

# D2.3 Available tools and measures

KNOWLEDGE WAVE ON MARINE LITTER FROM THE AQUACULTURE SECTOR



This project has received funding from the European Union's EASME-EMFF funding programme under grant agreement EASME/EMFF/2017/1.2.1.12/S2/04/S12.789391.



<b>Project No.</b>	S12.789391
<b>Project acronym</b>	AQUA-LIT
<b>Project name</b>	Preventive Measures for Averting the Discarding of Litter in the Marine Environment from the Aquaculture Industry.
<b>Start date of the project</b>	01.01.2019
<b>Duration</b>	24 months
<b>Deliverable ID</b>	D2.3. Available tools and measures
<b>Due date of deliverable</b>	M6
<b>Lead beneficiary for this deliverable</b>	Flanders Marine Institute (VLIZ)

**Please cite as:**

Devriese L., De Raedemaeker F., Sandra M., Ferrer M.C., Mascaró C.A., Lukic I., Altvater S., Gin I., Zorgno M., Deudero S., Mata Lara M. (2019). Available tools and measures. Knowledge wave on marine litter from the aquaculture sector. D2.3. AQUA-LIT project. Oostende, Belgium. 52 Pp.

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### Other acknowledgements:

The authors wish to thank the VLIZ library and Beatriz T. Hansjosten for their support.

Dissemination level		
<b>PU</b>	Public	X
<b>CO</b>	Confidential, restricted under conditions set out in Model Grant Agreement	
<b>CI</b>	Classified, information as referred to in Commission Decision 2001/844/EC	

### DOCUMENT HISTORY

VERSION	DATE	NOTE	ISSUED BY
01	24/04/2019	Draft version sent to project partners	VLIZ
02	29/05/2019	Final revision by project partners	VLIZ
03	17/06/2019	Final version for PO	VLIZ

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# AQUA-LIT project

**AQUA-LIT** is an EMFF-EASME funded project that aims at providing the aquaculture sector with a sustainable **toolbox** of innovative ideas and methodologies to address the 3 main components of marine littering: **prevention & reduction, monitoring & quantification, and removal & recycling.**

To fulfill this mission, we will be working face-to-face with aquaculture farmers in three **regional Learning Labs**: at the **Mediterranean basin**, the **North Sea** and the **Baltic Sea regions**. In parallel, we will identify and cluster existing, upcoming and already implemented tools on marine littering, and we will further **develop a platform and an app** for providing the **'Tide against marine litter toolbox'**.

Lastly, we will **'scale up the tide'** by developing the **'policy for less litter'** set of recommendations, by showcasing the **'funding a wave of solutions'** available for the sector and by coming up with a **transferability plan for outermost regions.**

Through this, we expect to help all stakeholders from the aquaculture chain to increase the understanding, awareness and availability of solutions, so a potential **transformation of the aquaculture sector towards a less polluting sector** can become possible.



## Project Consortium



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European Centre for Information on  
Marine Science and Technology  
**(EurOcean)**



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## Summary

There are no global estimates of the amount of plastic waste generated by the fisheries and aquaculture sector ([FAO, 2017](#)). Nevertheless, it is estimated that in the European Economic Area (EEA) losses are in the order of 3,000 to 41,000 tonnes of aquaculture waste per annum, and total stocks of debris already present in the ocean may be in the order of 95,000 to 655,000 tonnes from aquaculture ([Sherrington \*et al.\*, 2016](#)).

**'Identifying the options to address key waste items from the fishing industry and aquaculture which could contribute to marine litter, and implement pilot projects where appropriate (including deposit schemes, voluntary agreements and end-of-life recovery)'** is a priority action at global level included in the G7 Action Plan on Marine Litter ([2015](#)). This crucial need is subsequently translated into action plans at European, regional and national level. The AQUA-LIT report 'Available Tools and Measures' gives an overview of the global, regional, European and national action plans and documents that contain measures to reduce or avoid marine litter from the aquaculture sector. Not only measures, but also needs, research gaps, actions and strategies are included. These measures are discussed in relation to their specific target group. It is important to note that **only the measures and actions related to the aquaculture sector are included in this report.**

This report shows that marine litter is currently high on the political agenda. The global and European framework for the prevention and management of marine debris exists, but needs to be further translated into implemented tailor-made actions and measures depending on the source of marine debris. **The results indicate that the necessary knowledge base to take policy actions and effective measures is currently largely lacking.** This certainly applies to the aquaculture sector as a source of marine litter. This knowledge is indisputably necessary in order to implement clear policy actions and effective measures to prevent leakage of litter during aquaculture activities.

This report, together with the report D2.2 'Knowledge wave on marine litter from aquaculture sources', forms the knowledge base for the AQUA-LIT workshops 'Learning Labs'. These Learning Labs will provide a forum for the face to face work with the aquaculture farmers, gear producers, ports staff, waste management, policy makers and other relevant stakeholders in the aquaculture sector.

# Methodology

Global, regional, European and national action plans and documents are searched for actions, needs, measures, tools or strategies to limit the influx of marine litter from the aquaculture sector. The focus is on the three AQUA-LIT sea areas: North Sea, Mediterranean Sea and the Baltic Sea. For each of the measures, the potential target groups are noted (Table 1).

Table 1: A short clarification of the six different target groups for the measures and actions discussed.

Target group	Clarification
Aquaculture	Aquaculture farmers, traders of aquaculture products
Science	Scientists (e.g. applied sciences, environmental science)
Waste	Waste management, waste processing, recycling, upcycling, circular economy. Port facilities for waste collection.
Public	Broader public, citizen initiatives
Producers	Producers of alternative polymers, biopolymers, biomaterials or alternative resources for materials
Policy	Policy makers – global, EU, regional, national

Table 2: A short clarification of the seven different categories of actions or measures discussed.

Category of actions or measures	Clarification
Monitoring	Actions (or measures) related to scientific research and to mapping the impact, presence or trends of (micro)litter related to the aquaculture sector. This is mainly used when there is little scientific information available about the problem in question. (Not in relation to potential solutions, see category ‘solutions’)
Planning	Actions or measures related to spatial planning: e.g. included in the MSP or Natura2000 areas.
Solutions	Actions related to the identification of possible solutions to specific problems in the context of marine litter.
Economic	Actions or measures related to production or production losses, distribution, consumption of aquaculture products.
Social	Actions or measures related to voluntary agreements, promotion, education, encouraging, responsibility etc. involving specific sectors or groups.
Recovery	Actions or measures that can ensure that lost material or gear is recovered, or that material is not unintentionally lost.
Policy	Documents indicating or proposing specific policy actions related to aquaculture-litter.

This report briefly explains the marine litter action plans, and lists the specific actions or measures. A hyperlink is provided to all relevant documents and action plans. As can be seen from the table of contents, the strategies and measures presented are subdivided into global, regional, European and national action plans. Besides the target groups, categories are used to indicate within which framework this measure or action fits (Table 2). It should be considered

that this classification cannot always be made unequivocally and that the choice has been made to represent the most comprehensive context.

After classification, the available measures and tools are evaluated on the basis of the target groups (Table 1) and the categories (Table 2). This will provide insight into the implementation stage and the knowledge gaps and the policy challenges that are currently present.

## Global ocean policy

### The Agenda 2030: a global policy for sustainable development

Twenty years after the first ‘Earth Summit/United Nations Conference on Environment and Development’ (UNCED, Rio de Janeiro, 1992) resulted in the [Agenda 21](#), the UN set the scene for a new Global Agenda for Sustainable Development known as [Rio+20](#) (2012). In September 2015 the UN General Assembly (UNGA) adopted the resolution ‘Transforming our world: the 2030 Agenda for Sustainable Development’. [Agenda 2030](#) contains 17 Sustainable Development Goals (SDGs) with 169 targets covering a broad range of Sustainable Development (SD) issues, from ending poverty and hunger, improving health and development, making cities more sustainable and environmentally friendly, and combating conflict and climate change ([UN Resolution A/RES/70/1](#)). Through Agenda 2030, world leaders pledged for common action in pursuit of a universal SD policy agenda. (Source: [Lescrauwaet et al. 2018](#))

The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. Several SDGs are relevant to aquatic food resources, and SDG14 specifically focusses on ‘**Life Below Water**’. Target SDG14.1 aims by 2025 ‘to prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, **including marine debris** and nutrient pollution’.

The UN Ocean Conference (New York, June 2017) adopted the intergovernmental agreed political declaration ‘Our Ocean, our future: call for action’. This declaration is the summary of seven partnership dialogues and over 1,400 voluntary commitments to advance the implementation of SDG14 and related targets ([UN Resolution A/RES/71/312](#)). One of the actions on an urgent basis includes: ‘to accelerate actions to prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, **including marine debris, plastics and microplastics**, nutrient pollution, untreated wastewater, solid waste discharges, hazardous substances, pollution from ships and abandoned, lost or otherwise discarded fishing gear, as well as to address, as appropriate, the adverse impacts of other human-related activities on the ocean and on marine life, such as ship strikes, underwater noise and invasive alien species’.

## Global actions and measures on aquaculture related debris

The global policy documents and action plans in Annex 1 enclose papers prepared by United Nations, UN Environment, National Oceanic and Atmospheric Administration (NOAA), the Group of Seven (G7) and the Group of Twenty (G20). These documents do not contain ongoing measures to address aquaculture related litter, but provide an overview of the key research needs, targets and priority actions or strategies.

A priority action in the G7 Action Plan to Combat Marine Litter includes: ‘Identifying the options to address **key waste items from the fishing industry and aquaculture** which could contribute to marine litter, and implement pilot projects where appropriate (including deposit schemes, voluntary agreements and end-of-life recovery)’ ([G7 Action Plan on Marine Litter, 2015](#)). The G20 maintains that the tools to reduce marine litter have to be as diverse as the challenge of marine litter itself. There is no ‘one size fits all’ solution. We reiterate the need to address pollution from sea based sources, including key waste items from the fishing and **aquaculture industry** as well as from the shipping sector ([G20 Action Plan on Marine Litter, 2017](#)).

The [Honolulu Strategy \(2012\)](#) contains ‘a global framework for prevention and management of marine debris’ and consists of several strategies focused on the prevention and management of sea-based sources of marine debris, **including actions in relation to aquaculture related activities**. These strategies are aimed at different target groups. For example, Strategy B1 focuses on educating the aquaculture sector and making them aware of the problems of marine litter and management of aquaculture gear. Strategy B5 focuses on the development and implementation of legislation and policies to prevent littering, requiring close interaction between policy makers and the aquaculture sector.

Strategy B1. Conduct ocean-user education and outreach on marine debris impacts, prevention, and management.

- Conduct education and outreach programs related to relevant legislation and best practices/technologies for the prevention, reduction, and management of aquaculture-related debris and other solid wastes that engage aquaculturists;
- Develop and promote the application of BMPs (best management practices) for aquaculture operations and practices, including aquaculture equipment and gear deployment, handling, and maintenance, in order to minimize or reduce the probability of accidental aquaculture equipment and gear loss at sea;
- Promote best practices for the environmental management of aquaculture.

Strategy B3. Develop and strengthen implementation of industry BMPs (best management practices) designed to minimize abandonment of vessels and accidental loss of cargo, solid waste, and gear at sea.

- Require aquaculture nets to have electronic location and identification if lost at sea;
- Promote development of BMP for the environmental management of aquaculture facilities.

Strategy B5. Develop and strengthen implementation of legislation and policies to prevent and manage marine debris from at-sea sources and implement the requirements of MARPOL Annex V and other relevant international instruments and agreements.

- Develop and implement legislation and policies at the regional and national levels to minimize marine debris from aquaculture, through close cooperation with relevant UN agencies (FAO, IMO and UNEP), Regional Seas Organizations, national governments, the aquaculture industry, ports, and environmental NGOs.

Strategy B6. Build capacity to monitor and enforce (1) national and local legislation and (2) compliance with requirements of MARPOL Annex V and other relevant international instruments and agreements.

- Build national capacity to actively monitor and enforce requirements of relevant legislation for minimizing marine debris from aquaculture;
- Actively monitor and enforce requirements from relevant legislation for minimizing equipment and gear loss of aquaculture;
- Adopt international protocols for monitoring equipment loss/breakage in aquaculture production;
- Develop a compendium of environmentally safe aquaculture gear;
- Establish partnership at the regional and national level with aquaculture industry to minimize their debris output.

The summary of key research needs of the [UNEP \(2016\)](#) 'Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change' includes several research needs linked to the aquaculture sector. The target group for these needs is clearly the scientific community experienced with research on marine litter, microplastics, food safety, toxicity etc. UNEP defined these **key research needs in relation to macro- and microplastics**, classified into sources and pathways, properties of the polymers, impact, fate and distribution etc. Only the needs for the aquaculture sector are shown below.

Sources and pathways of macro-plastics:

- The quantities and relative importance of different land- and sea-based sources of macro-plastics and their entry points to the ocean need to be investigated in greater detail, in particular taking account of regional differences. Research is required to quantify inputs from the aquaculture sector and the factors contributing to such losses.

Impact of microplastics:

- Concerning microplastics, research is required to determine if microplastics in fisheries and aquaculture resources present a risk for food security, including food safety and impact on human health.

## Fisheries and aquaculture:

The research needs concerning the fisheries and aquaculture sectors have been combined, covering sources, impacts and potential solutions.

- For macroplastics, research is required to assess the quantities of fishing- and aquaculture-related debris released by these sectors;
- For macroplastics, research is required to employ risk assessment in decision support for siting or re-siting aquaculture and developments;
- For microplastics, research is required to assess microbial pathogen load on microplastics in different areas of the ocean (open ocean, areas impacted by human sewage, aquaculture and fisheries areas).

The revised GPML (Global Partnership on Marine Litter) indicators and targets included as intended outcome for the target 2020-25 ([UNEP, 2016](#)):

- Target: Reduce the quantities and impact on the environment of marine litter introduced directly at sea.
- Indicator description: Quantity of aquaculture gear abandoned, lost or otherwise discarded (ALDFG<sup>1</sup>) items per km<sup>2</sup> sea surface, km<sup>2</sup> water column, km<sup>2</sup> seabed, km<sup>-1</sup> shoreline (e.g. floats, rope, nets, cages, poles).

The report of the 'First Meeting of the Ad Hoc Open-ended Expert Group on Marine Litter and Microplastics' ([UNEP, 2018](#)) contains needs for future work, e.g.

- Quantifying the economic impact of marine litter on major economic sectors such as tourism, **aquaculture** and fisheries at the national/regional level to help countries make the case internally for action.

Currently, there are no global estimates of the amount of plastic waste generated by the fisheries and aquaculture sector ([FAO, 2017](#)). The Food and Agriculture Organization of the United Nations (FAO) collaborated with a number of organizations to deal with the issue from three major perspectives: marine litter originating from the fishing industry; **the impact of microplastics on fisheries and aquaculture resources**; and the food safety risks of microplastics for human health through fish consumption. FAO and UNEP have published a report on '**Microplastics in fisheries and aquaculture**', which provides a status of knowledge on the occurrence and implications of microplastics for aquatic organisms and food safety ([FAO, 2017](#)).

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<sup>1</sup> ALDFG: Abandoned, lost or otherwise discarded fishing gear

## Evaluation of the global measures and needs

From the global policy documents and action plans on marine litter, 22 specific requirements could be defined (see also Annex 1). Of these, only two have been defined as clear targets (by 2020-25 or 2025). In addition, six needs (mainly key research needs), one notification and 13 actions have been defined.

These 22 requirements are mainly addressed to policy makers (40%) and, of course, to the aquaculture sector (36%) (Figure 1). It is remarkable that 20% of these actions and needs are targeted to the scientific research community, indicating that **the necessary knowledge base to take policy actions and effective measures is currently largely lacking**. This points to the need for policy makers to initiate research, and then to set indicators and targets in order to be able to monitor and estimate this problem. The largest share (32%) of the requirements belong to the 'monitoring' category (Figure 2), i.e. needs related to scientific research.

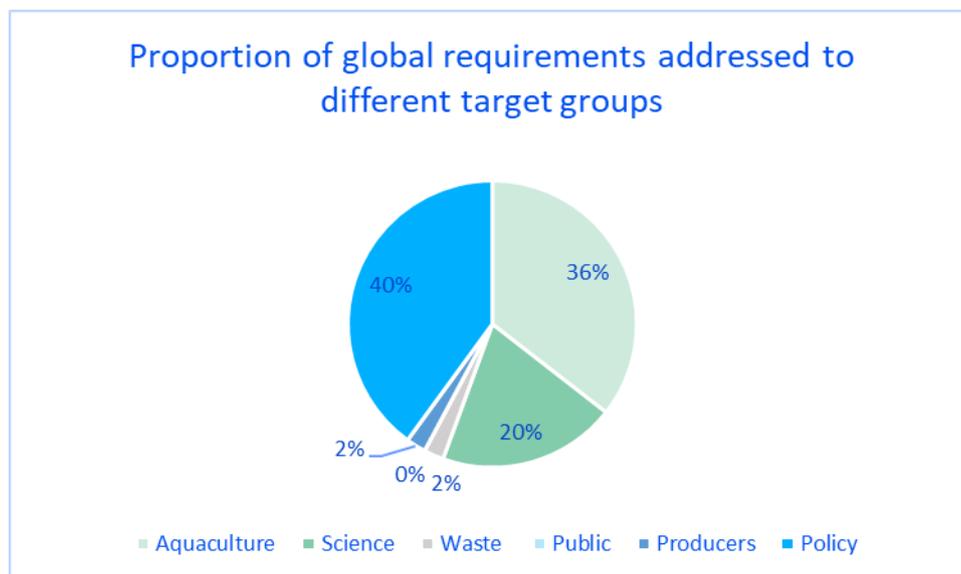


Figure 1: Global requirements related to the mitigation of debris from the aquaculture sector classified by target group.

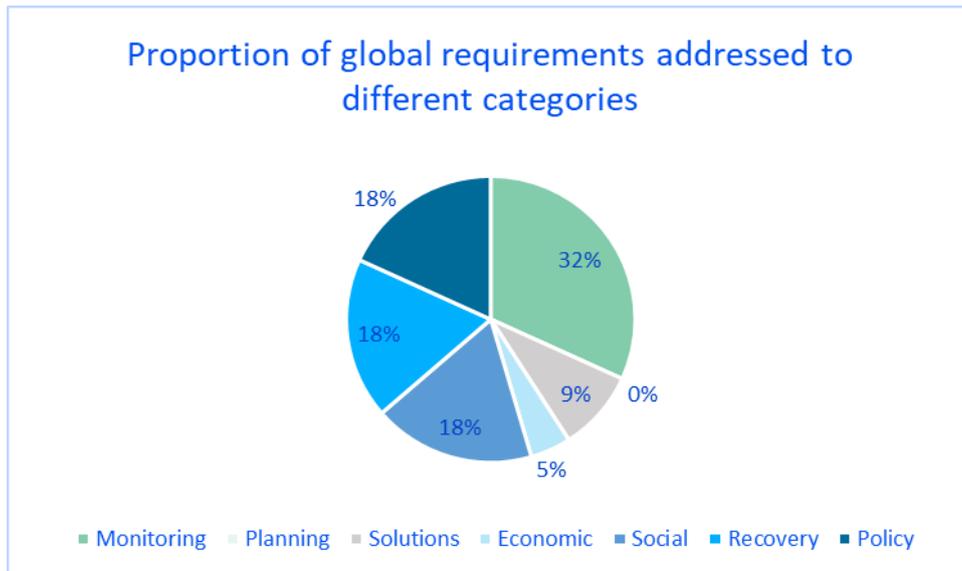


Figure 2: Global requirements related to the mitigation of debris from the aquaculture sector classified by category.

## Regional Seas Programmes

At the regional sea level, fourteen of the Regional Seas Programmes have also adopted legally binding, non-UN conventions, for the protection of the marine environment as part of the regional seas conventions and action plans framework. The four European regional seas conventions include the *Helsinki Convention* (HELCOM) in the Baltic Sea, the *Barcelona Convention* (UNEP-MAP) in the Mediterranean Sea, the *Bucharest Convention* in the Black Sea and the *OSPAR Convention* in the North East Atlantic Ocean, including the North Sea (Figure 3). (Source: [Lescrauwaet et al. 2018](#); UNEP)



Figure 3. Regional seas conventions worldwide (Source: UNEP)

## North East Atlantic: actions and measures on aquaculture related litter

The Regional Action Plan (RAP) for Prevention and Management of Marine Litter in the North-East Atlantic sets out the planned implementation for common actions OSPAR Contracting Parties will take to combat marine litter in the North East Atlantic ([OSPAR Commission, 2014](#)). The actions are divided into four themes, of which the first theme ‘**Actions to combat sea-based sources of marine litter**’ is important in this project. It will be implemented over the period 2014-2021. Action number 35 must be implemented by the OSPAR members by 2015:

- Identify the options to address **key waste items from the fishing industry and aquaculture**, which could contribute to marine litter, including deposit schemes, voluntary agreements and extended producer responsibility ([OSPAR Commission, 2014](#)).

Action number 36 is related to the development of best practice in relation to fishing industry, but **may be relevant for the aquaculture sector**, and must have been implemented by the OSPAR members by 2016:

- Through a multinational project, together with the fishing industry and competent authorities develop and promote best practice in relation to marine litter. All relevant aspects should be included ([OSPAR Commission, 2014](#)).

The OSPAR RAP also includes detailed ‘contracting party’ actions helping to implement the RAP itself, e.g. number 70:

- Promoting Extended Producer Responsibility Strategies requiring producers, manufacturers, brand owners and first importers to be responsible for the entire life-cycle of the product with a focus on items frequently found in the marine environment.

OSPAR's work on Marine Litter is coordinated through the Intersessional Correspondence Group on Marine Litter (ICG ML). A new OSPAR report, providing an overview and assessment of existing forms of measures and/or best practices is expected.

For **the North Sea**, the North Sea Commission’s Marine Resources Group (MRG) drafted a resolution on marine litter, which was supported and adopted during the Annual Business meeting of the North Sea Commission (Conference of Peripheral Maritime Regions, CPMR) ([CPMR, 2018](#)). This resolution aims at expressing concern and raise awareness about the impact of marine litter in the North Sea. The recommendations are very broadly formulated, for example a recommendation that could be of interest to the aquaculture sector:

- Encourage green procurement: offer alternatives to plastics and produce/use plastics which are designed to allow for greater durability, reuse and high-quality recycling;

- Synergies with cross-sectoral range of businesses and organisations should be explored which are instrumental to finding innovative ways to take action against plastic pollution;
- Sharing examples of successful projects and best practices to members is needed to raise awareness.

Consequently, the CPMR and MRG have drafted a declaration on marine litter and plastic waste as well, adopted on the 21<sup>st</sup> of June 2018 ([CPMR declaration 2018](#)).

The North Sea Action Plan on Marine Litter is currently being drawn up by CPMR (cfr Draft Technical Paper of October 2018). The purpose of this document is to provide an action plan to the MRG's Marine Litter resolution to ensure a continued, as well as a joint approach in tackling marine litter, with the main attention focused on preventing any litter to "leak" into our systems and encouraging a behavioural change towards plastics. Having this ambition and future vision in mind, the Action Plan focuses first on identifying small steps and particularly on keeping in mind three key points:

- The specific **role** of regions (facilitating and regulatory);
- What specific **themes** are most important;
- And, **how** to go about it.

The action plan is intended **as a strategy**, which will continuously evolve by keeping score of the results, rather than listing recommended actions.

## Mediterranean Sea: actions and measures on aquaculture litter

The main objective of the Regional Plan for Marine Litter Management in the Mediterranean ([UNEP, 2013](#)) is to prevent and reduce marine litter pollution in the Mediterranean. Appendix 1 of this plan consists of a work plan with timetable for the implementation of the relevant Articles of the Marine Litter Regional Plan. Examples of actions that may be of interest in the context of aquaculture-related waste are:

- Action 7. Extended Producer Responsibility strategy by making the producers, manufacturer brand owners and first importers responsible for the entire life cycle of the product, with measures prioritizing the hierarchy of waste management in order to encourage companies to design products for reuse and recycling;
- Action 10. Prevention measures related to the establishment of mandatory Deposits, Return and Restoration System for expandable polystyrene (EPS) boxes;
- Action 15. "Gear marking to indicate ownership" concept;
- Action 15. Reduced ghost catches using environmental neutral upon degradation of nets, pots and traps.

The CleanSea (EU H2020 FP7 n° 308370) Summary of Marine Litter Policy Options mentioned that ‘**urgent governmental action is still required in order to address litter originating from aquaculture**’, and proposed measures to mitigate marine litter from the aquaculture sector ([Veiga et al., 2015](#); [CleanSea, 2015](#)):

- **Design and Production:** Innovative alternatives for aquaculture gear based on neutral biodegradable materials.
- **Use:** Use of alternative materials in aquaculture (e.g. cotton mussel socks).
- **Collection:** Explore the possibility of gear marking.
- **Recycling:** Collection and removal of old or abandoned nets for recycling and incorporation in new products.

Fisheries and aquaculture sectors are partly contributing to marine litter in **the Adriatic Sea** ([DeFishGear, 2017](#)). A good picture of the full economic significance of the impacts of marine litter remains relatively limited. However, it is well known that every year, marine litter results in economic costs and **significant losses for the economic sectors** involved, such as fisheries and aquaculture. A sector-based approach provides a basis for a socio-economic analysis of marine litter because it investigates the increased costs and potential losses of revenue associated with marine litter for vital economic sectors, such as aquaculture.

This guideline document for coastal zone management includes **tools to reduce or mitigate marine litter from the aquaculture sector**:

- Mussel farming socks (polypropylene): agreements with the mussel farmers to bring to shore the no longer usable socks, try to cover the costs of the waste disposal and requirements in terms of how to collect the already abandoned socks;
- Mussel farming socks (polypropylene): the use of biodegradable materials or compostable ones will reduce costs arising from their disposal;
- The need to define a system to receive and manage the waste on land, as well as to identify who should be responsible for the waste disposal and the associated costs.

The EU Strategy for the Adriatic Ionian Region ([EUSAIR](#)), a macro-regional approach composed of national, regional, and local bodies, focuses on a number of challenges identified and shared by all partners. The [Action Plan](#) created to accompany the strategy is focused around four interdependent pillars, which list possible, indicative actions. Pillar number three on ‘environmental quality’ stresses the need for joint efforts to deal with the entire life cycle of marine litter, but no action has yet been suggested.

The Spanish government proposed, as part of the Spanish Marine Strategies ([EsMarEs](#)), a [program of measures for marine litter](#), focusing on ‘state’, ‘pressure’ and ‘operative’ objectives (see further **National action plans on marine litter – Spain**).

## Baltic Sea: actions and measures on aquaculture litter

The Regional Action Plan (RAP) for Marine Litter in the Baltic Sea contains actions for the Contracting Parties to the Helsinki Convention for joint implementation on regional scale ([HELCOM, 2015](#)). Actions in this RAP linked to the corresponding activities within OSPAR are marked with the reference to the OSPAR Regional Action Plan on Marine Litter. Cooperation is ongoing between the Regional Seas in order to implement the Regional Actions Plans in a coordinated way e.g. to build on each other's work and jointly plan implementation. The actions are divided into regional actions (collective HELCOM actions) and voluntary national actions. The voluntary national actions are primarily of national concern and responsibility of the Contracting Parties.

In the series 'Regional actions addressing sea-based sources of marine litter' ([HELCOM, 2015](#)), there are some **actions addressing waste related to fishing and aquaculture**, e.g.

- Action RS5: Promote and disseminate best practice in relation to all relevant aspects of waste management within the fishing sector (including e.g. waste management on board, waste management at harbors and operational losses/net cuttings).
- Action RS6: Through a multinational project, such as the MARELITT Baltic project, together with the fishing industry and other stakeholders, develop and promote best practice in relation to ALDFG and derelict fishing gear and their removal.
- Action RS8: Identify the options to address key waste items from the fishing and aquaculture industry, which could contribute to marine litter, including deposit schemes and extended producer responsibility. (See also OSPAR action number 35).

In the series 'Voluntary national actions addressing sea-based sources of marine litter' ([HELCOM, 2015](#)), there also are some proposed **national actions addressing waste related to fishing and aquaculture**, e.g. Action NS7:

- Enhance resource efficiency by facilitating markets and applications for plastic waste from the fishing, aquaculture and shipping industry (e.g. by bringing together producers of waste and recycling companies) by looking at specific items and differences in materials, including giving value to waste streams by financial incentives.

During the follow-up meeting of the implementation of the regional actions of the Regional Action Plan on Marine Litter ([HELCOM, 2018](#)), all actions are evaluated in relation to ongoing activities and the next steps. The ongoing activities of the Contracting Parties for the actions in the action plan are shown below:

- Action RS5:
  - One Swedish and one OSPAR report on best practices for waste management within the fishing/aquaculture sector, which are considered regarding the applicability in the Baltic Sea. There has not yet been contact with the stakeholders involved. Envisaged working process for this action: Swedish report on management on board and in harbours.

- Germany is contributing to this action, and is aware of ongoing related activities within the implementation process of the OSPAR RAP ML. Germany is having a national roundtable where the green deal to reduce the waste from the fishing, and aquaculture sector is being discussed.
- Finland is carrying out a national survey on the sources of both macro- and microlitter (plastics). As a part of this study, a detailed analysis on litter sources in fishing and aquaculture in Finland will be conducted. Information from this survey will be available in 2018 and will feed on RS5 and RS8.
- Action RS6:
  - Removal of derelict fishing gear, lost or discarded by fishermen in the Baltic Sea project (WWF Poland). A map on the potential locations of underwater objects, shipwrecks and hooks to be produced. Surveys to be conducted among fishermen on the designation of the DGF. Methodology on retrieval of fishing gear has been developed. Forty ports have been visited and surveyed for waste management and processing on fishing gear.
  - Germany is contributing to this action. Germany is part of the EU project MARELITT and especially involved in carrying out environmental impact assessments for retrieving operations of ALDFG. Furthermore, in the framework of scientific diving operations, Germany is compiling information on benthic hotspots of ghost gear in German Baltic waters and the ecological soundness of manual retrieval operations.
  - An initial draft of HELCOM Recommendation on abandoned, lost or otherwise discarded fishing gear (ALDFG) is presented. Recommendations from the Workshop were submitted for consideration.
- Action RS8:
  - At the EU level, The European Commission DG Environment (DG ENV), has compiled a study to support the development of measures to combat a range of marine litter sources, being its chapter 4 on marine litter reduction actions for the fisheries and aquaculture sector relevant for this action ([Sherrington et al., 2016](#)).

The CleanSea (EU H2020 FP7 n° 308370) Summary of Marine Litter Policy Options also proposes three **measures to mitigate marine litter from the aquaculture sector** ([Veiga et al., 2015](#); [CleanSea, 2015](#)):

- Design, Production & Use: Innovative alternatives for aquaculture gear based on harmless and biodegradable materials (e.g. cotton mussel socks).
- Recycling: Collection and removal of old or abandoned nets for recycling and incorporation in new products.
- Collection and Waste transfer: Higher penalties for improper disposal of gear.

The German government proposed a 'Programme of Measures (PoM) for the Marine Protection of the German Parts of the North Sea and the Baltic Sea ([2016](#)), including general

information on the procedures and methods for establishing the programme (see further **National action plans on marine litter – Germany**).

## Evaluation of the regional measures and needs

From the regional action plans and documents on marine litter, 25 specific requirements could be defined (see also Annex 2). These mainly include measures and actions. For the North-East Atlantic, three actions were formulated (OSPAR), and more specifically for the North Sea, some recommendations were included. For the Mediterranean, three actions, four measures and one need were listed. In addition, some requirements were noted specifically for the Adriatic Sea. For the Baltic region, four actions were formulated (HELCOM) and a further three measures were provided.

The aquaculture sector is logically the largest target group (31%) to implement the actions and measures. The implementation of such measures also requires policy action (25%) (Figure 4). In this way, aquaculture farmers, together with aquaculture gear producers and the authorities or companies involved in waste processing, can be obliged to comply with certain requirements. Contrary to global needs, the actions and measures proposed on a regional scale do not directly address the scientific research community. The regional measures are specific and tailored to the aquaculture sector (including producers of materials and waste processing) on the basis of the current bottlenecks.

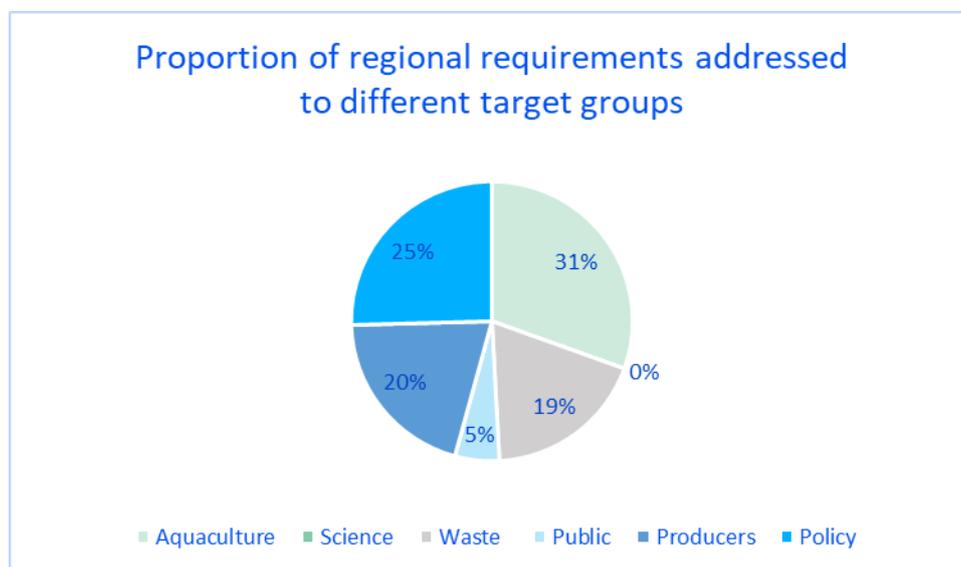


Figure 4: Regional requirements related to the mitigation of debris from the aquaculture sector classified by target group.

The actions and measures listed at regional level (Figure 5) focus mainly on seeking or implementing solutions (42%), including specific action for preventing the loss of aquaculture gear (29%), and awareness actions targeting a broad public including the aquaculture sector.

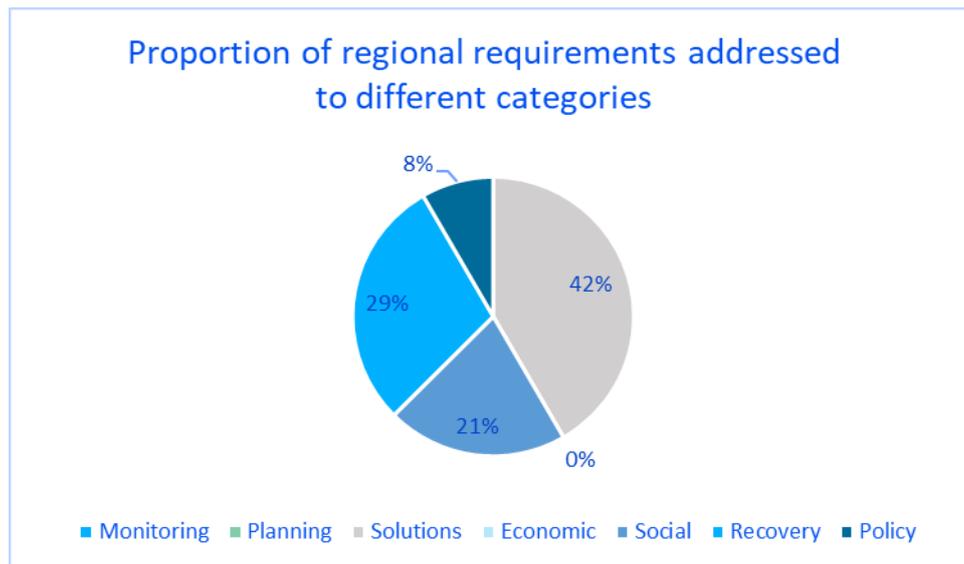


Figure 5: Regional requirements related to the mitigation of debris from the aquaculture sector classified by category.

## European policy

### EU Integrated Maritime Policy

On a European level, the Directorate-General for the Environment (DG ENV) of the European Commission (EC) aims to protect, maintain and reinforce the European environment. The Directorate-General for Maritime Affairs and Fisheries (DG MARE) of the EC operates in two policy areas: the Common Fisheries Policy (CFP) and the Integrated Maritime Policy (IMP).

The management of the European fleet and the conservation of fish stocks are mainly regulated by the Common Fisheries Policy (CFP, Regulation (EU) No 1380/2013). The CFP contains no specific policies on (marine) litter, but provides a mandate to encourage sustainable practices.

The EU Integrated Maritime Policy (IMP, COM (2007) 575) seeks a coherent approach to all EU marine and maritime issues and increased coordination between policies and policy domains to draw higher returns from the ocean while reducing impacts on the environment. It consists of a number of transversal policy instruments and is coordinated by the Directorate-General for Maritime Affairs and Fisheries (DG MARE). The Marine Strategy Framework Directive (MSFD) can be considered as the environmental pillar of the IMP and provides a common framework to establish environmental targets for the protection and conservation of the marine environment. The MSFD aims for a ‘good environmental status’ (GES) for all seas under the jurisdiction of the Member States by 2020. The ecosystem approach is enshrined within the legal framework of the IMP as a guiding principle for the management of human activities in accordance with the precautionary principle. The MSFD and WFD are complementary to other

environmental directives, such as the Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC). Common implementation strategies (CIS) provide a platform for the Member States and EC DG Environment (DG ENV) to coordinate and follow the implementation of these directives. (Source: [Lescrauwaet et al., 2018](#))

The Marine Strategy Framework Directive (MSFD) requires EU Member States to ensure that, by 2020, "**properties and quantities of marine litter do not cause harm to the coastal and marine environment**" ([MSFD TGML, 2015](#); Descriptor 10). Aquaculture installations are included as a sea-based source of marine litter ([Feasibility study, DG Environment, 2013](#)). Microlitter is included in Descriptor 10 of the MSFD ([2017/848/EU](#)), but additional scientific and technical progress is still required to support further development of some threshold values ([SAPEA, 2019](#)). Within the MSFD, no targets were set for (micro)litter from aquaculture activities. Aquaculture was included as a possible activity affecting the supply of marine litter, but targeted measures for beach litter, such as reducing litter from aquaculture appear to be underdeveloped. Only France (North-East Atlantic), Ireland, Italy, Spain and Sweden **specifically addressed aquaculture in relation to MSFD** ([EC COM\(2018\) 562 final](#)). Specific information or figures are currently not available in the national contributions under MSFD cycle II. However, measures or actions such as the development and use of ecosystem-oriented and sustainable fishing/aquaculture gear are proposed ([EIONET Central Data Repository](#)). Only France has formulated a clear measure in the framework of MSFD (see 'national action plans – France').

Three **actions that may be of interest to the aquaculture sector** were included in the report for DG ENV to support the development of measures to combat a range of marine litter sea-based sources ([Sherrington et al., 2016](#)):

- Shift consumption away from harmful products: Reduce the use of plastic components of fishing gear that are designed to be lost or break apart during their use, e.g. plastic dolly rope, and polystyrene floats and buoys not sealed in a protective cover. This could be achieved with an outright ban on sale and use of such items, or an environmental tax that will make alternative products cost-competitive (and overcome the convenience factor).
- Reduce dumping at sea: Use market-based instruments such as advanced disposal fees, deposit refund schemes and manufacturer buy-back schemes to reduce litter and raise recycling rates.
- Reduce dumping at sea: Remove financial disincentives to bringing waste ashore including marine litter found at sea (litter retention). Port reception facilities play an important role and can be complemented with national recycling and disposal systems for items that require special processing such as nets and gear made from composite materials.

The Committee on the Environment, Public Health and Food Safety calls on the Committee on Fisheries, as the committee responsible, to incorporate the following suggestion (number 11) into its motion for a resolution (Towards a sustainable and competitive European aquaculture sector: current status and future challenges, [Iturgaiz, 2019](#)):

- Is convinced that the use of different international experience of well-planned aqua farms integrated into local economies and **the promotion of European environmental best practices**, in particular as regards sustainable waste management, safeguarding and making the most of local biodiversity, and choice of sustainable eating habits, would strengthen aquaculture and would help all Member States to increase sustainable aquaculture production; points out that best practice examples in other regions have been developed under different political and geographical conditions that are not necessarily comparable with the various conditions across the Member States.

The EC new Directive on port reception facilities for the delivery of waste from ships ([COM\(2018\) 33](#)) was adopted with the aim to remove possible barriers for ships to bring ashore their waste streams, including fishing vessels. The Directive sets measures to ensure this waste is returned to land using adequate port reception facilities, where the waste should be collected separately for recycling. It addresses all ports, including smaller ones, such as fishing ports and marinas. The aquaculture vessels also use the small fishing ports as they need to reach the port reception facilities to dispose their waste. However, the **Directive does not address aquaculture ships directly**, only fishing. Directive emphasises the relevance of incentives for delivery of waste on shore for recreational and fishing ships and highlights that the notification and inspection obligations would put a disproportionate burden on smaller vessels and ports. Thus, it proposes that a differentiated approach based on length and gross tonnage is applied.

## EU Plastic Strategy

The programmes of measures for marine litter have to be seen in the wider context of developments at EU level, which led to the adoption of the **Circular Economy Package**:

- 1) The European Strategy for Plastics to transform the way plastics and plastic products are designed, produced, used and recycled. In 2018, further specific measures to reduce the leakage of plastics into the environment and tackle sea-based marine litter have been adopted.
- 2) The EU Directive on the reduction of the impact of plastics on the environment focuses on single use plastics and fishing gear. Introduction of a mandatory Extended Producers Responsibility (EPR) scheme forms part of the proposed implementation. In December 2018, the Commission, Parliament and Council have reached a provisional political agreement on the content of the directive, which was formally approved by the European Council and by the European Parliament in May 2019. It has to be implemented by the Member States within the next two years.

This European legislation introduces new and additional requirements for the handling of waste from the commercial fishing sector. Currently, Member States and Contracting Parties of the Regional Seas Conventions are discussing whether the **new regulations on fishing gear include recreational fishing sector and aquaculture as well**.

The choice by the EU for EPR implies that particular attention is paid to end of life gear. However, ALDFG (abandoned, lost and discarded fishing/aquaculture gear) is so far not taken into account. Some countries have started to analyse whether the scope of the directive could be enlarged and whether this meets conformity and proportionality (see **National Action Plans, Germany**). EPR focuses on the complete supply chain for fishing gear. Specific roles and responsibilities are assigned to producers/importers of fishing gear, with the exception of artisanal producers of fishing gear. There is still uncertainty on the definitions of producers and importers of fishing gear and the distinction between artisanal, non-artisanal fishing gear as well as aquaculture gear. All these questions have a large interface with the Regional Seas Conventions' activities, for example mentioned under OSPAR Regional Action Plan Marine Litter (RAPML), Action 36, Design and Recycling of Fishing Gear.

The 'vision for a circular plastics economy' needs to promote investment in innovative solutions and turn today's challenges into opportunities ([European Commission, 2018](#)), and in relation to the aquaculture sector, it includes the target:

- Marine litter from sea-based sources such as ships, fishing and aquaculture are significantly reduced.

Besides the legislative proposal on port reception facilities to reduce the discharges of waste by ships, the Commission will also further study **the contribution of aquaculture to marine litter and examine a range of measures to minimise plastic loss from aquaculture**. The list of future EU measures to implement the Strategy includes two actions in the context of aquaculture. One action is to tackle sea-based sources of marine litter and one action is to support multilateral initiatives on plastics:

- Development of measures to limit plastic loss from aquaculture (e.g. possible Best Available Techniques Reference Document);
- Renewed engagement on plastics and marine litter in fora such as the UN, G7, G20, the MARPOL convention and regional sea conventions, including the development of practical tools and specific action on fishing and aquaculture.

To address specific waste challenges the Commission ([European Commission, 2014](#)) proposes:

- An aspirational target of reducing marine litter by 30% by 2020 for the ten most common types of litter found on beaches, as well as for fishing gear found at sea, with the list adapted to each of the four marine regions in the EU.

## EU wide initiatives

The European Fisheries Area Network (FARNET) published a short and practical guide, produced to encourage small-scale fisheries and aquaculture businesses to operate in a sustainable way that makes the most of resources and minimizes waste ([Burch et al., 2019](#)). This guide aims to give Fisheries Local Action Groups (FLAGs) an introduction to some of the key concepts of the circular economy, while giving practical advice and examples of how they can encourage and support their communities to move towards more sustainable and circular production and

consumption practices. The four stages of the product life cycle are explained through this document:

- Eco-design: the first step to re-thinking what we produce, how we produce it and how the product or service will be distributed and used.
- Production: the next step is to think about what we can do with waste and any by-products (from fisheries/aquaculture) that are still generated from our production systems.
- Use: how fishing and aquaculture equipment, products and machinery are used and maintained.
- Recycling: The final stage of a circular product life cycle is to recycle the materials that went into making that product.

Some possible tips and tricks are proposed concerning marine litter to make the aquaculture sector more circular, e.g.

- Production and capture: Repair nets and gear instead of throwing them away, ensure the maintenance of boats, buy eco-designed nets, find new uses for old nets and gear.
- First sale: What alternative to plastic bags and polystyrene boxes?
- Processing: Reduce packaging as much as possible and source it from sustainable sources (recycled steel, biodegradable plastics, sustainable forest products).
- Consumption: Enhance recycling chain emergence in order to reuse packaging waste discarded by consumer.

Marine litter from aquaculture contributes to the **spread of invasive alien species**, putting pressure on native biodiversity and habitats, as well as farmed species (e.g. [Rech et al., 2018](#)). To protect our seas, Seas At Risk recommends some points of **action in relation to effective management and preventing littering from aquaculture activities** ([Seas At Risk, 2018](#)):

- Train aquaculture staff on reducing and preventing marine litter from aquaculture operations;
- Record and report litter from aquaculture facilities and set targets for year-on-year reductions;
- Undertake further research to identify effective management measures to reduce the threat posed by invasive alien species to native species and habitats.

**Specifically for the microscopic plastics**, reference is made to the European SAPEA's Evidence Review Report on micro- and nanoplastic pollution ([SAPEA, 2019](#)). Although microplastics have been found in the environment for many years it is only since 2014 that attempts have been made to fully identify and quantify the sources ([Hann et al., 2018](#)). According to this Eunomia study, five country level studies (from Norway, Germany, Denmark, Sweden and the Netherlands) have been conducted within Europe. However, within the study, only Sweden has done **the quantification for aquaculture**.

The [SAPEA report](#) comprehensively examines the best available evidence from the natural sciences and computer modelling, as well as social, political and behavioural sciences. It mentioned that the **fisheries and aquaculture sectors represent a substantial source of plastic marine litter**. Some of the most obvious impacts are due to derelict (fishing) gear.

One of the key conclusions is:

- These particles come from a variety of sources, including plastic products, textiles, fisheries/aquaculture, agriculture, industry and general waste.

The verdict of SAPEA’s Evidence Review Report reads as follows:

- The best available evidence suggests that microplastics and nanoplastics do not pose a widespread risk to humans or the environment, except in small pockets. But that evidence is limited, and the situation could change if pollution continues at the current rate.

## Evaluation of the European measures and needs

From the European action plans and documents on marine litter, 14 specific requirements could be defined (see also Annex 3): five actions, three targets and six other notifications. No direct measures were formulated at EU level, but two clearly defined targets were set in the framework of the Plastic Strategy and the MSFD. These targets should then be further specified by means of measures at the level of the EU Member States.

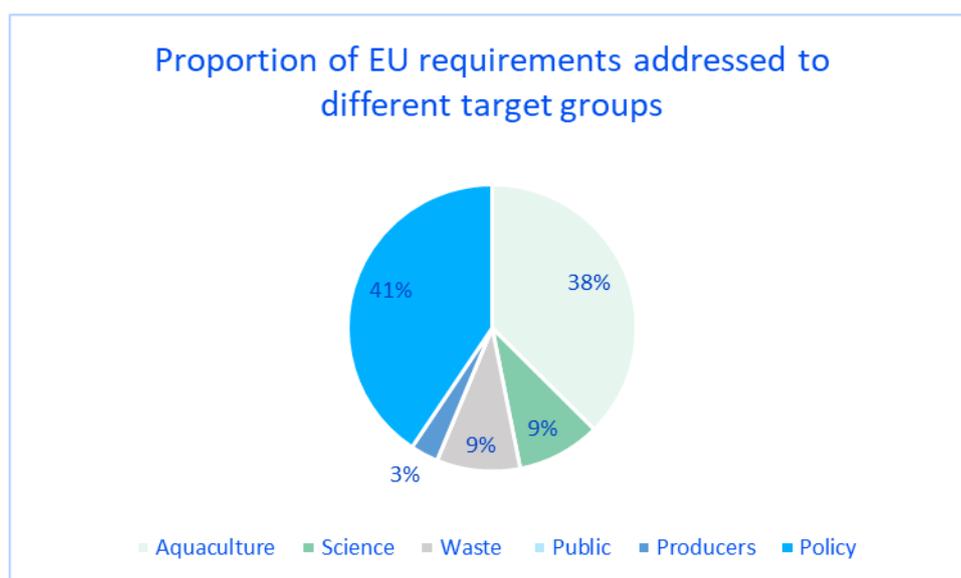


Figure 6: European requirements related to the mitigation of debris from the aquaculture sector classified by target group.

These EU requirements are mainly addressed to policy makers (41%) to implement initiatives, actions or measures, and to the aquaculture sector itself (38%) (Figure 6). The requirements listed at EU level (Figure 7) focus mainly on seeking or implementing solutions (36%), and proposing specific policy engagements (43%) for mitigation strategies involving aquaculture-related litter.

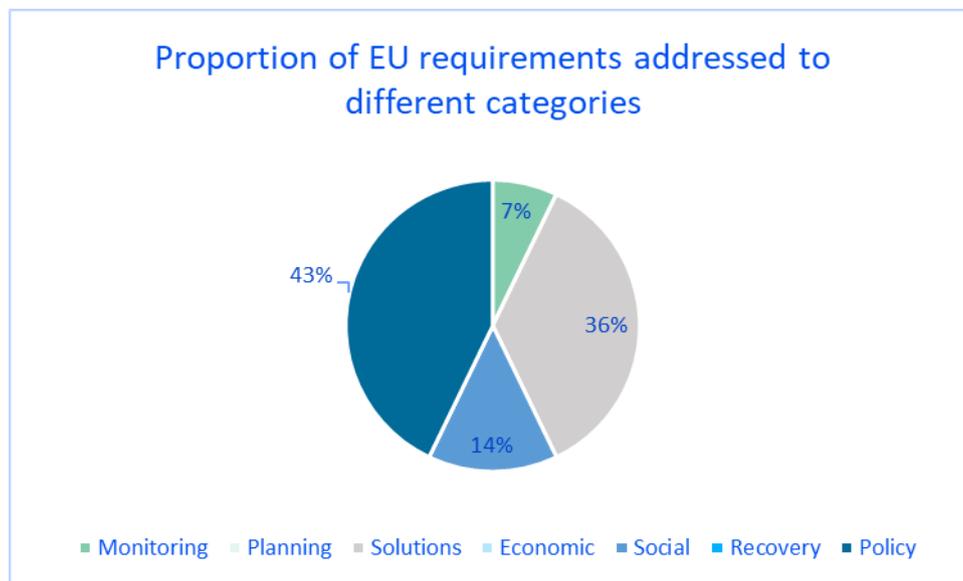


Figure 7: European requirements related to the mitigation of debris from the aquaculture sector classified by category.

## National action plans on marine litter

This section of the report clarifies the national action plans on marine litter and/or other relevant documents (e.g. aquaculture documents). **The focus is on measures/actions related to marine litter from the aquaculture sector, available in the plans and documents known by the AQUA-LIT partners.** It is therefore possible that relevant action plans or vision documents have not been included in this section. Additions can always be made through the AQUA-LIT members or AQUA-LIT's Coordinator ([mariana.mata.lara@geonardo.com](mailto:mariana.mata.lara@geonardo.com)).

### Belgium

In Belgium, there are two action plans to combat marine litter, one at the Flemish level ([OVAM, 2017](#)) and one at the federal (national) level ([FPS Marine Environment, 2017](#)). The Flemish Integral Action Plan on Marine Litter includes 36 measures and 21 targets. Specific in the context of aquaculture activities, the Flemish action plan includes two relevant actions:

- Measure number 13: Mapping the impact of aquaculture marine litter in Flanders and developing remedial measures (before 2022);

- Goal number 5: Sustainable waste management will reduce the impact of aquaculture on marine litter to an absolute minimum by 2022, and the practices applied in Flanders are among the best in Europe.

The federal action plan formulates 55 actions, of which seven priority actions. One priority action includes the aquaculture sector:

- Blue deals will be signed with different sectors. Through these 'blue deals', companies will be specifically encouraged per sector to make voluntary efforts to combat marine litter. Eligible sectors are wind farms, dredging, sand extraction, fishing, aquaculture, etc. The blue deals will encourage companies to make a specific effort per sector to combat marine litter.

The Flanders Marine Institute (VLIZ) has published two policy briefs related to the research landscape and the scientific information on (marine) litter and microplastics in Belgium ([Devriese and Janssen, 2017](#); [Devriese and Janssen, 2019](#)). The last document **includes the need to assess the impact of aquaculture activities on the presence of marine and beach litter**.

## Cyprus

The Operational Programme for Cyprus (2014CY14MFOP001, European Maritime and Fisheries Fund) includes one measure related to (fishing) gear:

- Article 40(1)(a): Protection and restoration of marine biodiversity - collection of lost fishing gear and marine litter.

This measure indicates that fishing boats should be able to participate in clean-up campaigns instead of engaging activities.

## Denmark

At the moment there is no Danish national action plan against plastic pollution. Aquaculture was mentioned as a potential source of litter, mainly from the North Sea region into the Nordic waters ([Blidberg et al., 2015](#); [Strand et al., 2015](#)).

The Ministry of Environment and Food is responsible for defining new regulations concerning the establishment of marine compensatory instruments when applying for approval of open-water fish farms. In regard to mussel farming on seabed, the Danish Environmental Protection Agency is the interpreting authority when it comes to the WFD and the MSFD. This authority also administers the MSD in the sea areas, while the municipal councils are the authorities that administer the WFD until the baseline, plus 1 nautical mile. For mussel farming in the water column the Danish Agriculture and Fisheries Agency can lay down regulations on permits to establish, utilize and operate farms (BalticSCOPE, 2017). In regard to seaweed farming, the Danish Coastal Authority is the responsible body connected with applications for establishing

seaweed farming. In regard to sea gardens – recreational and association-based production of shellfish and seaweed in coastal waters and fjords, applications for permits must be forwarded to both, the Danish Coastal Authority and the Danish Agriculture and Fisheries Agency.

## France

The National Programme related to the prevention of debris for France ([Le programme national de prévention des déchets \(PNPD\)](#)) 2014-2020 emphasizes the need, in the context of public policy, for a good coordination between ‘debris’ and ‘aquatic environmental’ tools and measures. In particular, the "programmes of measures" under the Marine Strategy Framework Directive (MSFD) to ensure the good environmental status of marine environments, which were adopted in April 2016.

France specifically addressed aquaculture in the MSFD ([COM \(2018\) 28 final](#)), in particular **measures for shellfish farming:**

- Tackles shellfish aquaculture, an activity which can be a significant source of litter, but which is only rarely addressed in other Member States’ programmes of measures. France plans to limit the degradation of the impacted habitats by limiting access to the relevant marine culture plots in tidal areas, and by collecting and recycling litter generated by them.

## Germany

The German government proposed a ‘Programme of Measures (PoM) for the Marine Protection of the German Parts of the North Sea and the Baltic Sea’ ([2016](#)), including general information on the procedures and methods for establishing the programme. For example, measure UZ5-02 as an **environmental target for ‘seas without pressures from litter’ in relation to the aquaculture sector:**

- Modification/substitution of products in a comprehensive life-cycle approach.

The PoM includes an attachment with fact sheets for each of the proposed new measures, providing detailed information on those measures. The fact sheets include specific information on the environmental impacts and assessed alternatives for each measure. The measures, including those for reducing marine litter coming from aquaculture, will be subject to continued public consultation in the federal and state governments and to securing financing. The Round Table on Marine Litter was established 2016 to support the elaboration and implementation of the [PoM](#).

The national MSFD contribution of Germany mentions ([MSFD - Die Bundesregierung, EAA 2018](#)):

- The promotion, development and use of ecosystem-friendly and sustainable (fishing) gear.

Approximately the same action was included in 2015 in the Programme of Measures (PoM) for the Marine Protection of the German Parts of the North Sea and the Baltic Sea ([PoM, 2015](#)):

- Modification / substitution of products (coming from the fisheries and aquaculture sectors) in a comprehensive life cycle approach (ongoing).

The PoM includes an attachment with fact sheets for each of the proposed new measures providing more detailed information on those measures. The fact sheets include SEA-specific information on the environmental impacts and assessed alternatives for each measure. The measures, **including those for reducing marine litter coming from aquaculture**, will be subject to continued public consultation in the federal and state governments and to securing financing. The Round Table on Marine Litter was established 2016 to support the elaboration and implementation of the PoM.

Up to 12 nautical miles, the permission to set up an aquaculture site is given by the responsible state authorities, in the German Baltic either by the Ministry of Schleswig-Holstein or the Ministry of Mecklenburg-Vorpommern. There are very strict rules to be followed to make sure that there is **no litter ending up in the environment**; toxins, plastic and any chemicals, metals or medication that might leak into the water. In Germany it works in a way that those installing the farm are not allowed to leave any litter behind. Aquaculture business is considered as any other industry when it comes to disposal of broken parts or dismantled units: the aquaculture related industrial waste is not to be disposed as a general garbage (except for those elements particularly permitted). Commonly, farmers have their own disposal/waste collection procedures on their property and – from time to time – this will have to be disposed of in an approved manner, which follows the common regulations to be adhered to by most other industry.

The recycling regulation also applies for specific materials such as paper, glass, cloth, and several other materials (depends on the region). For example, in Hamburg, usually non-biological wastes from households but also from small companies can be delivered at announced schedules (2- 3 times a year) at specific collection points where a truck comes to pick up such materials. In Germany, to date, there has been no cases of farm dismantling. However, the owners/operators are expected to dismantle the farm, once end-of-life is reached. Developers have to think of the waste management and dismantling process, already at the project application stage - before they get the permission. There are very clear obligations stated in the aquaculture farming permission. All the installations and equipment need to be removed completely - everything that was brought in the water, build or put in the place, has to be removed to leave the area in the same state as it was before the farm was built. Aquaculture systems will have to obtain a licence to operate and in most of the “Länder” there are various **licencing procedures in place requires everyone to follow general waste disposal and recycling laws**, thus, everybody has to do it. Large-scale companies will have to make their own arrangement (usually via an authorized and specialized company), which handles via contract and disposes them off in an approved manner. These procedures differ across the States in Germany.

Germany is also currently conducting a research study to analyse the scope of Extended Producers Responsibility (EPR) related to fishing/aquaculture gear (collected or derelict) and

whether EPR can be used as new instrument for a broader clean up, partly burden the producers. In addition, selected measures are elaborated. For aquaculture gear, the focus is on the question how farmers should handle the extra costs that will accompany the introduction of an EPR scheme. An 'insurance fond' will be tested to see how they can be incentivised to gear and nets in a more systematic way (apart from voluntary measures) and to burden producers (within EU and outside EU countries) with these costs.

## Italy

The **GHOST project**, co-funded by the LIFE + Biodiversity Instrument of the European Union, promotes tangible measures to reduce the effects of ALDFG and to improve the biodiversity of rocky habitats in the coastal areas of the north Adriatic Sea ([GHOST project, 2016](#)).

- Entire protocol on removal of nets on the seafloor. Phases: analysis of the location - evaluation of risks - practical guide on removal (tools, specific personnel, time);
- Entire protocol on stakeholders' involvement for increasing awareness among farmers and policy;
- Development of disposal / recycling strategy of nets.

In the beginning of April 2019, a first green light from the Italian government was given to the "**SalvaMare**" draft law, that was unanimously approved by the Italian Council of Ministers, and that should be approved by the Chamber in June. The draft law, which the Italian Ministry of Environment Sergio Costa renamed **#SalvAmare**, requires that:

- Fishermen will be allowed to bring plastic they find caught in their nets and will be able to deposit it in specific recycling areas placed in ports;
- They will be provided with an environmental certificate attesting their commitment to the sea and sustainable fishing;
- Their catch chain will be recognizable and recognized;
- They will not be subject to a fine or penalty for illicit traffic of waste;
- Recycling collection points will be installed in ports for the disposal of waste taken from the sea;
- Fishermen will be subject to awards and incentives for their "fishing for litter" activities.

## Norway

In 2018, the Norwegian government launched a new development program to combat marine litter and microplastics. The main objective of the Norwegian development program to combat marine litter and microplastics is to prevent and greatly reduce the extent of marine litter from large sources in developing countries.

## Portugal

General Directorate for Natural Resources (DGRM) actively participates in several actions of the [OSPAR Regional Action Plan \(RAP\)](#) and in particular leads actions 49 and 55:

- [Action 49](#) on the presence and impact of expanded polystyrene in the marine environment and the involvement of Industry in the development of solutions to reduce its impacts. The Interreg [OceanWise project](#), led by DGRM, intends to respond to this RAP action.
- [Action 55](#), for the development of regional and subregional maps of floating sea litter accumulation hotspots. The [CleanAtlantic project](#), in which DGRM is a partner, includes work areas geared to respond to this RAP action.

Furthermore, under the “Marine Strategies for Portuguese Marine Waters” created by the DGRM, the measures related to marine litter are projects focused on monitoring. To support this, the Portuguese Environmental Agency created a marine litter monitoring program responding to the commitments taken for OSPAR. In the program it is recognized that fishing and aquaculture practices account for most of the marine litter found (11%), from which the origin could be recognized. However, there are no measures in place to address this issue.

## Spain

The JACUMAR report ([Junta Nacional Asesora de Cultivos Marinos, 2008](#)) of the National Advisory Board for Marine Cultures (Ministry for Agriculture, Fisheries and Food) formulates several measures/strategies tailor-made for the aquaculture farmer to prevent littering, e.g.:

- [Section 3](#): It explains how to create a Minimization Plan for an aquaculture company, it divides the process in the following steps: Initial organization and planning, Development of an environmental assessment, Selection of minimization measures, Development of an action plan, Implementation of the measures and environmental monitoring.
- [Section 4: Minimization measures](#). This section introduces what kind and which measures can be implemented in an aquaculture facility. Different kinds of minimization measures are presented: Changes in primary matters, Technological changes, Internal reuse of matter, Product changes, Organization and management measures.
  - [Section 4: Subsection 4.1: Cleaning products. Measure 4](#): Use alternative products with a wider lifespan in order to reduce the generation of waste.
  - [Subsection 4.2: Containers and packaging. Measure 1](#): Reuse of the big-bags for non-food use, big-bags are made of resistant materials that can be reused for new purposes different of their original use.
  - [Subsection 4.2: Containers and packaging. Measure 2](#): Internal reuse of small feedbags. These smaller feedbags can be used as waste bags reducing the need to buy them.

- Subsection 4.2: Containers and packaging. Measure 4: Negotiate the devolution of packaging with providers, to be reused.
- Subsection 4.2: Containers and packaging. Measure 5: Better size management of the plastic film used in fish packaging, thus reducing the creation of waste.
- Subsection 4.2: Containers and packaging. Measure 8: Replacement of nets before they reach the end of their lifespan.
- Subsection 4.2: Containers and packaging. Measure 9: Green deal application for feed bags
- Subsection 4.6: Fouling. Measure 4: Scheduled net replacement.
- Subsection 4.7: Staff awareness. Measure 1: Raising environmental awareness amongst the staff.
- Subsection 4.7: Staff awareness. Measure 3: Staff training.

The ACUIVERDE project ([Proyecto Acuiverde. Guía de buenas prácticas, 2012](#)) involved several entities (amongst them a Spanish Ministry) and drafted a series of measures of good practices in aquaculture. This process was initiated by APROMAR (Asociación Empresarial de Acuicultura en España), the Spanish Business Association of Aquaculture, who committed to spread it through his members and to encourage to adopt said measures.

- Module 4: Minimization of the environmental impact. It is recommended to implement some environmental management and to evaluate the impacts of the facility amongst the environment;
- Module 5: Waste management. Aquaculture facilities should be informed about the legislation concerning waste and have all needed permissions and licences. The nature of the generated wastes should be known as a first step for their correct management, and then manage those wastes according to the law. A Waste Management Program should be implemented following the three R's: Reduce, Reuse and Recycle. Awareness should be raised amongst Staff. If possible, use recycled products or those that can be recycled.

As a result of the JACUMAR report, "Guide for the minimisation of aquaculture waste" was published. During 2014-2020, the Spanish Aquaculture Strategic Plan (PEAE) provides for the continuation of this and other work carried out by different Spanish research groups on the use and reuse of waste from aquaculture activities. During 2016, the Spanish Aquaculture Observatory (OESA) began updating this guide with the collaboration of AZTI ([OESA, 2017](#)):

- Section 3: How to implement a Minimization Plan. The following steps are mentioned: Initial organization and planning, Development of an environmental assessment, Selection of minimization measures, Development of an action plan, Implementation of the measures and environmental monitoring.
- Section 4: Minimization measures. Different kinds of minimization measures are presented: Changes in primary matters, Technological changes, Internal reuse of

matter, Product changes, Organization and management measures. Advantages of implementing the minimization measures.

- Subsection 4.1: Training and awareness-raising in the company. Measure 4.1.1: Economical and environmental awareness-raising.
- Subsection 4.1: Training and awareness-raising in the company. Measure 4.1.3: Staff training.
- Subsection 4.3: Materials, containers and packaging. Measure 4.3.1: Use of material with a wider lifespan.
- Subsection 4.3: Materials, containers and packaging. Measure 4.3.2: Reuse or recycle feed packaging and other containers and packages for non-food uses.
- Subsection 4.3: Materials, containers and packaging. Measure 4.3.5: Reuse or recycle feed packaging and other containers and packages by means of third parties that might be interested in these.
- Subsection 4.3: Materials, containers and packaging. Measure 4.3.6: Better size management of plastic film used in packaging.
- Subsection 4.4: Loss due to mortality. Measure 4.4.4: Reduction of loss due to fish evasion or breakage of ropes or other. Replacement before the end of the lifespan of these materials.
- Subsection 4.7: Fouling. Measure 4.7.2: Scheduled cleaning and replacement of nets.

The Spanish government proposed as part of the Spanish Marine Strategies ([EsMarEs](#)), a [program of measures for marine litter](#), focusing on 'state', 'pressure' and 'operative' objectives. Even though there are no specific objectives for aquaculture activities, there are some focused on fisheries and a general objective focusing on reducing the amount of marine litter generated by both terrestrial and maritime sources. The [EsMarEs program of measures](#), lists under 'Descriptor 10: Marine Litter' the existing measures and the new proposed measures.

#### Existing measures:

- MARPOL (Annex V) establishes a general prohibition (with regulated exceptions) of litter discharge at sea and commits Parties to receive the garbage (generated by ships) and so-called "cargo residues" in adequate facilities in the ports. All Spanish ports of general interest (Puertos del Estado) dispose of these facilities.
- An incentive provided by the Port Authorities, to reduce 20% of the compulsory fixed rate system for ships that dock, when the ship has a certificate from the maritime administration in which it is stated that, for the environmental management of the ship, for its design, equipment available or conditions of exploitation, reduced quantities of waste are generated accordingly.
- Pilot projects to improve waste management on board fishing vessels, such as the *Isla Verde Project* in the demarcation of the North-Atlantic region (Puerto de Vigo) as well as projects for the installation of clean points in fishing and recreational docks, such as *Clean Ports* in the North Atlantic marine demarcation (Puertos de Cantabria) or *Ports Nets* in the levantino-balear marine demarcation (Ports of the Generalitat de Catalunya).

- The material published by the Network of Environmental Authorities (Red de Autoridades Ambientales) on awareness and good practices for the fisheries, aquaculture and other sectors.
- At the community level, there is regulation on the marking of fishing gear to indicate ownership and over recovery of gear lost (Regulation (EC) nº1224 / 2009, of November 20, 2009, by which it is established a Community control regime to ensure compliance with the rules of the common fisheries policy). In Spain there are several coordinated initiatives that include localisation and subsequent controlled removal of this type of gear in protected areas, for example, the MEDRECOVER project in the Levantine-Balearic marine demarcation (led by the University of Barcelona and the Natural Park of Mongr, Illes Medes and Baix Ter) and the SOS REDES project in the Estrecho and Alborn marine demarcation (which develops the Man and Territory Association, financed with own funds).

New proposed measures (relevant for the aquaculture sector):

- BM3: Promotion of projects aimed at reduction, reuse and recycling of certain materials such as expanded polystyrene (EPS) or fishing nets.
- BM4: Promotion of projects and innovative initiatives in the environmental aspect of technologies and processes of the fishing and aquaculture sector.
- BM6: Improvement of waste management in the ports.
- BM7: Promoting projects for a better waste management on board of fishing vessels or in aquaculture facilities.
- BM9: Normative revision that affects the application of producer extended responsibility.
- BM18: Promotion and financing of "Garbage fishing" activities.
- BM23: Development of an action protocol about lost or abandoned fishing gear that pose a threat to the conservation of habitats and species in areas of the RN 2000.
- BM27: Creation of the figure of "Guardians of the beach ", aimed at associations, environmental organisations, fishermen, fisheries and aquaculture associations and other groups where they can watch over the environmental preservation and the raising of awareness of the marine litter problem at a local, regional and national level.

## Sweden

Sweden has the *Swedish aquaculture – a green industry in blue fields: Strategy 2012 – 2020*, as well as the *Action Plan for development of Swedish aquaculture: Making the Strategy 2012 – 2020 concrete*. However, the strategic and sustainable blue growth in the sector is the main focus in these two national documents. Lead agency is the Swedish Authority for Marine and Water Management (SwAM), listed under the Ministry of the Environment. Further authorities, such as the Coast Guard, participate in the implementation of Swedish fisheries and aquaculture policy. Municipalities still have an important role in marine planning and permissions since they have a veto on establishments inside the territorial sea boundary. In terms of litter from aquaculture activities, in Sweden there are prominent initiatives organised

by the local authorities. For example, in Sweden, the West Coast Sotenäs municipality has an ongoing ghost fishing project. In addition, the [Sotnenäs Symbiosis Center](#) - implementation of industrial symbiosis and circular economy - focuses on aquaculture, marine industry, ocean plastic and innovative circular, and sustainable development.

## The Netherlands

In the Netherlands, as far as the consortium can find, there is no action plan on tackling marine litter. In the Netherlands, however, the so-called 'Green Deals' are being used, for example for clean beaches, but also for fisheries and aquaculture ([MSFD – EAA 2018](#)).

## United Kingdom

The 25 Year Environment Plan ([HM Government, 2018](#)) sets out government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats, including tackling marine litter.

## Additional information: Shellfish Aquaculture Gear Management Workshop

During the Shellfish Aquaculture Gear Management Workshop 2018 ([NOAA, Florida, US, 2018](#)), **potential measures for the shellfish aquaculture farmers are established**. These rules are specific to shellfish aquaculture gear management and can provide inspiration for the AQUA-LIT Learning Labs and the Toolbox for integrated approaches.

- Non-natural materials (all gear) must be anchored to the bottom. Never skimp on anchoring and buy a larger anchor than you think you need because the weather will be worse than you expected.
- All culture materials shall be free of pollutants.
- Bags/trays/nets should be removed from the water during cleaning.
- The aquaculturist is responsible for proper disposal of all materials used.
- The aquaculturist must remove all gear 60 days after termination of a lease.
- The leaseholder's identification information must be attached to floating gear and off-bottom structures. "This helps public understand that aquaculture gear is not trash, it has a purpose and can be retrieved." Tagged gear is good for positive public perception. "If you are willing to add your name to gear, you will be responsible for it. Tagging and tracking gear also adds protection from theft."
- Reduce and manage chafing, use like to like materials (ex: metal on metal).

- Do not overload gear: Some suppliers overestimate the number of oysters or clams you can grow in each bag/cage to make them appear more efficient and affordable, but overstocked gear does not behave the way it is intended to. Do not overstock your gear.
- Hold periodic shoreline clean-ups to show the public that the aquaculture industry cares. Weigh collected debris to demonstrate that aquaculture gear is a small portion of the total marine debris collected.
- Dispose of gear properly at the end of its life span.
- Storm Preparation
- Draft a written storm plan and hold storm drills annually for your employees.
- If possible, make decisions early (about 3 days before storm hits).
- Sinking gear takes longer than anticipated; have your crew practice sinking a line of cages to estimate how long it will take.
- Floating gear tips: check knots and lines, check cage doors, make sure bags are not overstocked, keep oysters on site (not out of the water).
- Suspended gear tips: check pilings, make sure basket doors are closed, lower the lines to the lowest position on the anchor post to be out of wind and wave action.

## FARNET transnational seminar for FLAGS

During the FARNET transnational seminar for FLAGS ([Germany, 2017](#)), a completely environmentally-friendly mesh for mussel cultivation was proposed.

- With the help of FLAG funding, a local company has been able to put in place a **biodegradable mesh** for their mussel cultivation.

## Recycling System for Waste EPS Floats (Japan)

**EPS (Expanded Polystyrene) floats** are used widely for various aquaculture operations in coastal areas such as net cage rafts and oyster farming rafts. If these floats are not well maintained and left exposed to the elements of weather and other physical abrasions, they disintegrate into smaller pieces and scatter along the beaches ([NOWPAP MERRAC, 2015](#)).

- The Government of Japan made efforts in introducing new EPS float treatment systems to respond to EPS litter. The basic method is that the wasted EPS floats are compressed with a portable compressor at the fishing port near the marine culture area. Hence, the material processed with this device can be recycled as foam plastic.

## OceanWISE project

Plastic foam products made of **expanded polystyrene (EPS)** are amongst the top 10 items of marine litter found on European beach litter surveys. [OceanWise](#) is looking for solutions to reduce this type of marine litter from the fishing industry (fisheries, aquaculture, sea-food companies).

## Conclusions & Highlights

The AQUA-LIT project ('Scaling up the Tide') aims to demonstrate how to overcome barriers for an integrated governance and economic development reducing littering from the aquaculture sector. Therefore, this report provides information on existing policy tools and measures to reduce or avoid litter from the aquaculture sector, and it will serve as a starting point for the AQUA-LIT workshops ('Learning Labs'). These multi-actor learning labs will provide a forum for the face-to-face work with the aquaculture farmers, policy makers and other relevant actors or stakeholders along the aquaculture value chain.

**'Identifying the options to address key waste items from the fishing industry and aquaculture which could contribute to marine litter, and implement pilot projects where appropriate (including deposit schemes, voluntary agreements and end-of-life recovery)'** is a priority action at global level included in the G7 Action Plan on Marine Litter ([2015](#)). This crucial need is subsequently translated into action plans at European, regional and national level.

This report on 'Available Tools and Measures' gives an overview of the global, regional, European and national action plans and documents that contain measures to reduce or avoid marine litter from the aquaculture sector. Following highlights and conclusions from this report will be the starting point for the discussion at the learning labs:

- ***High-level policy requirements have to be translated into concrete actions***  
Marine litter is currently high on the political agenda. The global and European framework for the prevention and management of marine debris exists, but needs to be further translated into implemented tailor-made actions and measures depending on the source of marine debris.
- ***Need for more research to support the evidence base for decision making***  
The research needs listed in this document show that the quantities and relative importance of different sources of plastics (including the aquaculture sector) and their entry point to the ocean need to be investigated in greater detail. **At the moment the necessary knowledge base for policy makers to formulate defined targets is largely lacking.** This certainly applies to the aquaculture sector as a source of marine litter. This knowledge is indisputably necessary in order to further implement clear policy actions and effective measures.
- ***Actions and measures on regional and sub-regional scales allow for a more targeted approach***  
The requirements listed at European level focus mainly on seeking or implementing solutions, and proposing specific policy engagements for mitigation strategies involving aquaculture-related litter. At the European level, clear targets were formulated in the framework of the Plastic Strategy and the MSFD. These targets should then be further specified by means of measures at the level of the EU Member States.

The actions and measures proposed on a regional scale are more specific and tailored to the aquaculture sector (including producers of materials and waste processing) based on the current bottlenecks.

- ***Work with all stakeholders along the value chain to find appropriate solutions***

In addition, the national requirements indicate the need working with all stakeholders along the value chain to find appropriate solutions to avoid littering from the aquaculture sector. In this way, very concrete actions and measures can be proposed in order to achieve the (environmental) targets set by policy makers. Concrete measures that have already been proposed are the use of alternative materials for mussel socks, and aquaculture gear tagging.

- ***Create possible synergetic benefits from jointly addressing sectors with similar litter issues***

In some cases it can be noticed that aquaculture as a sector as such is not specifically addressed (i.e. new Directive on port reception). Perhaps this is due to its relatively small size and capacities in many EU Member States, while additional burden can be perceived as limiting the growth of the sector. Thus, while the extended producer responsibility is relevant, littering is more likely to be facilitated through incentives. Moreover, framing the measures in a way, which can address multiple sectors with similar litter issues (i.e. recreation, fisheries, and aquaculture), and looking for joint solutions is likely to allow these sectors to join the capacities, and thus make the measures and solutions more feasible i.e. through the economies of scale or joint standardisation.

# ANNEXES

## ANNEX 1: Global actions and measures on aquaculture related debris

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target group	Reference	Hyperlink
Global	G20	G20	G20	2017	n.a.	Issues to be addressed	The G20 maintains that the tools to reduce marine litter have to be as diverse as the challenge of marine litter itself. There is no 'one size fits all' solution. We reiterate the need to: address pollution from sea based sources, including key waste items from the fishing and aquaculture industry as well as from the shipping sector.	Monitoring	Policy	G20 Action Plan on Marine Litter, 2017	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305536">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305536</a>
Global	G7	G7	G7	2015		Priority Action (see also HELCOM, OSPAR)	Identifying the options to address key waste items from the fishing industry and aquaculture which could contribute to marine litter, and implement pilot projects where appropriate (including deposit schemes, voluntary agreements and end-of-life recovery) and take into account the expertise of the Food and Agriculture Organization of the United Nations (FAO) ;	Solutions	Aquaculture, Waste,	Annex to the Leaders' Declaration G7 Summit 7-8 June 2015, Schloss Elmau, Germany	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305970">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305970</a>
Global	Global		UNEP	2016	n.a.	key research needs	The quantities and relative importance of different land- and sea-based sources of macro-plastics and their entry points to the ocean need to be investigated in greater detail, in particular taking account of regional differences. Research is required: To quantify inputs from the aquaculture sector and the factors contributing to such losses.	Monitoring	Aquaculture, Science, Policy	UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme: Nairobi. xxii, 252 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741</a>
Global	Global		UNEP	2016	n.a.	key research needs	Concerning microplastics, research is required to: Determine if microplastics in fisheries and aquaculture resources present a risk for food security, including food safety and impacts on human health;	Monitoring	Science, Policy	UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme: Nairobi. xxii, 252 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741</a>

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target group	Reference	Hyperlink
Global	Global		UNEP	2016	n.a.	key research needs	The research needs concerning the fisheries and aquaculture sectors have been combined, covering sources, impacts and potential solutions. For macroplastics, research is required to: Assess the quantities of fishing- and aquaculture-related debris released by these sectors;	Monitoring	Aquaculture, Science, Policy	UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme: Nairobi. xxii, 252 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741</a>
Global	Global		UNEP	2016	n.a.	key research needs	The research needs concerning the fisheries and aquaculture sectors have been combined, covering sources, impacts and potential solutions. For macroplastics, research is required to: Employ risk assessment in decision support for siting or re-siting aquaculture and developments.	Monitoring	Aquaculture, Science, Policy	UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme: Nairobi. xxii, 252 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741</a>
Global	Global		UNEP	2016	n.a.	key research needs	For microplastics, research is required to: Assess microbial pathogen load on microplastics in different areas of the ocean (open ocean, areas impacted by human sewage, aquaculture and fisheries areas);	Monitoring	Science, Policy	UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme: Nairobi. xxii, 252 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741</a>
Global	Global		UNEP	2016	2020-25	Goals B & C	Significant reduction by 2020-25: Reduce the quantities and impact on the environment of marine litter introduced directly at sea. Indicator: Quantity of aquaculture gear abandoned, lost or otherwise discarded (ALDFG) items per km-2 sea surface, km-2 water column, km-2 seabed, km-1 shoreline (e.g. floats, rope, nets, cages, poles).	Monitoring	Aquaculture, Science, Policy	UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme: Nairobi. xxii, 252 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=306741</a>
Global	Global		UNEP	2018	n.a.	Future work	Quantifying the economic impact of marine litter on major economic sectors such as tourism, aquaculture and fisheries at the national/regional level to help countries make the case internally for action	Economic	Aquaculture, Science, Policy	UNEP/AHEG/2018/1/6 Ad hoc open-ended expert group on marine litter and microplastics, First meeting Nairobi, 29–31 May 2018	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305969">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305969</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B1	<u>Strategy B1. Conduct ocean-user education and outreach on marine debris impacts, prevention, and management:</u> Conduct education and outreach programs related to relevant legislation and best practices/technologies for the prevention, reduction, and management of aquaculture-related debris and other solid wastes that engage aquaculturists	Social	Aquaculture	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target group	Reference	Hyperlink
Global	Global		UNEP, NOAA	2011	n.a.	Action B1	<u>Strategy B1. Conduct ocean-user education and outreach on marine debris impacts, prevention, and management:</u> Develop and promote the application of BMPs for aquaculture operations and practices, including aquaculture equipment and gear deployment, handling, and maintenance, in order to minimize or reduce the probability of accidental aquaculture equipment and gear loss at sea	Social	Aquaculture	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B1	<u>Strategy B1. Conduct ocean-user education and outreach on marine debris impacts, prevention, and management:</u> Promote best practices for the environmental management of aquaculture	Social	Aquaculture	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B3	<u>Strategy B3. Develop and strengthen implementation of industry BMP designed to minimize abandonment of vessels and accidental loss of cargo, solid waste, and gear at sea:</u> Require aquaculture nets to have electronic location and identification if lost at sea	Recovery	Aquaculture, Policy	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B3	<u>Strategy B3. Develop and strengthen implementation of industry BMP designed to minimize abandonment of vessels and accidental loss of cargo, solid waste, and gear at sea:</u> Promote development of BMP for the environmental management of aquaculture facilities	Recovery	Aquaculture, Policy	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B5	<u>Strategy B5. Develop and strengthen implementation of legislation and policies to prevent and manage marine debris from at-sea sources and implement the requirements of MARPOL Annex V and other relevant international instruments and agreements:</u> Develop and implement legislation and policies at the regional and national levels to minimize marine debris from aquaculture, through close cooperation with relevant UN agencies (FAO, IMO and UNEP), Regional Seas Organizations, national governments, the aquaculture industry, ports, and environmental NGOs.	Policy	Aquaculture, Policy	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B6	<u>Strategy B6. Build capacity to monitor and enforce (1) national and local legislation and (2) compliance with requirements of MARPOL Annex V and other relevant international instruments and agreements:</u> Build national capacity to actively monitor and enforce requirements of relevant legislation for minimizing marine debris from aquaculture	Policy	Policy	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B6	<u>Strategy B6. Build capacity to monitor and enforce (1) national and local legislation and (2) compliance with requirements of MARPOL Annex V and other relevant international instruments and agreements:</u> Actively monitor and enforce requirements from relevant legislation for minimizing equipment and gear loss of aquaculture.	Recovery	Aquaculture, Policy	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target group	Reference	Hyperlink
Global	Global		UNEP, NOAA	2011	n.a.	Action B6	<u>Strategy B6. Build capacity to monitor and enforce (1) national and local legislation and (2) compliance with requirements of MARPOL Annex V and other relevant international instruments and agreements: Adopt international protocols for monitoring equipment loss/breakage in aquaculture production</u>	Recovery	Aquaculture, Science, Policy	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B6	<u>Strategy B6. Build capacity to monitor and enforce (1) national and local legislation and (2) compliance with requirements of MARPOL Annex V and other relevant international instruments and agreements: Develop a compendium of environmentally safe aquaculture gear</u>	Solutions	Aquaculture, Science, Producers, Policy	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		UNEP, NOAA	2011	n.a.	Action B6	<u>Strategy B6. Build capacity to monitor and enforce (1) national and local legislation and (2) compliance with requirements of MARPOL Annex V and other relevant international instruments and agreements: Establish partnership at the regional and national level with aquaculture industry to minimize their debris output.</u>	Social	Aquaculture, Policy	Honolulu Strategy (2012). A global framework for prevention and management of marine debris.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305963</a>
Global	Global		United Nations	2015	by 2025	Target SDG14.1	<u>SDG14.1 states that by 2025: prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.</u>	Policy	Policy	The 2030 Agenda for Sustainable Development A/RES/70/1	<a href="https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf">https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf</a>
Global	Global		United Nations	2017		Action 13(g)	<u>Accelerate actions to prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris, plastics and microplastics, nutrient pollution, untreated wastewater, solid waste discharges, hazardous substances, pollution from ships and abandoned, lost or other wise discarded fishing gear, as well as to address, as appropriate, the adverse impacts of other human-related activities on the ocean and on marine life, such as ship strikes, underwater noise and invasive alien species”.</u>	Policy	Policy	UN Resolution A/RES/71/312	<a href="http://undocs.org/A/RES/71/312">http://undocs.org/A/RES/71/312</a>

## ANNEX 2: Regional actions and measures on aquaculture related debris

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target Group	Reference	Hyperlink
Mediterranean Sea	Mediterranean	MAP partners	UNEP MED	2013	2017	Action 15	Apply as appropriate by 2017 "Gear marking to indicate ownership" concept and "reduced ghost catches through the use of environmental neutral upon degradation of nets, pots and traps concept", in consultation with the competent international and regional organizations in the fishing sector.	Recovery	Aquaculture, Producers, Policy	UNEP (DEPI)/MED WG. 379/5	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=311217">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=311217</a>
Mediterranean Sea	Mediterranean Sea	MAP partners	UNEP MED	2013	2017	Action7	Application of prevention measures related to Extended Producer Responsibility strategy by making the producers, manufacturer brand owners and first importers responsible for the entire life-cycle of the product with measures prioritizing the hierarchy of waste management in order to encourage companies to design products for reuse, recycling and materials reduction in weight and toxicity	Solutions	Producers, Policy	UNEP (DEPI)/MED WG. 379/5	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=311217">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=311217</a>
Mediterranean Sea	Mediterranean Sea	MAP partners	UNEP MED	2013	2017	Action 10	Apply prevention measures related to establishment of mandatory Deposits, Return and Restoration System for expandable polystyrene boxes in the fishing sector	Recovery	Aquaculture, Waste, Policy	UNEP (DEPI)/MED WG. 379/5	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=311217">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=311217</a>
OSPAR	North-East Atlantic	FR, BE, UK, PT	OSPAR Commission	2014	2015	Action 35 (see G7)	Identify the options to address key waste items from the fishing industry and aquaculture, which could contribute to marine litter, including deposit schemes, voluntary agreements and extended producer responsibility.	Solutions	Aquaculture, Waste	OSPAR Commission, Marine Litter Regional Action Plan, 2014	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305542">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305542</a>
OSPAR	North-East Atlantic	UK, SE, DE, NL, NO	OSPAR Commission	2014	2016	Action 36	Develop best practice in relation to fishing industry: Through a multinational project, together with the fishing industry and competent authorities develop and promote best practice in relation to marine litter. All relevant aspects should be included.	Social	Aquaculture, Policy	OSPAR Commission, Marine Litter Regional Action Plan, 2014	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305542">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305542</a>
Mediterranean Sea	Adriatic Sea	AL, BA, HR, GR, IT, ME, SI	DeFishGear	2017	n.a.	Notification	Mussel farming socks (polypropylene): agreements with the mussel farmers to bring to shore the no longer usable socks, try to cover the costs of the waste disposal and requirements in terms of how to collect the already abandoned socks.	Recovery	Aquaculture, Waste	DeFishGear. Guidelines for Marine Litter and Derelict Fishing Gear Management in the Frame of ICZM. Output WP6.5. - Adriatic IPA	<a href="http://www.vliz.be/en/catalogue?module=ref&amp;refid=306460">http://www.vliz.be/en/catalogue?module=ref&amp;refid=306460</a>

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target Group	Reference	Hyperlink
Mediterranean Sea	Adriatic Sea	AL, BA, HR, GR, IT, ME, SI	DeFishGear	2017	n.a.	Needs	The need to define a system to receive and manage the waste on land, as well as to identify who should be responsible for the waste disposal and the associated costs.: It would require identifying types of compensation for the “producers” of waste found at sea which can be used to compensate the costs of those overseeing the collection of the waste in the port. In fact, it is not logical that the local government with the “misfortune” of having a large fishing fleet should be responsible for the disposal of waste originating to only a minimal degree in the coastal zone under its responsibility.	Policy	Aquaculture, Waste, Policy	DeFishGear. Guidelines for Marine Litter and Derelict Fishing Gear Management in the Frame of ICZM. Output WP6.5. - Adriatic IPA	<a href="http://www.vliz.be/en/catalogue?module=ref&amp;refid=306460">http://www.vliz.be/en/catalogue?module=ref&amp;refid=306460</a>
Mediterranean Sea	Adriatic Sea	AL, BA, HR, GR, IT, ME, SI	DeFishGear	2017	n.a.	Notification	Mussel farming socks (polypropylene): the use of biodegradable materials or compostable ones will reduce costs arising from their disposal.	Solutions	Aquaculture, Producers	DeFishGear. Guidelines for Marine Litter and Derelict Fishing Gear Management in the Frame of ICZM. Output WP6.5. - Adriatic IPA	<a href="http://www.vliz.be/en/catalogue?module=ref&amp;refid=306460">http://www.vliz.be/en/catalogue?module=ref&amp;refid=306460</a>
North Sea	North Sea		CPMR - MRG	2018	n.a.	Recommendation	Encourage green procurement: offer alternatives to plastics and produce/use plastics which are designed to allow for greater durability, reuse and high-quality recycling.	Solutions	Producers	Resolution on Marine Litter: Plastics(2018). Resolution on Marine Litter: Plastics. CPMR North Sea Commission: Gothenburg. 5 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310079">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310079</a>
Baltic Sea	Baltic Sea	EU	CleanSea	2015	n.a.	Measure	Design, Production & Use: alternative for all kind of nets	Solutions	Aquaculture, Producers, Policy	CleanSea - Summary of Marine Litter Policy Options. Veiga, J.; Leslie, H.; Fernandez, P.; Perez, C.; Ferreira, M.; Altvater, S. (2015). Policy options for litter-free seas: Developed under CleanSea project co-funded by the European Union Seventh Framework Programme under grant agreement n° 308370. CleanSea Project: [s.l.]. Brochure pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932</a> <a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934</a>
Baltic Sea	Baltic Sea	EU	CleanSea	2015	n.a.	Measure	Recycling: Collection and removal of old or abandoned nets for recycling and incorporation in new products	Recovery	Aquaculture, Waste, Public, Producers	CleanSea - Summary of Marine Litter Policy Options. Veiga, J.; Leslie, H.; Fernandez, P.; Perez, C.; Ferreira, M.; Altvater, S. (2015). Policy options for litter-free seas: Developed under CleanSea project co-funded by the European Union Seventh Framework Programme under grant agreement n° 308370. CleanSea Project: [s.l.]. Brochure pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932</a> <a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934</a>
Baltic Sea	Baltic Sea	EU	CleanSea	2015	n.a.	Measure	Collection and Waste transfer: Higher penalties for improper disposal of gear	Recovery	Aquaculture, Policy	CleanSea - Summary of Marine Litter Policy Options. Veiga, J.; Leslie, H.; Fernandez, P.; Perez, C.; Ferreira, M.; Altvater, S. (2015). Policy options for litter-free seas: Developed under CleanSea project co-funded by the European Union Seventh Framework Programme under grant agreement n° 308370. CleanSea Project: [s.l.]. Brochure pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932</a> <a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934</a>

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target Group	Reference	Hyperlink
Mediterranean Sea	Mediterranean Sea		CleanSea	2015	n.a.	Need	Urgent governmental action is still required in order to address litter origination from aquaculture.	Policy	Policy	CleanSea - Summary of Marine Litter Policy Options. Veiga, J.; Leslie, H.; Fernandez, P.; Perez, C.; Ferreira, M.; Altvater, S. (2015). Policy options for litter-free seas: Developed under CleanSea project co-funded by the European Union Seventh Framework Programme under grant agreement n° 308370. CleanSea Project: [s.l.]. Brochure pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932</a> <a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934</a>
Mediterranean Sea	Mediterranean Sea	EU	CleanSea	2015	n.a.	Measure	Design and Production: Innovative alternatives for aquaculture gear based on neutral biodegradable materials	Solutions	Producers, Policy	CleanSea - Summary of Marine Litter Policy Options. Veiga, J.; Leslie, H.; Fernandez, P.; Perez, C.; Ferreira, M.; Altvater, S. (2015). Policy options for litter-free seas: Developed under CleanSea project co-funded by the European Union Seventh Framework Programme under grant agreement n° 308370. CleanSea Project: [s.l.]. Brochure pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932</a> <a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934</a>
Mediterranean Sea	Mediterranean Sea	EU	CleanSea	2015	n.a.	Measure	Use: Use of alternative materials in aquaculture (e.g. cotton mussel socks)	Solutions	Aquaculture, Producers, Policy	CleanSea - Summary of Marine Litter Policy Options. Veiga, J.; Leslie, H.; Fernandez, P.; Perez, C.; Ferreira, M.; Altvater, S. (2015). Policy options for litter-free seas: Developed under CleanSea project co-funded by the European Union Seventh Framework Programme under grant agreement n° 308370. CleanSea Project: [s.l.]. Brochure pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932</a> <a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934</a>
Mediterranean Sea	Mediterranean Sea	EU	CleanSea	2015	n.a.	Measure	Collection: explore the possibility of gear marking	Recovery	Aquaculture, Policy	CleanSea - Summary of Marine Litter Policy Options. Veiga, J.; Leslie, H.; Fernandez, P.; Perez, C.; Ferreira, M.; Altvater, S. (2015). Policy options for litter-free seas: Developed under CleanSea project co-funded by the European Union Seventh Framework Programme under grant agreement n° 308370. CleanSea Project: [s.l.]. Brochure pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932</a> <a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934</a>
Mediterranean Sea	Mediterranean Sea	EU	CleanSea	2015	n.a.	Measure	Recycling: Collection and removal of old or abandoned nets for recycling and incorporation in new products	Recovery	Aquaculture, Waste, Public, Producers, Policy	CleanSea - Summary of Marine Litter Policy Options. Veiga, J.; Leslie, H.; Fernandez, P.; Perez, C.; Ferreira, M.; Altvater, S. (2015). Policy options for litter-free seas: Developed under CleanSea project co-funded by the European Union Seventh Framework Programme under grant agreement n° 308370. CleanSea Project: [s.l.]. Brochure pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305932</a> <a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305934</a>

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target Group	Reference	Hyperlink
HELCOM	Baltic Sea		Baltic Marine Environment Protection Commission (HELCOM)	2015	2016	Action RS8 (=OSPAR 35, G7)	Regional actions, sea-based sources of marine litter. Identify the options to address key waste items from the fishing and aquaculture industry, which could contribute to marine litter, including deposit schemes and extended producer responsibility.	Solutions	Aquaculture, Waste	HELCOM (2015), Regional Action Plan for Marine Litter in the Baltic Sea. 20 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305530">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305530</a>
HELCOM	Baltic Sea		Baltic Marine Environment Protection Commission (HELCOM)	2015	2016	Action NS7	National actions, aquaculture waste. Enhance resource efficiency by facilitating markets and applications for plastic waste from the fishing, aquaculture and shipping industry (e.g. by bringing together producers of waste and recycling companies) by looking at specific items and differences in materials, including giving value to waste streams by financial incentives.	Social	Waste, Producers, Policy	HELCOM (2015), Regional Action Plan for Marine Litter in the Baltic Sea. 20 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305530">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305530</a>
HELCOM	Baltic Sea	SE, DE, FI	Baltic Marine Environment Protection Commission (HELCOM)	2015	2018	Action RS5	Promote and disseminate best practice in relation to all relevant aspects of waste management within the fishing sector (including e.g. waste management on board, waste management at harbors and operational losses/net cuttings).	Social	Aquaculture, Waste	HELCOM (2015), Regional Action Plan for Marine Litter in the Baltic Sea. 20 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305530">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305530</a>
HELCOM	Baltic Sea	DE, PL	Baltic Marine Environment Protection Commission (HELCOM)	2015	2017	Action RS6	Through a multinational project, such as the MARELITT Baltic project, together with the fishing industry and other stakeholders, develop and promote best practice in relation to ALDFG and derelict fishing gear and their removal.	Removal	Aquaculture	HELCOM (2015), Regional Action Plan for Marine Litter in the Baltic Sea. 20 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305530">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305530</a>
OSPAR	North-East Atlantic		OSPAR Commission	2014	2016	Action 70	Promong Extended Producer Responsibility Strategies requiring producers, manufacturers, brand owners and first importers to be responsible for the enre life-cycle of the product with a focus on items frequently found in the marine environment.	Solutions	Producers, Policy	OSPAR Commission, Marine Litter Regional Action Plan, 2014	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305542">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305542</a>
North Sea	North Sea		CPMR - MRG	2018	n.a.	Recommendation	Synergies with cross-sectoral range of businesses and organisations should be explored which are instrumental to finding innovative ways to take action against plastic pollution.	Social	Aquaculture, Waste, Producers, Policy	Resolution on Marine Litter: Plastics(2018). Resolution on Marine Litter: Plastics. CPMR North Sea Commission: Gothenburg. 5 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310079">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310079</a>
North Sea	North Sea		CPMR - MRG	2018	n.a.	Recommendation	Sharing examples of successful projects and best practices to members is needed to raise awareness .	Social	Aquaculture, Public	Resolution on Marine Litter: Plastics(2018). Resolution on Marine Litter: Plastics. CPMR North Sea Commission: Gothenburg. 5 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310079">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310079</a>

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target Group	Reference	Hyperlink
North Sea	North Sea		CPMR	2018	n.a.	Key points	Prevention. The Action Plan focuses first on identifying small steps and particularly on keeping in mind three key points: 1. The specific role of regions (facilitating and regulatory) 2. What specific themes are most important. 3. And, how to go about it.	Solutions	Policy	North Sea Action Plan on Marine Litter Draft Technical Paper. CPMR North Sea Commission. October 2019	<a href="#">Not available</a>

## ANNEX 3: European actions and measures on aquaculture related debris

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target group	Reference	Hyperlink
EU	EU	EU	Eunomia, European Commission	2016		Need	Shift consumption away from harmful products: Reduce the use of plastic components of fishing gear that are designed to be lost or break apart during their use, e.g. plastic dolly rope, and polystyrene floats and buoys not sealed in a protective cover. This could be achieved with an outright ban on sale and use of such items, or an environmental tax that will make alternative products cost-competitive (and overcome the convenience factor).	Solutions	Aquaculture, Producers, Policy	Sherrington, C.; Darrah, C.; Hann, S.; Cole, G.; Corbin, M. (2016). Study to support the development of measures to combat a range of marine litter sources: Report for European Commission DG Environment. Eunomia: London. 411 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310081">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310081</a>
EU	EU	EU	Eunomia, European Commission	2016		Action	Reduce dumping at sea: Use market-based instruments such as advanced disposal fees, deposit refund schemes and manufacturer buy-back schemes to reduce litter and raise recycling rates.	Solutions	Aquaculture, Waste, Policy	Sherrington, C.; Darrah, C.; Hann, S.; Cole, G.; Corbin, M. (2016). Study to support the development of measures to combat a range of marine litter sources: Report for European Commission DG Environment. Eunomia: London. 411 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310081">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310081</a>
EU	EU	EU	Eunomia, European Commission	2016		Action	Reduce dumping at sea: Remove financial disincentives to bringing waste ashore including marine litter found at sea (litter retention). Port reception facilities play an important role and can be complemented with national recycling and disposal systems for items that require special processing such as nets and gear made from composite materials.	Solutions	Aquaculture, Waste, Policy	Sherrington, C.; Darrah, C.; Hann, S.; Cole, G.; Corbin, M. (2016). Study to support the development of measures to combat a range of marine litter sources: Report for European Commission DG Environment. Eunomia: London. 411 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310081">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=310081</a>
EU	EU	EU	European Commission	2018	2018	Action	The Commission will also further study the contribution of aquaculture to marine litter and examine a range of measures to minimise plastic loss from aquaculture. ACTION: to tackle sea-based sources of marine litter: development of measures to limit plastic loss from aquaculture (e.g. possible Best Available Techniques Reference Document)	Solutions	Aquaculture, Science, Policy	European Commission (2018). A European strategy for plastics in a circular economy . European Commission: [s.l.]. 23 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305550">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305550</a>
EU	EU	EU	European Commission	2018	2018	Action	ACTION in support of multilateral initiatives on plastic: Renewed engagement on plastics and marine litter in fora such as the UN, G7, G20, the MARPOL convention and regional sea conventions, including the development of practical tools and specific action on fishing and aquaculture.	Policy	Aquaculture, Policy	European Commission (2018). A European strategy for plastics in a circular economy . European Commission: [s.l.]. 23 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305550">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305550</a>
EU	EU	EU	European Commission	2018	2018	Vision/Target	Marine litter from sea-based sources such as ships, fishing and aquaculture are significantly reduced.	Policy	Aquaculture, Policy	European Commission (2018). A European strategy for plastics in a circular economy . European Commission: [s.l.]. 23 pp.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305550">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305550</a>

Region	Sea basin	Countries involved	Name organisation	Year of publication	Year of implementation	Type	Content (specify the measure or tool)	Category	Target group	Reference	Hyperlink
EU	EU	FR, IT, ES, IE, SE	European Commission	2018		Notification	Targeted measures for beach litter, such as reducing litter from aquaculture appear to be underdeveloped. Only France (North-East Atlantic), Ireland, Italy, Spain and Sweden specifically addressed aquaculture in relation to MSFD.	Policy	Aquaculture, Policy	REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL assessing Member States' programmes of measures under the Marine Strategy Framework Directive	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0562&amp;from=EN">https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0562&amp;from=EN</a>
EU	EU	EU	European Commission	2013	n.a.	Notification	Aquaculture installations are included as a sea-based source of marine litter	Policy	Aquaculture, Policy	European Commission, 2013. Feasibility study of introducing instruments to prevent littering.	<a href="http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305974">http://www.vliz.be/nl/catalogus?module=ref&amp;refid=305974</a>
EU	EU	EU	European Commission	2014		Target	To address specific waste challenges the Commission proposes an aspirational target of reducing marine litter by 30% by 2020 for the ten most common types of litter found on beaches, as well as for fishing gear found at sea, with the list adapted to each of the four marine regions in the EU	Policy	Policy	Towards a circular economy: A zero waste programme for Europe; 2014 (COM(2014) 398 final)	<a href="https://eur-lex.europa.eu/resource.html?uri=cellar:50edd1fd-01ec-11e4-831f-01aa75ed71a1_0001.01/DOC_1&amp;format=PDF">https://eur-lex.europa.eu/resource.html?uri=cellar:50edd1fd-01ec-11e4-831f-01aa75ed71a1_0001.01/DOC_1&amp;format=PDF</a>
EU	EU	EU	European Commission, JRC	2015	ongoing	Target	The Marine Strategy Framework Directive (MSFD) requires EU Member States to ensure that, by 2020, "properties and quantities of marine litter do not cause harm to the coastal and marine environment".	Policy	Policy		<a href="http://publications.jrc.ec.europa.eu/repository/bitstream/JRC99960/lb-na-27677-en-n.pdf">http://publications.jrc.ec.europa.eu/repository/bitstream/JRC99960/lb-na-27677-en-n.pdf</a>
EU	EU	EU	European Parliament	2018		Notification	Is convinced that the use of different international experience of well-planned aqua farms integrated into local economies and the promotion of European environmental best practices, in particular as regards sustainable waste management, safeguarding and making the most of local biodiversity, and choice of sustainable eating habits, would strengthen aquaculture and would help all Member States to increase sustainable aquaculture production; points out that best practice examples in other regions have been developed under different political and geographical conditions that are not necessarily comparable with the various conditions across the Member States;	Social	Aquaculture, Waste	Towards a sustainable and competitive European aquaculture sector: current status and future challenges (2017/2118(INI))	<a href="http://www.europarl.europa.eu/sides/getDoc.do?pubRef://EP//TEXT+REPORT+A8-2018-0186+0+DOC+XML+VO//EN">http://www.europarl.europa.eu/sides/getDoc.do?pubRef://EP//TEXT+REPORT+A8-2018-0186+0+DOC+XML+VO//EN</a>
EU	EU	EU	Seas at Risk	2018	n.a.	Notification	Train aquaculture staff on reducing and preventing marine litter from aquaculture operations;	Social	Aquaculture		<a href="https://seas-at-risk.org/19-aquaculture/927-tackling-marine-litter-from-aquaculture-and-the-spread-of-invasive-alien-species.html">https://seas-at-risk.org/19-aquaculture/927-tackling-marine-litter-from-aquaculture-and-the-spread-of-invasive-alien-species.html</a>
EU	EU	EU	Seas at Risk	2018	n.a.	Notification	Record and report litter from aquaculture facilities and set targets for year-on-year reductions;	Monitoring	Aquaculture, Science, Policy		<a href="https://seas-at-risk.org/19-aquaculture/927-tackling-marine-litter-from-aquaculture-and-the-spread-of-invasive-alien-species.html">https://seas-at-risk.org/19-aquaculture/927-tackling-marine-litter-from-aquaculture-and-the-spread-of-invasive-alien-species.html</a>
EU	EU	EU	Seas at Risk	2018	n.a.	Notification	Undertake further research to identify effective management measures to reduce the threat posed by invasive alien species to native species and habitats.	Solutions	Aquaculture, Science, Policy	Rech, S.; Salmina, S.; Borrell Pichs, Y.J. (2018). Dispersal of alien invasive species on anthropogenic litter from European mariculture areas. Mar. Pollut. Bull. 131: 10-16	<a href="http://www.vliz.be/en/catalogue?module=ref&amp;refid=294701">http://www.vliz.be/en/catalogue?module=ref&amp;refid=294701</a> ; <a href="https://seas-at-risk.org/19-aquaculture/927-tackling-marine-litter-from-aquaculture-and-the-spread-of-invasive-alien-species.html">https://seas-at-risk.org/19-aquaculture/927-tackling-marine-litter-from-aquaculture-and-the-spread-of-invasive-alien-species.html</a>

