



Set of policy recommendations for achieving a circular economy for European fishing gear

How can this pack can support you?

This policy pack provides a summary of SEARCULAR's priority policy recommendations for achieving a circular economy for fishing gear and fisheries related marine litter across Europe.

POLICY BRIEF THEMES

1

Challenges and opportunities in developing a circular economy for fishing gear

This brief provides an overview of findings from our project that can support relevant targets laid out by current EU legislation.

2

Biodegradable materials for fishing gear and equipment

This brief outlines SEARCULAR's policy recommendations for the use of alternative, natural and biodegradable materials to traditional plastic.

3

Recycled materials for circular fishing gears

From gear design to recycling, in this brief we highlight our main policy recommendations to help reduce fisheries-based marine plastic pollution.

4

Waste Management Infrastructure - managing fishing gear from deck to port

This brief provides a summary of SEARCULAR's key policy recommendations for scaling up fisheries circularity in European ports.

This pack also includes SEARCULAR's proposal for a Digital Product Passport for gear.



Challenges and opportunities in developing circular fishing gear

How can this brief support you

This SEARCULAR policy brief showcases findings from our research and innovation project that can support relevant targets laid out by current EU legislation.

The [European Green Deal](#) dictates that Europe should do all in its power to implement more sustainable practices for people and planet.

Specifically, this brief showcases how SEARCULAR's results can support progress towards:

- **50% collection rate of end-of-life fishing gear** as determined by the [Single Use Plastics \(SUP\) Directive](#)
- **Building capacity at port to provide adequate collection facilities** as directed by the [Port Reception Facilities Directive \(EU\) 2019/883](#)
- **The design of fishing gear in line with the voluntary [Circular Design of Fishing Gear Standards EN 17988](#)** in order to **create high-quality secondary raw materials** from EOL fishing gear to support [The Circular Economy Action Plan](#).

Key Recommendations

1

A co-creative and iterative approach to the development and implementation of alternative gears should be adopted to achieve targets for a 50% reduction in marine plastic litter from fisheries. SEARCULAR has demonstrated possible alternatives that utilise plastic free materials as well as improvements in management of EOL gears that pave the way for future refinement and scale-up of solutions.

2

Policy should focus on the prevention of marine litter at source by promoting formal approval of a portfolio of scientifically-proven solutions. SEARCULAR has proven the use of alternative materials for the design of fishing gear that reduce marine plastic pollution. Promoting their uptake through standards, and incentivised certification schemes will enhance uptake by producers and end-users.

3

Alignment of gear design regulation with the [standards for Circular Design of Fishing Gear](#) and with the [Safe and Sustainable by Design \(SSbD\) framework](#) will support a circular management model for fishing materials, including social, economic and environmental sustainability. Through our work with ports and EOL gear management, SEARCULAR has demonstrated new routes for recycling unwanted material.



European
Green Deal



SUP
Directive



CE Action
Plan



PRF
Directive



CE Fishing Gear
Standards



SSbD

Background Research

SEARCULAR has worked proactively across the fishing gear value chain to develop and demonstrate four solutions that support circularity and reduce marine plastic litter across the fishing sector. A key challenge consistently highlighted by our work has been that uptake of new technologies and solutions will be limited if there is no market demand¹. Circularity is a transition and SEARCULAR has demonstrated significant steps towards this.

Despite positive feedback from industry, and encouraging results from at-sea testing of our innovations and lab analysis of environmental impact, it is likely our solutions will not be competitive on an open market².

Policy support to create a lead market, or the implementation of regulation promoting alternative designs and more circular fishing gear is integral to reach the targets laid out by the European Commission. For example, following the recommendations laid out in the [EN 17988 series for 'Circular design of fishing gear and aquaculture equipment'](#), and the [SSbD framework](#) lead to fishing gear products that do not contain substances of concern and that can be dismantled more easily, resulting in more reuse of parts and components or higher quality recycling. In turn, this will support the industry in achieving collection and recycling rates for fishing gear as set out in the [SUP Directive](#).



A co-creative and iterative approach to the development and implementation of alternative gears should be adopted to achieve circularity for fishing gears.

This will support targets for a 50% reduction in marine plastic litter from fisheries. Each step along this transition pathway should be recognised and incentivised.

Through four solutions, SEARCULAR has demonstrated the need to engage with key stakeholders at each stage of development to enhance social acceptance and end-user adoption¹. Whether through the use of novel, alternative materials^{3,4} or using recycled materials^{5,6,7}, engagement with manufacturers and end-users is integral to the development of solutions. To support design, refinement, and scale-up for widespread use, further support and incentives should be implemented. This would support government targets for a 50% reduction in marine plastic litter from fisheries, as determined by the [SUP Directive](#).

Formal approval or certification of a portfolio of scientifically-proven solutions for a variety of fisheries could enhance their uptake across the industry.

This shift in focus to the prevention of marine litter at source would enhance progress towards the target for the reduction of marine plastic pollution from fisheries.

SEARCULAR has proven the use of alternative materials for the design of fishing gear that reduce marine plastic pollution. Through robust development, laboratory testing and testing at sea aboard commercial fishing vessels^{3,4,8,9} we have shown that novel, alternative materials can be successful under commercial environments. Promoting the implementation of proven solutions through regulation or certification schemes would likely enhance uptake by producers and end-users, as has been shown through other certification schemes such as the MSC Sustainability Certification.

This is vital in reducing marine plastic pollution produced by European fisheries as laid out in the [SUP Directive](#), [European Green Deal](#), and [Circular Economy Action Plan](#).



The design of gear is integral to support effective recycling of end-of-life gear and reducing plastic use at source.



Alignment of policy and regulation with the [standards for Circular Design of Fishing Gear](#) and with the [Safe and Sustainable by Design \(SSbD\) framework](#) will support a circular management model for fishing gear. SEARCULAR has developed two solutions that utilise EOL gear, both of which highlight the need for easy disassembly and clear material use to enhance recyclability for high-quality recyclates^{5,10}. [Our Gear Lifecycle Factsheet \(GLF\) concept](#)¹¹, implements Digital Product Passport initiatives¹² and provides an example of how gears could be labelled to showcase both their manufacture and best practice for EOL, aligning with the requirements set out in the [EN 17988 Standards series](#).

Additionally, two of our solutions have explored the use of alternative materials to reduce plastic marine litter at source^{3,4}. By integrating biodegradability into fishing design via the use of biodegradable polymers or organic materials, the design of gear can lead to a significant reduction in marine plastic pollution from fisheries, while maintaining catch efficiency. Furthermore, our environmental safety testing has shown that these materials have minimal impact on the marine environment, habitats and wildlife².

SEARCULAR is a research and innovation project – comprising 13 partners – working together with industry to reduce marine litter and microplastic generated by fishing gear.

Tailored to the requirements of diverse fisheries, SEARCULAR has developed and tested [4 innovative solutions](#) to tackle marine plastics from fishing gears at source, and ultimately, support sustainable fisheries and healthy marine environments for generations to come.



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- 12 [What is the Digital Product Passport?](#)

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UK Research
and Innovation



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Biodegradable materials for fishing gear and equipment

How can this brief support you

As a direct replacement of traditional plastic components used in fishing gear, **natural and biodegradable alternatives have the potential to significantly reduce plastic pollution produced by fisheries.**

SEARCULAR has tested two solutions using alternative materials: BIOFADs (biodegradable fish aggregating devices) from natural materials and marine biodegradable demersal seine ropes. Both support the target of **50% reduction of plastic pollution from fisheries** as set out in the [Zero Pollution Action Plan, European Green Deal](#) by replacing the plastic used within these gears with biodegradable alternatives ^{1,2}.

The implementation of marine biodegradable demersal seine ropes would ensure that microplastic pollution caused by rope abrasion in this fishery would biodegrade into carbon dioxide, water and biomass, supporting targets for a 30% reduction in microplastic release ([Zero Pollution Action Plan, European Green Deal](#)). SEARCULAR's novel design of dFADs, constructed entirely using natural materials, eliminates plastic from this essential fishing device for the tropical tuna purse seine fishery.

In support of these targets to reduce marine plastic pollution as part of the [European Green Deal](#), this brief outlines SEARCULAR's policy recommendations for the use of alternative materials to traditional plastic.

Key Recommendations

1

Increasing uptake of alternative materials in the manufacture of fishing gear and equipment would significantly reduce marine plastic pollution generated by European fisheries ^{1,2}. SEARCULAR's novel fishing gears and equipment manufactured using alternative materials (biodegradable and natural) perform comparatively to conventional plastic gears in our trial fisheries, contributing to the reduction of plastic waste without compromising on catch efficiency or gear performance ^{3,4,5}.

2

Policy should continue moving from a predominantly waste-management approach to place greater emphasis on gear design and material use ^{6,7}. There are several policy mechanisms for collecting and managing waste at the products end-of-life. Moving to a prevention-based focus for material use and gear design would reduce the amount of plastic produced by the industry requiring subsequent management ⁶.

3

Guidance on the use of new materials needs to be swift and adaptive, to keep pace with technological development, and consider environmental impacts along the entire value chain. The technological development of new materials, particularly biodegradable polymers, is fast paced and often protected by industry secrets. International standards for biodegradable materials should be developed to ensure any new materials and products meet circularity and sustainability requirements.



Background Research

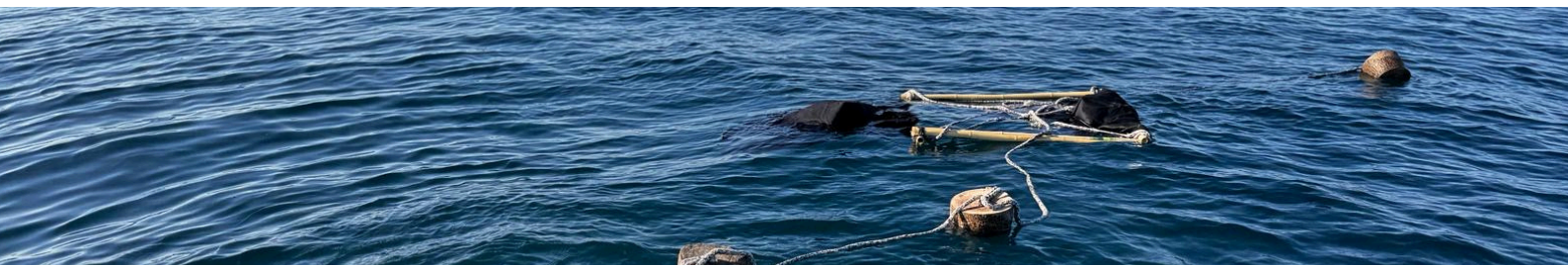
SEARCULAR has worked with manufacturers and the fishing industry to develop and test alternative materials for the production of low-impact, biodegradable fishing gear. In particular, we have explored the use of **natural materials** for drifting Fish Aggregating Devices (dFADs) used in tuna purse seine fisheries^{1,3}, and innovative **marine biodegradable polymers** for demersal seine ropes².

In both fisheries, our biodegradable designs **perform comparatively to traditional plastic alternatives**, with similar target catch performance, behaviour at sea and lifespan^{3,4,5}. By replacing plastics with natural biodegradable alternatives, SEARCULAR BIOFADs eliminate plastic pollution from these devices⁸. Our marine biodegradable seine ropes ensure that any particles worn from abrasion are quickly degraded,

preventing accumulation of microplastics in the marine environment.

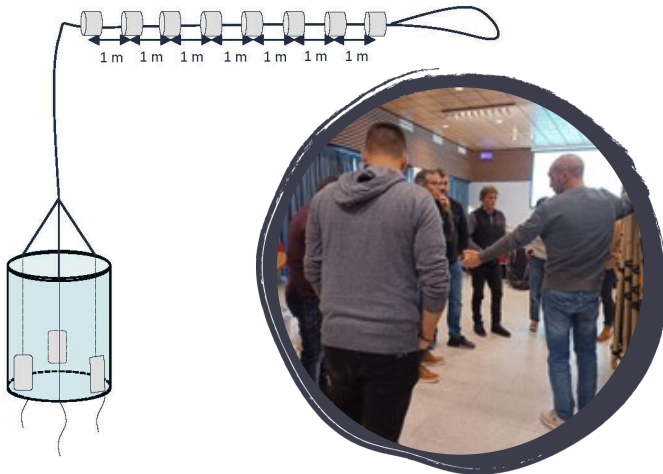
We know that uptake of new materials by manufacturers will be limited if there is no market demand⁹. Currently the cost of alternative materials and designs are prohibitive for fishers. We ask that funding mechanisms are put in place to support manufacturers and fisheries that develop and adopt alternative materials, helping to reduce the environmental impact of the industry.

In this brief we highlight our main policy recommendations to help reduce fisheries-based marine plastic pollution and to overcome challenges and barriers to adopting alternative materials in the manufacture of fishing gear and equipment.



Utilizing natural materials for dFADs completely eliminates plastic pollutions from these devices.

Through a series of co-creation workshops with fishermen, SEARCULAR has developed three innovative new models of drifting Fish Aggregating Devices (dFADs). These biodegradable FADs (BIOFADs) are constructed entirely of natural materials such as bamboo, paulownia, pine and recycled cotton¹. Trials in the Mediterranean Sea have yielded promising results, with the BIOFADs remaining active after 6.5 months - the expected lifespan of a traditional plastic dFAD³. **With an estimated 120,000 FADs deployed worldwide each year³, the reduction in plastic pollution and entanglement risk through the roll-out of biodegradable alternatives is significant**, however there are barriers to wide-scale adoption of these materials.



Above: Diagram showing the structure of a new cylindrical BIOFAD model. Co-designed with fishers and made with natural materials.
Inset: A co-creation workshop held as part of the design process.

There is no structured process for certifying and validating the use of alternative materials. **Policy should recognize and support the adoption of scientifically validated biodegradable materials**, such as those demonstrated by SEARCULAR. This would ensure that alternative natural and renewable components are **formally acknowledged as credible, safe, and effective** options for reducing the environmental footprint of fishing gears. Formal approval and regulation mandating the use of biodegradable, non-entangling FADs would ensure uptake and enable fishermen to showcase their efforts to move towards lower-impact fishing methods⁹. Such approval and certification schemes should include mandatory life cycle assessment to ensure that the new solutions do not shift burdens from marine pollution to other impact categories.

Developing seine ropes using a marine biodegradable polymer prevents accumulation of microplastics in the marine environment.



Working closely with manufacturers, SEARCULAR has developed innovative biodegradable seine ropes using marine biodegradable polymers². When tested aboard a commercial fishing vessel, we found the **biodegradable ropes perform comparably to traditional plastic ropes**, with similar behaviour and longevity⁵. Anecdotal feedback from the skipper shows a positive response to the ropes and confidence in the continued use of the alternative ropes. **Using biodegradable polymers for demersal seine ropes has the potential to remove 77-97 tonnes of microplastic pollution per year from Norwegian fisheries alone**¹⁰.

Despite positive results in the performance of biodegradable seine ropes, and the role they can play in significantly reducing marine microplastic pollution from fisheries, **wide-scale uptake remains a challenge**. The cost of implementing biodegradable ropes is prohibitive for fishermen. Thus, **funding mechanisms should support fisheries that adopt alternative materials**, helping reduce cost gaps and accelerating market uptake⁹.

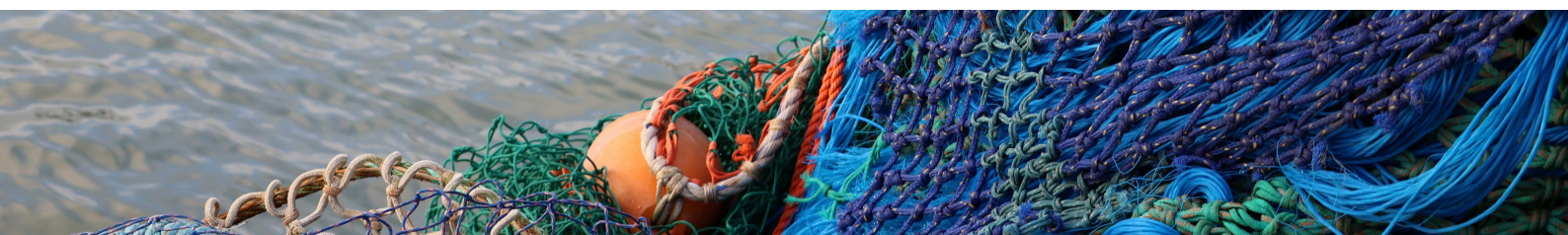
At the same time, our Cost Benefit Analysis suggests that policy to **facilitate scale up of alternative material manufacturing** would lower the price premium currently associated with alternative fishing gear materials⁸. Producer responsibility schemes that reward fishing gear manufacturing with reduced environmental impacts across the entire value chain, would support a more competitive market between biodegradable alternatives and conventional plastic gears.

Policy should focus on gear design and manufacture to reduce the amount of plastic waste produced by the fishing industry at source.

While the current focus on collection and recycling determined by the [Zero Pollution Action Plan](#), [European Green Deal](#) supports the reduction of end-of-life gear being incinerated or placed in landfill, SEARCULAR has demonstrated that shifting to **biodegradable alternatives reduces the amount of plastic waste produced**⁸.

However, it is important to consider certification of any alternative materials to ensure they are environmentally sustainable and suitable for marine conditions. The development of mandatory **standards**⁷ and **certification of scientifically-proven materials** would prevent the adoption of non-recyclable or environmentally more harmful substitutions and supports a long-term reduction in marine plastic.

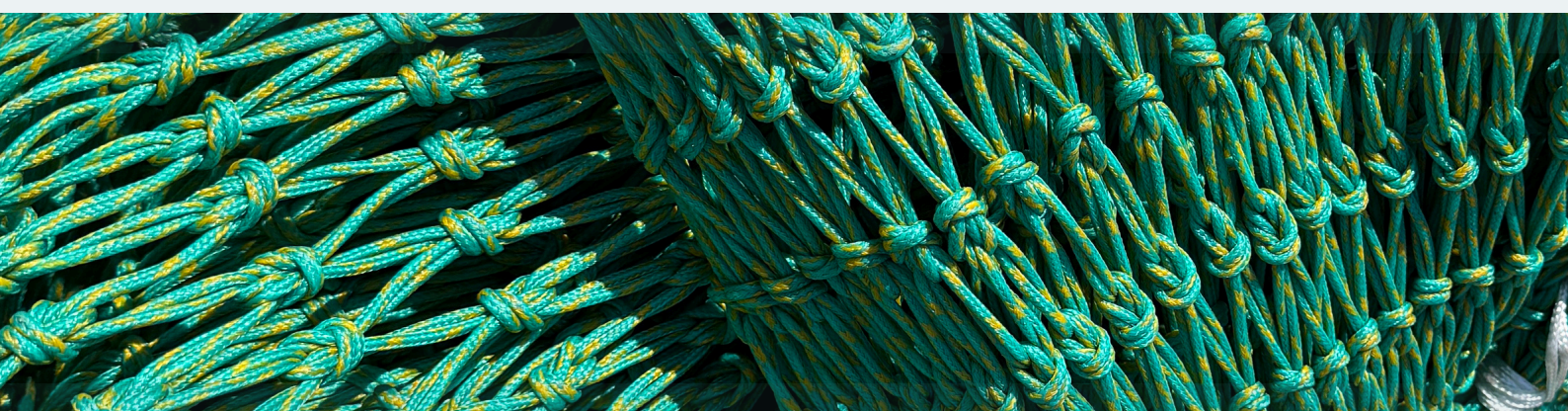
We note that while our results show the potential benefits of alternative, biodegradable materials, these materials are tailored to specific fisheries and regions. For inclusion across different fisheries or geographic areas, further research and development would be required.



About SEARCULAR

SEARCULAR is a European Horizon-funded research and innovation project under Mission Protect our Oceans and Waters. SEARCULAR has 13 partners, from across Europe and is working with the fishing industry to co-develop solutions that reduce marine litter and microplastic generated by fishing gear.

Tailored to the requirements of diverse fisheries, SEARCULAR has developed and tested **4 innovative solutions** to tackle marine plastics from fishing gears at source, and ultimately, support sustainable fisheries and healthy marine environments for generations to come.



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Recycled materials for circular fishing gears

How can this brief support you

SEARCULAR has worked to evidence the best practice and approaches for incorporating recycled materials at manufacture, and recycling at end-of-life, in order to reduce marine litter, microplastics, and marine pollution from European fisheries throughout the whole fishing gear lifecycle.

Under the [Circular Economy Action Plan 2020](#), and [Design of gear under standards \(EN 17988\)](#),

SEARCULAR has trialled and refined prototype dolly ropes composed of recycled materials^{1,2}, and targeted a plastic-2-plastic approach by promoting uptake of chemical recycling (pyrolysis) of fishing nets and end-of-life (EOL) gears³.

In support of achieving these circular economy directives as part of the [European Green Deal](#), this brief outlines SEARCULAR's clear policy recommendations for gear recycling in order to reach EU fisheries targets.

Key Recommendations

1

Approve and certify gears that are circular by design – based on material performance across the whole lifecycle. Scientifically-proven gears that demonstrate benefits, such as reducing marine plastic pollution, a high recycling efficiency, facilitating plastic-2-plastic recycling, and meeting sustainable by design criteria across the whole Life Cycle Assessment should be incentivised for widespread uptake⁴.



2

Implement smart Blue Points, port reception facilities that effectively integrate end-of-life fishing gear management. SEARCULAR's smart Blue Points facilitate the effective sorting and conditioning of EOL gear, channeling materials to the required collection stream (e.g. mechanical or chemical recycling) and facilitating conversion into secondary raw materials⁵. To support this, a programme of measures – similar to those implemented under the [Marine Strategy Framework Directive \(MSFD\)](#) – should be offered to vessels and ports for returning EOL gear to be appropriately recycled.



3

Set threshold targets for the optimal percentage composition of recycled materials at manufacture, alongside a standardised and transparent digital product passport⁶. To support this, policy and regulation must be aligned with [circular design standards](#)⁷. Financial, access, or market-based incentives should be provided to support fishers in adopting gears designed and manufactured with a higher percentage of recycled materials.



Background Research

There are challenges and opportunities when it comes to achieving a circular economy for fishing gear in Europe. One of the challenges to reaching the targets set out in the [European Green Deal](#) is to incorporate recycled materials into gears at manufacture, and at the same time, recycle components of end-of-life gear to develop secondary raw materials.

SEARCULAR has showcased the complexity but potential benefits of recycling old fishing gear⁵. For example by utilising both mechanical and chemical recycling, value can be added to waste materials³, providing an incentive to collect and return materials to port, and reducing fisheries related marine litter at sea and on land.

Considering the full lifecycle of fishing gears via **Life Cycle Assessment (LCA)**⁴ enables a more complete understanding of the environmental impact of production, product longevity, and use and reuse at the end of life. Our LCA considers the environmental costs of production of alternative materials, gear longevity, potential pollution risk, and end-of-life management. Gaining this understanding of impacts across the full value chain is integral to achieving truly sustainable circularity for fishing gears.

In this brief, we highlight our policy recommendations to help reduce fisheries-based marine plastic pollution and to overcome challenges and barriers to recycling and operationalising gear circularity.



Incentivise the use of gears that are circular by design – based on material performance across the whole lifecycle

Different materials have different environmental impacts at sea^{4,5}, by making smart choices about the composition of materials used in gear, environmental impacts and plastic pollution can be minimised and where possible eliminated. **SEARCULAR has been developing new designs for gears using both recycled plastics and alternative materials** (See Policy Brief 2). We have successfully demonstrated that components of fishing gear can be recycled using both mechanical and thermochemical recycling processes to produce new plastic products and fishing gear^{1,3}.

Viewing gear performance and plastic pollution reduction across the whole life cycle is critical when comparing gear alternatives, and validated solutions that work for industry and perform strongly across the whole LCA should be granted formal approval or certification to help enhance social acceptance and promote uptake.

Implement smart Blue Point port reception facilities that integrate end-of-life fishing gear into local waste management streams.

SEARCULAR's results indicate that promoting and incentivising the collection of gears, and the uptake of chemical recycling (pyrolysis) of end-of-life fishing gear is a highly effective method of reducing environmental impacts at sea^{3,5}. By reducing barriers to collection of EOL gears, and adding value to waste materials, fishers are motivated to return and recycle old gear at port⁸, reducing marine plastic pollution.

Fishing gears are composed of multiple mixed materials – some of which are not suitable for mechanical recycling⁵. SEARCULAR's smart blue point system has shown that with clearly dedicated collection hubs, allowing for sorting, cleaning and sufficient conditioning, **end-of-life materials not suitable for mechanical recycling can undergo pyrolysis and produce oils suitable for plastic production and the manufacture of secondary products³ – the end goal of a plastic-2-plastic model.**

For SEARCULAR's full recommendations for smart port reception facilities [see Policy Brief 4](#).

POLICY BRIEF 3

Set threshold targets for the optimal percentage composition of recycled materials at manufacture

Under the [European Green Deal](#) the European Commission should **introduce minimum thresholds for the percentage composition of recycled plastics at manufacture**. This is in addition to the provision of financial incentive, formal approval, or regulation for scientifically-proven circular gears to facilitate recycling at end-of-life and enable scalable plastic-2-plastic solutions³. Where possible recycled materials from fishing gear should be prioritised, enabling a fishing-2-fishing or fishing-2-plastic circular system^{2,3}.

To support this SEARCULAR is proposing the rollout of a [standardised Gear Tag and Gear Lifecycle Factsheet \(GLF\)](#)⁶ – to act as a Digital Product Passport⁹ – which provides transparency on the gears manufacture and lifecycle, and signposts the relevant waste management strategies to encourage effective end-of-life recycling. SEARCULAR's Smart Blue Points and their associated mobile app has showcased how material traceability can be supported¹⁰. While SEARCULAR has demonstrated the commercial potential of recycled material from fishing gears, the manufacturing of this material, particularly the extrusion process, remains complex, currently resulting in low yields⁴. Further research is needed to support waste managers and manufacturers in successfully implementing these circular approaches.



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- 7 [Design of Gear Under Standards](#)
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- 9 [What is the Digital Product Passport?](#)
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Waste Management Infrastructure - managing fishing gear from deck to port

How can this brief support you

As part of its work towards objectives laid out in the [European Green Deal](#) and [Circular Economy Action Plan \(2020\)](#), SEARCULAR has focused on circular smart port-based solutions which provide the practical infrastructure required for effective waste collection and management. Specifically, under the [Port Reception Facilities Directive](#), [EU Ocean Pact](#), and [EU Ports Strategy](#), ports are legally required to provide adequate waste management facilities to handle fisheries specific waste and prevent gear from reaching landfill.

To directly address this, SEARCULAR has tested and simulated a '**Smart Blue Point**' which enables collection, characterization, sorting, and conditioning of end-of-life (EOL) fishing gear at port, ensuring material traceability¹. This provides a scalable model for EOL waste management and the blueprint for a dedicated pathway for recyclable materials to enter the circular economy².

This brief provides a summary of SEARCULAR's key policy recommendations for scaling up fisheries circularity in European ports.

Key Recommendations

1

Support the deployment of a smart 'Blue Point' and link these to optimised reverse logistics systems across regions. Strengthen existing port infrastructure and rollout **SEARCULAR's Blue Point model** to significantly reduce marine litter and improve the traceability of EOL fishing gear^{1,2}. Facilitating harbour-side collection, sorting and conditioning can incentivise and maintain demand for high quality recyclable materials at port³.

2

To improve the efficiency of chemical and mechanical recycling of EOL fishing gears, their waste management should be integrated into existing processing pathways and plants. Our research indicates that the volume of fishing gear waste collected in ports across the Basque region is insufficient at a regional scale for a stand-alone chemical or mechanical processing plant.² Thereby, collected, sorted and conditioned fishing gear should be fed into existing chemical or mechanical processing plant pathways under a plastic-2-plastic strategy⁴.

3

Make digital product passport⁵ mandatory for fishing gear and devices. Aimed at supporting the EOL management from the outset and focused on the [design of gear under standards](#), certified fishing gears should be incentivised to support EOL waste management. **Digital product passports – in the form of a gear tag or gear lifecycle factsheet** – that provide transparency on material composition and sources, and guidance on EOL management could support increased recycling^{5,6}.

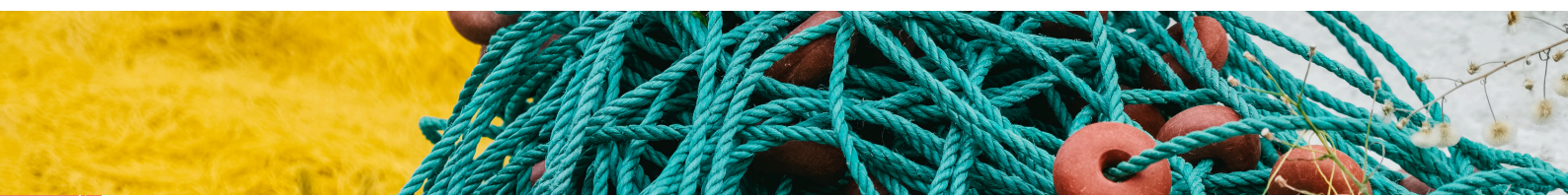


Background Research

To develop the roadmap for circular fishing ports across Europe, inclusive of a **scalable 'Blue Point' model for EOL gears**, SEARCULAR has worked with Basque Government, port authorities and ports to understand their needs and requirements for gear collection and sorting^{1,2}. Fishing gear waste management infrastructure needs to be carefully tailored to the specific needs of the port and the region, and at the same time, aligned with existing waste management streams at a regional and national scale². SEARCULAR has trialled and refined a Smart Blue Point design for fishing gear waste collection, sorting and conditioning in a Basque County port in Northern Spain. **The results of this trial have informed a 3D digital model of this smart port based solution²**, which can be in turn rolled out and adapted to fit individual port and regional requirements.

Additionally, SEARCULAR has undertaken a regional trial in the Basque region, in which almost **14 tonnes of fishing gear were collected, characterized, sorted and separated for chemical recycling**. Furthermore, **1 tonne of this material was thoroughly processed and successfully converted into pyrolysis oil^{2,4}**. This additional recycling route has proven effective in reducing the volume of fishing waste typically destined for landfill, and contributes to recycling within the framework of a circular economy.

SEARCULAR has evidenced the benefits of a standardised, but simultaneously, locally tailored port reception and management model, designed for connectivity between ports, and regional and national facilities. This brief provides three core focus areas to realise these benefits.



Support the deployment of smart 'Blue Points' and link these to optimised reverse logistics systems across regions

SEARCULAR has developed a model to prioritise the deployment and scaling up of smart Blue Points across Europe². **The Blue Point should act as an operational hub for the collection, dismantling, and conditioning of discarded fishing gear, supported by a network of satellite collection points at smaller ports and linked via an optimised reverse logistics system across regions.**

The EU should promote and regulate the collection, classification, conditioning, and recycling of EOL fishing gears and utilise the connected EU Blue Point system to monitor compliance, promote effective local management. To incentivise the usage of the Blue Points by fishers³, the disposal of dismantled fishing gear should be free of charge or with reduced flat waste fees under the [Port Reception Facilities Directive](#) and [EU Ports Strategy](#). Additional eco-modulation of waste fishing gear disposal could be attributed to the recyclability of the products and materials delivered.

Integrate fishing waste into existing waste management facilities

High costs of sorting, waste management logistics, and a lack of traceability mean that a lot of fishing gear still ends up in landfill or incinerators^{1,2}. To address this and targets in the [Zero Pollution Action Plan \(2021\)](#), SEARCULAR explored the feasibility of dedicated fisheries waste management plants. However, the results of **regional Basque trials indicated that the tonnage of fisheries waste collected at ports is not sufficient for its own waste management facility and should instead be integrated into existing local or regional recycling facilities²**.

To map this process, SEARCULAR has used a reverse logistics model², and identified that **effective integration with existing waste management is dependent on collecting, sorting, and conditioning gears in Blue Points at port to ensure materials are of a sufficient quality for recycling**. Once processed, the materials should be directed to established recycling routes, such as mechanical and chemical recycling⁴, supporting the development of a plastic-2-plastic strategy. It is advised that case specific environmental assessments should be undertaken to minimise the risk of unforeseen impacts, including those related to port logistics and recycling emissions⁶.

POLICY BRIEF 4

Make the digital product passport mandatory for fishing gear and devices

A fundamental barrier to the efficacy of Blue Points and utilising existing waste management streams is providing a steady stream of recyclable gears². This starts with their design, **gears should be manufactured in line with circular design standards and design-for-recycling principles, for easy disassembly and recycling**. This will lead to higher quality recyclates and secondary raw materials, ultimately adding value to materials that would otherwise be landfilled and, therefore, lost from the circular economy^{2,4}.

Building on existing policy recommendations regarding certified gears (See Policy Brief 1 and 2), **the EU should promote the implementation of a Digital Product Passport that allows materials to be tracked throughout their entire lifecycle^{5,6} – from manufacture to second life**. This could be facilitated by extended producer responsibility schemes and a gear labelling concept such as SEARCULAR's Gear Tag and Gear Lifecycle Factsheet (GLF)⁶.

SEARCULAR is a European Horizon-funded research and innovation project under Mission Protect our Oceans and Waters. SEARCULAR has 13 partners, from across Europe and is working with the fishing industry to co-develop solutions that reduce marine litter and microplastic generated by fishing gear.

Tailored to the requirements of diverse fisheries, SEARCULAR has developed and tested **4 innovative solutions** to tackle marine plastics from fishing gears at source, and ultimately, support sustainable fisheries and healthy marine environments for generations to come.



References and Resources

- 1 Paule España, Asier Asueta, 2026. Technical performance of Smart port-based solutions for EOL Fishing gear. SEARCULAR Deliverable 4.3
- 2 Ismo Ruohomäki, Paule España, 30.08.2025. Guidelines on Good Management Practices for EOL fishing gear. SEARCULAR Deliverable 4.1
- 3 Carolina Alonso, Maria Uyarra, Oihane C. Basurko, 2026. Report on stakeholder assessment and engagement activities. SEARCULAR Deliverable 5.1
- 4 Hernan Calvo, Paule Espana, 2026. EOL fishing gears pyrolysis for "Plastic2Plastic" strategy. SEARCULAR Deliverable 4.2
- 5 What is the Digital Product Passport?
- 6 Benedict Wilson, Emily Easman, Stephan Kabasci, Oihane C. Basurko, 2026. SEARCULAR's Gear Lifecycle Factsheet (GLF)a Digital Product Passport for fishing gear
- 7 Hélène Gomes, et al., SEARCULAR Consortium, 2026. Sustainability validation of SEARCULAR solutions. SEARCULAR Deliverable 5.2

How to cite:

Benedict Wilson, Emily Easman, Paule España, Oihane C. Basurko, SEARCULAR Consortium. Waste Management Infrastructure - managing fishing gear from deck to port. SEARCULAR Policy Brief 4. June 2026.



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Circular Solutions for Fishing Gears

CONCEPT

SEARCULAR's Gear Lifecycle Factsheet (GLF) a Digital Product Passport for fishing gear

SEARCULAR has developed a conceptual design and proposal for a standardised Gear tag and Gear Lifecycle Factsheet (known as a GLF), which will act as a Digital Product Passport for fishing gear¹.

The GLF will provide transparency around gear components and recyclability, and support best practice and circularity throughout the whole gear lifecycle.



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Background

It is widely accepted that **an integral step towards better management end-of-life (EOL) fishing gear, and reducing Abandoned, Lost or Discarded Fishing Gear (ALDFG) is to implement clear gear labelling and marking.** Gear marking supports the effective management of EOL gear by providing information on gear type and materials, the producer and ownership, and recycling method. Thus, marking gear allows for traceability in case of retrieval after loss². **We are proposing a Digital Product Passport comprising a mark (serial number) fixed to the gear, a tag kept by the owner and an associated standardised digital factsheet (GLF), all linked by the identifiable serial number.** This will support material transparency, traceability, and signposts pathways to high quality end-of-life (EOL) management and recycling.

The GLF has been designed to be:

- Aligned with **Circular Design Standards (EN 17988 parts 2 and 6)**³ to support end-of-life management and **FAO's Voluntary Guidelines on the Marking of Fishing Gear (VGMFG)**².
- A central point for gear information, and **act as a Digital Product Passport in accordance with the ESPR regulations**¹.
- **Practical and easy to use for the fishing industry at ports**, making gear labelling and information, transparent and accessible.
- Used by skippers and vessel owners at ports for sorting and **integrating EOL gear into SEARCULAR's SMART Blue Points and reverse logistic systems across regions**⁴.

This conceptual design supports SEARCULAR's policy recommendations⁵. Digital Product Passports should be made mandatory for new fishing gear manufactured across Europe.



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SEARCULAR Gear Lifecycle Factsheet (GLF) Proposal

In conjunction with the GLF, **we have designed a simple colour-coded gear tag that is directly linked to the marked gear via its unique serial number. This serves to connect the owner to the 'digital gear passport' and provides an easy to use, attachable tag to aid EOL gear management at ports.** The tag will include a QR code which provides a single entry point into the GLF and all of the relevant gear information required to enhance traceability and gear circularity.



Concept for a colour coded gear tag. The tag is linked to marked gear via a unique serial number (SN) and contains a QR code to access the Gear Lifecycle Factsheet (GLF). The tags are colour coded by waste management stream, and can easily be attached to gear at EOL.

The GLF will provide information on:

- The named gear type and serial number (SN)
- The manufacturer, and date and location of manufacture.
- Details of the gear construction and information on gear dismantling
- Details on the primary materials and their recycling options – e.g. mechanical or chemical. To support this the gear name and label will be categorised via distinct colour-coding to reflect specific collection streams and management groups.
- A link to an interactive map with regional waste management facilities and designated Blue Points⁴ for collection and preparation of recyclable materials.
- The EU Regulation and EcoDesign for Sustainable Products Regulation framework.
- Sustainability 'A-G' ratings for gear circularity categories, such as:
 1. Recycled content within the product at manufacture
 2. Recyclable content at EOL
 3. Gear Durability (Lifespan)
 4. Energy efficiency rating across the whole lifecycle



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GLF concept

(Based on hypothetical gear information)

GEAR LIFECYCLE FACTSHEET (GLF)

For circular fishing gear



SN: 00001

GEAR: BIO-SEINE ROPE



GEAR COMPOSITION, DISMANTLING & RECYCLING

68% BIO-PLASTIC > CHEMICAL RECYCLING

24% RECYCLABLE PVC > CHEMICAL. 8% NON-RECYCLABLE.
FULL COMPOSITION AND DETAILS.



PRODUCTION AND MANUFACTURE

MANUFACTURER, LOCATION, DATE.



INTERACTIVE MAP OF AVAILABLE
WASTE MANAGEMENT FACILITIES AND
BLUE POINTS



ESPR



RECYCLED CONTENT X%



RECYCLABLE CONTENT X%



DURABILITY/LIFESPAN X YEARS



ENERGY EFFICIENCY

FOR MORE DETAILS AND CALCULATIONS SEE BELOW

A-G RATING CALCULATIONS

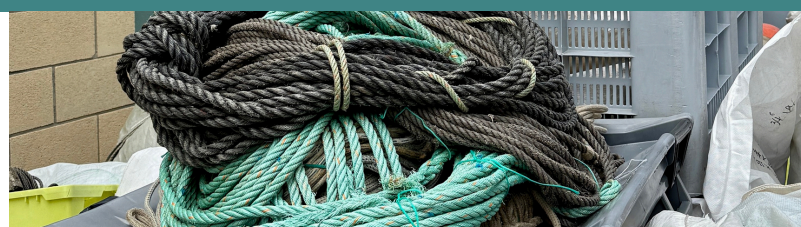
SUSTAINABILITY RATING

SEARCULAR's core objective is to reduce marine litter and microplastic generated by European fisheries at source. Our project has implemented circular economy practices within the fishing sector value chain, including at ports in aid of this central objective. The project works holistically, building acceptance of the tried and tested solutions offered by the project and fostering behavioural change through fully integrated stakeholder engagement throughout the project.

SEARCULAR involves the collaboration of 13 organisations, over three years (2023 - 2026) and is funded by the European Union under the EU Mission 'Restore our Ocean and Waters' and UK Research and Innovation (UKRI).

RESOURCES

- [1] [What is the Digital Product Passport?](#)
- [2] [FAO Voluntary Guidelines on the Marking of Fishing Gear](#)
- [3] [Design of Gear Under Standards](#)
- [4] Ismo Ruohomäki, Paule España, 2025. Guidelines on Good Management Practices for EOL fishing gear, SEARCULAR Deliverable 4.1
- [5] Easman, E., Wilson, B., Cabezas, O., SEARCULAR Consortium, 2026. Set of policy recommendations for achieving a circular economy for European fishing gear. SEARCULAR Deliverable 5.4.



How to cite

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SEARCULAR Deliverable 5.4.

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