture rope
2	Blackshell Farm	Shellfish Aquaculture Mesh

Tier 3 Stakeholders

Identified in task 1 of this project as medium priority stakeholders, these stakeholders have been contacted during task 1 and sent a reminder to complete the BIM survey.

Table A6-3: Tier 3 Stakeholders

Final Tier	Entity Name	Entity Type
3	Downer International	chanderly
3	Marine Parts Direct	chanderly & marine parts
3	Galway Maritime	chanderly
3	Ballinrobe Boats & Supplies	chanderly
3	Hardware & Marine Supplies	chanderly & commercial fishing gear supplier
3	Tosh Widger	chanderly
3	Vincent Kelly Ship Chandlers	chanderly
3	Direct Chandlery	chanderly

A.6.2 Engagement Activities and Responses

Eunomia invited all identified Tier 1, 2 and 3 industry stakeholders[219] for this project to participate in a stakeholder consultation workshop on the design of a fishing gear EPR in Ireland. In agreement with DECC, government stakeholders (including DECC, BIM and the EPA) did not attend this workshop in order to encourage an open and frank conversation. The response rate was very low, despite reminders and the communicated objective of the workshop, as an opportunity to discuss and gather feedback on potential options for EPR schemes on fishing/aquaculture gear containing plastics.

6 stakeholders (i.e., 17% of invitees) attended the workshop on 6 June 2024.

The topics covered in the workshop included:

- Introductions,
- Scene setting & context,
- Key EPR design features,
- Open discussion, and
- Wrap up and next steps.

Attendees were invited to continue to provide information in response to BIM's survey, and to email additional thoughts/input following the webinar to Eunomia. One further response was received as a result of this, and the relevant feedback has been incorporated into the summary below.

A.6.3 Key Discussion Points

The following key points were raised by industry stakeholders during the workshop, and in the feedback submitted after the workshop.

- Product coverage (and legacy gear)
    - Stakeholders were broadly in agreement with the preliminary scheme design in terms of product coverage (gear containing plastic, gear for commercial purposes, etc.). Estimates of gear placed on the market from task 1 were considered reasonable.
    - Stakeholders were against the inclusion of legacy gear clean-up costs in the EPR scheme. This was due to the large amount of legacy gear (stakeholders estimated there will be '1000s' of tonnes in the legacy stockpile), the likely poor condition of much of this gear (limiting its potential for recovery in the form of recycling, reuse etc.) and the resulting significant cost burden associated with transport and treatment of this stream. The relatively small size of the industry in comparison would likely make this burden prohibitive. The potential inclusion of this stream would also be viewed as unfair and unjustified given that the EPR scheme was not in operation at the time the legacy gear reached end-of-life, and also given that not all the gear in question was placed on the market by current producers. Stakeholders suggested that this public funding should be made available to deal with this stream instead.
    - Stakeholders recognised the issues associated with reporting of second-hand/ reused gear placed on the market, via-a-vis the need to avoid double counting when reporting placed on the market data, while still capturing it for the purposes of estimating EoL costs

[219] In task 1 of this project, around 30 business operating as gear 'producers' in fishing and aquaculture sectors and additional research of other businesses operating across Ireland had been identified based on an earlier BIM study (including producers, suppliers, chandlers). The various stakeholders were separated into 3 stakeholder Tiers in agreement with DECC and BIM during task 1, based on the significance of the business within the Irish market and whether they had not previously been interviewed to discuss the topic of EPR schemes within the Irish fishing gear industry.

and charging fees correctly, however no further information was provided regarding the scale of the second-hand market or how such information is currently managed.

- Imports, distance selling and private purchases
    - Stakeholders raised concerns that it will disadvantage Irish producers if costs for Irish suppliers increase, as consumers will then import products from the UK (as not part of EU any longer) or further afield abroad. There was a stated desire for the inclusion of direct sales through online retailers as well as private imports (in the form of cross border purchases) in the scope of obligated producers to ensure a level playing field. The need for traceability and enforcement mechanisms was emphasised.
    - Similarly, stakeholders agreed that importers should be included within the scheme (as is already provided for in the Irish regulations), with further requirements for retailers (chandlers) and online marketplaces to participate in the scheme by ensuring that either they, or their suppliers are registered and meeting EPR obligations. The potential for a similar scheme to that of the label codes used in the Irish Farm Plastics Recycling Scheme was considered to ensure that the EPR scheme is only covering costs associated with gear placed on the market by obligated producers.
- Role of end-users in EPR
    - Stakeholders were in favour of a scheme that places the same obligations on fishers and other end users who are responsible for placing gear on the Irish market for the first time as on manufacturers and importers (in line with the definition of a "producer"). It was noted that whilst a lot of the producers/suppliers' customers (end-users) are small owner-managed businesses, not corporates, some of them are fishing companies bigger than their Irish suppliers, so the burden of this obligation cannot always be considered disproportionate.
    - It was highlighted that end-users will need to be to some degree responsible for participating in the EPR scheme to ensure that producers and the future EPR scheme are not undermined, or even threatened, by unregulated end users purchasing gear from non-obligated producers in other member states or third countries (either through imports, online sales, or direct sales) to keep costs down. As a potential solution, stakeholders proposed that government to explore the possibility of a commodity code on items (like for commercial imports) brought into the EU with a specific tax to be brought in to help tackle the issue of direct online sales to end users.
    - For end-users who are not considered producers, it was agreed that end-users will need to be involved to some degree (e.g., required to participate in the collection scheme set up by the EPR and to pay additional fees/ penalties if they use the EPR scheme to manage waste that was not PoM by producers obligated under the Irish scheme). This was considered important, since producers do not have control over the final disposal of EoL gear, and end-users of fishing gear should not be considered akin to consumers of household packaging, for example. Stakeholders also raised and discussed questions around considering legal requirement for end user reporting of lost gear, incentivising end users for gear recovery, and how this might be funded.
- Establishment of the EPR scheme and costs
    - Stakeholders expressed concerns about the potentially high costs of EPR and the risk of non-compliance, fraud or avoidance of responsibility that might result. This suggests a need for additional consultation and clarity on the "necessary costs" principle, to reassure producers that they will not be asked to pay for more than what is needed to cover the costs of managing their own products. Further communication on the regulatory requirements, enforcement timelines and penalties will also be needed.
    - There was some misconception around the potential risks of setting up a PRO (e.g., stakeholders expressed their fear that - bearing in mind competition law - if producers were to cooperate as an industry, they would be accused of acting in consort).

- Stakeholders stressed the importance of getting waste collectors and recyclers on board to estimate their costs as soon as possible. This was due to concern around the potential high costs of separate collection and sorting (including labour, transport costs, etc.) relative to poor material revenues, due to a lack of domestic recycling capacity. There was a lack of clarity regarding the objectives of the scheme in this regard (separate collection, as opposed to recycling of everything initially, which is not technically feasible at present).

- Stakeholders expressed a lack of clarity around the role BIM will play in any future PRO/ EPR scheme, and expressed a preference for BIM's involvement given their previous work in this area.

- There was also some misconception around the nature of producer responsibility for hose producers who had already established their own take back and recycling schemes for some products. For example, it was suggested that producers who run such schemes should either not be required to pay fees, or to claim back their recycling costs from the EPR scheme. This suggests a model of EPR that allows for individual compliance, which is not currently provided for (producers will be expected to comply through a PRO). However further details on the scale of these activities and the associated costs was not provided, and so further assessment of possible solutions was not feasible within the scope of this study. For example, there may be a hybrid scheme to allow for individual producers to manage their own collection and recycling obligation but still register and report performance through the PRO. Costs associated with PRO administration, awareness raising activities etc. would still need to be covered.

- Timeline
  - Stakeholders expressed a lack of clarity around the requirement to form a PRO (which they had assumed was being led by government) and the time left for them to do so (6 months) despite the existing regulations and SUPD requirements.
  - There was a lack of clarity on the penalties associated with any failure of industry to form a PRO/ register with a PRO on time
  - A 'start-then-strengthen' approach was welcomed, with obligations ramping up over time as data becomes available and requirements are clarified.

In summary, a clear and urgent need for further engagement between government, industry stakeholders, and waste operators was identified, to clarify several misconceptions about the concepts underpinning EPR, as well as the specific roles and responsibilities of different actors in the EPR scheme. The low attendance at this workshop highlights the fact that there has been a failure of market participants to engage with the process to date, and a lack of awareness of the regulatory requirements. Stakeholders are most concerned about the likely cost burden that EPR implies for them, and the impacts this may have on their competitiveness if others placing gear on the market are not similarly obligated (and requirements enforced as needed).

A.7.0 Modelling Assumptions

Table A7-1: Baseline assumptions

Baseline Flow	Assumptions	Source
EoL plastic in products in scope that is reused/repaired	30.00%	Eunomia assumption
EoL plastic in products in scope that is retrieved via producer responsibility	15.00%	Eunomia assumption
EoL plastic in products in scope that is retrieved	55.00%	FFL data
EoL plastic in products in scope that is retired	70.00%	CTC report
EoL plastic in products in scope that is collected for disposal	30.00%	Eunomia assumption
EoL plastic in products in scope that is processed	100.00%	Eunomia assumption
EoL plastic in products in scope that is retrieved via producer responsibility that has recycling loss	50.00%	Eunomia assumption
EoL plastic in products in scope that is collected for disposal that is recycled	3.00%	BIM report
EoL plastic in products in scope that is collected for disposal that is landfilled	47.00%	Eunomia assumption
EoL plastic in products in scope that is collected for disposal that is incinerated	50.00%	BIM report

Table A7-2: Growth rate

Category	Assumption	Source
Growth rate	1.50%	Eunomia assumption based on fish landings, fishing fleet and aquaculture growth rates

Table A7-3: Cost data

Cost category	Cost point	Data (EUR/t)	Source
Collection costs	Collection cost	288	Poseidon provided data point based on Stakeholder engagement
Prep for reuse	Warehousing costs per year	88	Stakeholder questionnaire from Defra furniture EPR project converted to EUR
	Sorting cost	53	https://www.local.gov.uk/about/news/lga-over-half-million-tonnes-recycling-rejected-point-sorting
	Op-ex	38	Stakeholder questionnaire from Defra furniture EPR project converted to EUR
	Waste disposal costs from prep for reuse	28	Stakeholder questionnaire from Defra furniture EPR project converted to EUR
Recycling costs	Sorting cost	53	https://www.local.gov.uk/about/news/lga-over-half-million-tonnes-recycling-rejected-point-sorting
	Warehousing costs per year	88	Stakeholder questionnaire from Defra furniture EPR project converted to EUR
	Exporting costs	50	Poseidon assumption
	Domestic recycling	225	Interview with IFF Plastics (a plastic recycler in Ireland)
Disposal Costs	Landfill tax	85	Landfill sites (citizensinformation.ie)
	Landfill gate fee	112	waste-management-in-ireland-benchmarking-analysis-and-policy-priorities.pdf (enterprise.gov.ie)
	Incineration	10	Ireland introduces incineration levy (euwid-recycling.com)
	Incineration gate fees	118	WRAP gate fee report converted to euros
Scheme Costs	Operational costs	3	Eunomia assumption from ZWS Mattress project. GBP to EUR
	Compliance costs	3	Eunomia assumption from ZWS Mattress project. GBP to EUR
	Monitoring costs	3	Eunomia assumption from ZWS Mattress project. GBP to EUR
	Labelling costs	7	Eunomia assumption

Table A7-4: Social impact data

Category		Assumption	Source
Employment GVA per tonne	Prep for reuse	0.0103	EU Reference Model for Waste
	Recycling	0.0103	EU Reference Model for Waste
	Landfill	0.0001	EU Reference Model for Waste
	Incineration	0.0001	EU Reference Model for Waste
	Collection	0.0006	EU Reference Model for Waste

Table A7-5: Social Discount Rate

Category	Assumption	Source
Standard Rate: 0-30 Years	4.00%	Ireland's Department of Public Expenditure and Reform discount rate

Table A7-6: Environmental impact data

Category	Assumption		Source
Incineration emissions from plastic	0.001	tCO2e/t of dense plastic	Eunomia Atropos Model

Table A7-7: Recreational gear assumption

Category	Assumption	Source
Recreational gear assumption	10.00%	Assumed the portion of what is placed on the market, Eunomia assumption

Table A7-8: Scenario assumptions

Category	Assumption	Source
Scenario 1	Collection increases from 25% in 2029 to 40% in 2038	Eunomia assumption based on EPR scheme design
Scenario 2	Collection increases from 30% in 2029 to 50% in 2038	Eunomia assumption based on EPR scheme design
	Recycling increases from 10% in 2029 to 20% in 2038	Eunomia assumption based on EPR scheme design

Table A7-9: Legacy gear assumptions

Category	Assumption	Source
Starting amount	5000 tonnes in 2021	Eunomia assumption
Reduction during amnesty programme	20%	Eunomia assumption


eunomia