*Pilot project:  removal of marine litter from Europe’s four regional seas*

Contract number: 070333/2012/SER/D2/636849



**Assessment Report**

**23 December 2013**

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List of Acronyms

DFG Derelict fishing gear

ML Marine litter

MLR Marine litter removal

PA Port authority

PRF Port reception facility

**Project acronyms**

|  |  |
| --- | --- |
| **Marine litter retention** | |
| **Project acronym** | **Full project name** |
| **North East Atlantic** | |
| VV-NL | Vuilvis Project Den Helder, The Netherlands |
| NABU-DE | NABU (mere ohne plastic), Germany |
| KIMO-SW | KIMO South West |
| KIMO-SC | KIMO Scotland |
| KIMO NL | KIMO The Netherlands |
| PMD-FR | Programme Macro-dechets, Aquitaine, France |
| CBB-FR | Contrats Bleus, Brittany, France |
| NPB-ES | Nada Pola Borda, Galicia, Spain |
| PES-ES | Pescal, Galicia, Spain |
| **Baltic Sea** | |
| KIMO-BA | KIMO Baltic |
| NABU-DE | NABU Germany |
| **Mediterranean Sea** | |
| CBM-FR | Contrats Bleus, Mediterranean |
| PM-ES | Memorandum of Understanding for Fishing for Litter, Palma Mallorca, Spain |
| PES-ES | Pescal, Galicia, Spain |
| **Derelict fishing gear** | |
| **North East Atlantic** | |
| LGN-NO | Norwegian retrieval survey for lost gillnets |
| **Baltic Sea** | |
| NPS-SE | Retrieval of derelict fishing gear in Sweden, Northern Part of the Sound (Patrick Carlsson) |
| SPS-SE | Southern Part of the Sound (Bo Landen) |
| SGO-SE | Stockholm-Gotland (Lars Tyden) |
| WWF-PL | WWF Poland (Collecting ghost nets in the Baltic Sea) |

1. Introduction

This report presents a comparative analysis of the existing marine litter removal (MLR) projects and is submitted to the European Commission as an annex to the MARELITT Progress Report of December 2013. The information and conclusions are derived from a comprehensive assessment of existing MLR projects in Europe undertaken as part of the MARELITT project; these assessments are contained in a detailed project assessment sheet (PAS) for each project.

Scope and objectives

MARELITT covers the following three types of MLR projects, which mostly involve fishermen:

Marine litter:

* 1. **Marine litter retention projects**, during which marine litter (ML) that accumulated in the nets during regular fishing activity, of (mostly) trawlers, is collected. These are also known as ‘Fishing for Litter’ projects)
  2. **Marine litter collection projects**, during which fishermen make special purpose trips to collect floating ML at sea. (So far this type of project has only been promoted by WFO.)

Derelict Fishing Gear (DFG ):

* 1. **DFG retrieval projects**, during which fishermen make special purpose trips to retrieve DFG. (So far this type of project has only been implemented on a regular basis in Sweden.)

As suggested by DG Environment, the assessment of the marine litter collection projects (type b above) has been replaced by a joint workshop between Waste Free Oceans (WFO) - MARELITT on marine litter removal. As this type of project has not been assessed in detail, it has not been included in this report.

The objectives of this report are:

To provide an overview of the main features of completed and ongoing MLR projects in the EU. This is based on the detailed project assessment sheets (PAS).

To support the identification of good practices for the initiation of MLR projects in the subsequent phase of the MARELITT project. The good practices are contained in a separate report, the ‘Code of Good Practice, which is a living document to be maintained during the course of the project.

To evaluate to what extent MLR projects can contribute to the qualitative descriptor for determining ‘good environmental status’ (i.e. that ‘properties and quantities of marine litter do not cause harm to the coastal and marine environment’). To do so, this report assesses for each type of MLR project whether it has the potential to be an effective remediation tool, to raise the awareness of the main stakeholders and to be combined with monitoring.

The report does not provide assessment of individual projects but looks at MLR practices collectively based on the performance of the individual projects assessed. Those seeking further information should refer to the project assessment sheets (PAS) that are contained in Annex 2 to the Progress Report.

**Section 2** of the report presents the main findings on ML retention projects, and **Section 3** contains the assessment of effectiveness and efficiency of the ML retention projects. **Section 4** presents main findings on the DFG retrieval projects, and **Section 5** presents the assessment of effectiveness and efficiency of the DFG retrieval projects. **Section 6** looks at sustainability and legal considerations for all types of MLR projects. Finally, **Section 7** draws some overall conclusions about the assessment and potential for MLR projects in the future.

Methodological considerations

The main objective of the MARELITT assessment phase has been to identify the most important and replicable good practices from amongst existing MLR projects. In addition to this, the assessment has also sought to better understand the practice of MLR and to determine, to the extent possible, the potential for such projects to become a real remediation tool for the problem of marine litter in the four European regional seas. The projects currently operating in the EU are relatively limited in scope based on the number of participating EU fishing vessels and ports – but if the scope were to be expanded to include a much larger share, what could be the potential effect on marine litter?

To answer the key questions, we have devised a method to assess the projects, based on accepted/standard evaluation methodologies (including EU ones), with criteria, evaluation questions and indicators. We have tailored the method to the specifics of the MLR projects, and to the data and information available to the MARELITT team. For each of the two types of MLR projects, we have considered the following:

**Effectiveness:** Thismeasures the degree to which project outputs and results can provide benefits and can contribute to the project’s objectives. We have evaluated overall effectiveness based on each of the three main objectives cited by most projects:

* **Marine litter removal**: this considers the impact on reduction of marine litter present in the seas and entering the seas as well as environmental impact overall
* **Raising awareness:** for the ML retention projects, this tends to refer to awareness about the negative environmental impact of marine litter. The existing DFG retrieval projects have not named raising awareness as an objective, but opportunities for doing so are discussed.
* **Monitoring of marine litter**: monitoring aims at gathering information about the state of marine litter, based on the characteristics of the collected waste.

**Efficiency:** this considers project costs, and the extent to which projects have been carried out in a cost-effective manner based on results produced.

**Other considerations:** this includes key issues that impact the operation of all MLR projects:

**Sustainability:** project financing, in consideration of the fact that MLR projects do not generate revenues and therefore require a steady stream of funding in order to have a long-term impact.

**Legal considerations:** this considers whether fishermen have a legal obligation to retain ML collected in the course of fishing activities and whether and how ports receive the collected ML

None of these issues has been straightforward or very simple to assess, as the report will explain in greater detail. This is related to a number of general considerations, which are worth presenting up front:

**Contextual data and information frequently do not exist.** A concrete understanding of the effectiveness of MLR projects in removing litter from the sea would require reliable data on 1) the amount of litter currently existing in each regional sea; and 2) the amount of litter entering the seas (and ideally also its source). Some attempts have been made to get an indicative understanding of these amounts in order to understand the environmental impact of the MLR projects and their potential as a remediation tool, but the real picture is unclear.

**Detailed, robust information, particularly quantitative, about the MLR projects was not available.** Most of the projects assessed lacked standard project monitoring systems that would enable the systematic collection of the kind of data required to undertake a robust effectiveness assessment. For example, project cost breakdowns were frequently not available because the projects were not set up to track this information. Part of the reason for this is that many of the existing initiatives are informal efforts, driven by the goodwill of motivated, concerned individuals. As such they are not characterised by typical project management structures and mechanisms.

**Qualitative information about the projects was often subjective.** Much of the information gathering about the projects depended on interviews with lead organisation. Sometimes there were gaps or nuances between what was said and the contents of official project reports or other studies. In some cases lead organisations were reluctant to provide information.

1. Marine litter retention projects: main findings

This section of the report summarises the main characteristics of marine litter (ML) retention projects and provides the basis for the assessment conclusions in Section 3.

Project locations

For this study, 18 ML retention projects were identified in the four European seas. From these projects, 12 have been subject to a detailed evaluation and are discussed in this report. This selection provides a representative sample of the ML retention projects (for some projects no information was available or they were too small, such as KIMO Isle of Man and KIMO Faroe where only one vessel was involved).

The first marine litter retention projects were initiated in the North East Atlantic in 2002, under the EU funded *Save the North Sea* project (2002-2004). A total of 53 vessels participated in Scotland, Shetland Islands, Sweden, Denmark and the Netherlands. The lead organisation, KIMO, is no longer implementing MLR activities in Denmark.

The majority of the projects (nine) are located in the North East Atlantic. Except for the project in Palma Mallorca (Spain) (PM-ES), the projects in the Mediterranean and the Baltic are more recent. There currently are two ML retention projects active in the Baltic Sea, and three in the Mediterranean. There are no projects in the Black Sea.

Table 1 below provides an overview of the projects that have been assessed, as well as the acronyms user to refer to them throughout this report.

Table 1: Project acronyms

| **Project Acronym** | **Full Project Name** |
| --- | --- |
| **North East Atlantic** |  |
| 1. VV-NL | *Vuilvis* Project Den Helder, The Netherlands |
| 1. NABU-DE | NABU (*Mere ohne Plastic*), Germany |
| 1. KIMO-SW | KIMO South West |
| 1. KIMO-SC | KIMO Scotland |
| 1. KIMO NL | KIMO The Netherlands |
| 1. PMD-FR | Programme Macro-dechets, Aquitaine, France |
| 1. CBB-FR | *Contrats Bleus*, Brittany, France |
| 1. NPB-ES | *Nada Pola Borda*, Galicia, Spain |
| 1. PES-ES | *Pescal*, Galicia, Spain |
| **Baltic Sea** |  |
| 1. KIMO-BA | KIMO Baltic |
| 1. NABU-DE | NABU Germany |
| **Mediterranean Sea** |  |
| 1. CBM-FR | *Contrats Bleus*, Mediterranean |
| 1. PM-ES | Memorandum of Understanding for Fishing for Litter, Palma Mallorca, Spain |
| 1. PES-ES | Pescal, Galicia, Spain |

Project objectives and duration

Fishermen that participate in the ML retention projects commit on voluntary basis to retain the marine litter that accumulates in their nets as part of their normal fishing activity, to store it on board in large hardwearing bags provided by the project, or, in the case of the CBB-FR by the port authority, and in the case of PM-ES by the fishermen themselves, and to deliver it on shore in the participating ports

***Project objectives***

The three main objectives stated by the ML retention projects are marine litter removal, awareness raising and monitoring. An objective is considered ‘stated’ when it is explicitly mentioned in project documents. All projects clearly state marine litter removal as their primary objective; only three projects indicate that raising awareness of fishermen, public authorities and the general public (NABU-DE, KIMO NL) and changing the behaviour of the fishery industry towards more sustainable waste management practices (NPB-ES) are the main objectives.

Awareness raising and monitoring were identified as specific activities in more than half of the projects, even though they were not specifically stated as formal project objectives. Awareness raising aims to establish behavioral change resulting in less waste ending up in the sea. Monitoring includes an analysis of a sample of marine litter collected to identify qualitative and quantitative trends in marine litter and reporting on the results of the analysis.

Table 2: Project objectives

| **Objectives** |  | **Number of projects** | **Project Names** |
| --- | --- | --- | --- |
| **ML retention** |  | 12 | All |
| **Raising awareness/change of culture** | Total | 8 | KIMO-SC  KIMO-BA  KIMO-NL  NABU  KIMO-SW  PMD-FR  NPB-ES  PES-ES |
|  | Fishermen | 8 | Idem |
|  | Policy makers | 3 | NABU  KIMO-BA  KIMO-NL |
|  | General public | 6 | KIMO-SC  KIMO-BA  KIMO NL  NABU  KIMO-SW  PMD-FR |
|  | Industry | 2 | KIMO-SC  KIMO-BA |
| **Monitoring** |  | 7 | KIMO-SC  KIMO-BA  KIMO-NL  NABU  KIMO-SW  NPB-ES  PES-ES |
| **Objectives** |  | **Number of projects** | **Project Names** |
| **ML retention** |  | 12 | All |

***Project duration***

In most cases, the project duration is linked to the source of funding – usually to the programming period of regional, national, or European funds or programmes. Projects are extended if financing is renewed. In the KIMO projects in the UK, removal operations have been planned for three years and then extended twice. Three projects, VV-NL, PMD-FR and NPB-ES started through one-year pilot projects and were extended, either under the same name or in a new project (PES-ES). One project (CBM-FR) stopped earlier than foreseen due to financial issues.

Table 3: Project duration

| **Project name** | **Starting date** | **End date** | **Project duration** | **Reason for ending the project** |
| --- | --- | --- | --- | --- |
| **NE Atlantic** | | | | |
| KIMO-SW | 2008 | March 2014 | 6 years | Renewed several times. End dates linked to funding periods. |
| VV-NL | 2000 | On-going | 13 years so far | Project and financing always renewed. |
| KIMO-SC | 2005 | 2014 | 9 years | Renewed several times. End dates linked to funding periods. |
| KIMO-NL | 2000 | On-going | 11 years so far | Project renewed every year. |
| CBB-FR | 2008 | 2013 | 6 years | Contrats Bleus are renewed every year. End date corresponds to EFF programming period. |
| PMD-FR | 2004 | 2012 | 8 years | End of regional funding. |
| NABU-DE | 2010 | 2014 | 4 years | Project extended. End dates linked to funding period. |
| NPB-ES | Nov 2009 | Dec 2010 | 1 year | Pilot project planned for one year. |
| PES-ES | 2012 | 2014 | 2 years | End of EFF programming period. |
| **Baltic Sea** | | | | |
| 2011 | On-going | 2 years so far | On-going. End date foreseen linked to funding period. |  |
| 2010 | 2014 | 4 years | Project extended. End dates linked to funding period. |  |
| **Mediterranean Sea** | | | | |
| 2003 | Not set | 10 years so far | No end date set. |  |
| 2010 | 2013 | 3 years | *Contrats Bleus* are renewed every year. The project is likely to end Tend to stop before end date of EFF programming period for financial reasons (management issues on financing). |  |
| 2012 | 2014 | 2 years | End of EFF programming period. |  |

Lead organisations

A lead organisation is defined as the organisation that is responsible for the management of the project. The lead organisations that have established the ML retention projects vary in type. Most are public authorities or their representatives; some were led by fishermen’s associations and one by an environmental NGO.

In two cases, the project was set up by a fisheries cooperative or organisation[[1]](#footnote-1). One project was established by a development fund (*Fonds de Developpement Durable de la peche*)[[2]](#footnote-2) whose main objective is to provide finance to fishermen (mainly covering loans for gear, equipment, reparations etc). Research foundations also function as lead organisations. In Spain, CETMAR (Centro Technologico del Mar),[[3]](#footnote-3) initiated two projects, whereas in France, Aquitaine region, the *Institut des Milieux Aquatiques* manages a regional programme on marine litter.

Four projects were set up by national networks of KIMO (Local Authorities International Environment Organisation) – an association of local authorities in coastal areas. KIMO has over 120 members in 14 countries, representing over 6 million inhabitants in the United Kingdom, Norway, Sweden, Denmark, the Netherlands, Belgium, and the Republic of Ireland with associate members in Germany, the Faeroe Islands and the Isle of Man. National Networks exist in each country. In 2007, KIMO increased its remit to include all the countries around the Baltic Sea. The expansion saw seventeen municipalities from Sweden, Poland, Latvia, Lithuania and Estonia commit to establish a KIMO International Baltic Forum. The project that is managed by NABU (Nature and Biodiversity Conservation Union), an environmental association, is based on the KIMO model.

None of the projects have been established by individual local or regional governments. In the Netherlands, the national government (*Rijkswaterstaat*) initiated a marine litter removal project in cooperation with MAIN (Maritime Waste Collection Netherlands), a private waste management company.

Table 4: Lead organisations

| **Type of lead organisation** | **Nr. of projects** | **Project names** | **Cooperation** | **Main motivation** |
| --- | --- | --- | --- | --- |
| KIMO | 4 | KIMO-SC |  | The objective of KIMO is to eliminate pollution from the Northern seas. |
| KIMO-SW | The project is co-ordinated by a Project Officer based at Seafood Cornwall Training (Newlyn) and overseen by KIMO UK. |
| KIMO-BA | KIMO-BA runs this project in cooperation with the Keep Sweden Tidy organisation. |
| KIMO-NL | KIMO Netherlands runs the project. |
| An individual local government | - |  |  |  |
| Regional government | - |  |  |  |
| National  government | 1 | VV-NL | This project is performed in collaboration with MAIN (Maritime Waste Collection Netherlands). | The North Sea Directorate is part of *Rijkswaterstaat* (RWS). The North Sea Directorate is responsible for the integral management of the water, seabed, and shipping lanes in the Dutch part of the North Sea.  The main motivation is the overall willingness to tackle the problem of fished litter stated during the Marine Forum (05.10.1999) and the subsequent NCDO conference ‘Nationale Zeebalans’ (*National Sea Balance*). |
| Regional fishing association | 2 | CBB-FR |  |  |
| PM-ES | The Memorandum of Understanding with the municipality of Palma was initiated by a local fishermen’s organisation. | The motivation for the PM-ES project was that fishermen were bothered by the amount of litter caught in their nets and its economic impact (on fish stocks and fishing gear). |
| Environmental NGO | 1 | NABU-GE | NABU collaborates with *Der Grune Punkt* – DSD, which is a Producer Responsibility Organisation (for packaging waste) | The motivation for NABU is the protection of the marine environment in the Baltic and North Sea by collecting marine litter from the sea bottom by fishermen. |
| Development fund | 1 | CBM-FR | The Sustainable Fisheries Development Fund (F2DP) contacted producers organisations to manage the projects. | The main motivation of the development fund is to finance maritime projects (entrepreneurship of fishermen).  The F2DP (Sustainable Fisheries Development Fund) is a professional association established at the initiative of the members of the Maritime Cooperation (which is an professional association organising different organisation such as maritime credit, maritime cooperative, producer organisations and fisheries unions). |
| Research Foundation | 3 | NPB-ES  PES-ES | For the PES-ES project, CETMAR, the leading organisation, coordinates the project with the national fisheries organisation (ONAPE). | The main objective of CETMAR (Galicia) is to promote cooperation among institutions, research centers and maritime and fishery sector and to promote the efficiency of all activities related to the use and exploitation of the marine environment. |
| PMD-FR | The Institute of Aquatic Environments is the lead organisation. It was selected by the Regional Council of Aquitaine (funding organisation). An earlier initiative on marine litter removal was undertaken by the regional fisheries organisation. | - |

Stakeholders

The main stakeholders[[4]](#footnote-4) involved in the existing ML retention projects are fishermen, port authorities, waste management companies and others such as governments, industry and the general public. There has been rather limited involvement of potentially relevant private industries such as the shipping industry, manufacturers or packaging, plastic, disposable products or other sources of ML.

Fishermen

In all projects, fishermen are key stakeholders, as they collect marine litter during their normal fishing operations. Motivations for fishermen to participate in marine litter collection projects, mentioned by the different project managers, are the protection of the environment, building a greener image for fishermen and the (economic) damage to nets.

The Contrats Bleus Project (Brittany and Mediterranean, France) provide financial compensation to the fishermen for bringing marine litter onshore. Payment of the fishermen was initiated in times of fuel crisis as a way to support fishermen on the one hand, while protecting the environment on the other hand. The financial compensation offered to the fishermen amounted to EUR 300 per tonne (Mediterranean) and EUR 375 per tonne (Brittany). In all other projects, no financial compensation is paid to the fishermen.

The key factors that motivate fishermen to participate are listed in table 5 below:

Table 5: Motivation for fishermen to participate in ML retention projects

|  |  |  |  |
| --- | --- | --- | --- |
| **Motivation for fishermen to participate** | **Number of projects** | **Project names** | **Comments** |
| Free receptacles to store waste on board | 10 | All projects (except PM-ES and CBB-FR) | No bags are provided to the fishermen in the CBB-FR project. The contract between the fishermen and *Contrats Bleus* project focuses on the financial compensation for the fishermen. The rest of the process – such as storage and disposal of marine litter- is regulated by the project manager. In the PM-ES project, fishermen use their ice boxes to store litter. |
| Free discharge of marine litter in the ports | 12 | All projects | In PM-ES waste needs to be separated before disposal. Although disposal is free, the number of categories of waste is limited.  In the CBB-FR project, all fishermen pay fees to land the marine litter, which support the waste collection and treatment. Fishermen however are paid to collect marine litter in this project. |
| Financial compensation directly tied to ML collection | 2 | CBB-FR  CBM-FR | The financial compensation offered to the fishermen amounts to EURO 300 per tonne (Mediterranean) and EURO 375 per tonne (Brittany). |

In addition to the three main ones listed in the table, a number of other factors also motivate fishermen to participate in the project:

**Responsible fishing**:

* + Fishermen regard themselves as custodians of the sea
  + Participation in ML retention projects is either recommended (the Netherlands) or made obligatory (France) by the organisations that grant Responsible Fishing certificates

**Economic cost of ML** to fishing vessels (contamination of catches, broken gear; fouled propellers).

**Visible improvements:** fishermen often fish on the same fishing grounds, which gradually become cleaner if they keep retaining ML.

**Public recognition** of the fishermen’s efforts (e.g. certificates, press releases, etc.)

**Legal:** a strict interpretation of Annex V to MARPOL leads tolegal obligation to retain on board and to land the ML accumulated in the nets (see Section 6.2 below)

Port authorities and waste management companies

Port authorities and waste management companies are indicated as important stakeholders. In all projects, these stakeholders (other than the lead organisations) are involved in and contribute to the process of the removal of the marine litter once it is landed. In practice, the division of responsibilities across these stakeholders is fragmented.

In all of the projects except one (PM-ES), the port authority is directly participating in the project (e.g. the litter collected by participating fishermen is managed by the regular operators hired by the port authority and port installations are used). In the case of the PMD-FR project, there was initially no participation of the port authority, however in the course of the project, the port authorities started to take physical and financial responsibility for the waste management of the landed marine litter.

Table 7: Role of port authorities

| **Role of port authorities** | **Number of projects** | **Names of projects** | **Comments** |
| --- | --- | --- | --- |
| Provide space at the port to place big bags or containers | 12 | All projects | In the CBB-FR project, there is no specific container for the marine litter. The big bags with marine litter are disposed in the same containers as the ship-generated waste. Other projects provide separate containers. |
| Providing big bags | 5 | KIMO-SW  KIMO-NL  NPB-ES  PES-ES  KIMO-NL | In the case of NPB-ES and PES-ES, the bags are provided by the port, however paid by CETMAR. In the case of KIMO-NL, some of the participating ports hand out the big bags to the fishermen, but not all. In any case, the big bags are paid by KIMO. |
| Removal of full bags from the quayside and depositing of ML in dedicated recipients, awaiting for collection | 6 | CBB-FR  KIMO  NABU  PES-ES  NPB-ES  KIMO-NL | In the NABU project, the harbour master contacts the waste management organisation when the containers are full.  In the case of NPB-ES, the port authorities supervise the disposal and transport.  In the KIMO-NL projects, in wich 12 port participate, the arrangements are different for each port, but several provides move the big bags from the quays. Some ports do this free of charge, others charge KIMO for this service. |
| Daily communication with fishermen and vessel owners | 1 | NPB-ES |  |
| Set up an area wide system of ports where marine litter can be disposed. | 2 | NABU-DE  KIMO-NL |  |
| Financial support for waste disposal | 3 | CBB-FR  PES-ES  KIMO-NL | In the CBB-FR project, EUR 250,000[[5]](#footnote-5) (excl. labour cost, app. 4-5 FTE) for waste management (collection and treatment of all waste in the ports, including marine litter landed by the fishermen) is covered by the port authority.  Also in the PES-ES project, the port authorities cover waste management costs (no amount provided).  In the KIMO-NL project, the waste management companies are charging KIMO a preferential rate, which can be considered as a form of provision of financial support. |
| Assistance to fishermen with containers/big bags. | 1 | CBB-FR  KIMO-SW  NABU-DE | In the CBB-FR project, the port authority is responsible for the replacement of containers (EURO 25.000 per year).  In the KIMO-SW project, the harbour master and staff maintain the skip (ML container), delivery of big bags and small logistic services.  In the NABU-GE project, the harbour captain contacts the waste management organisation if containers are full. |

Table 8: Role of waste management organisations

| **Role of waste management organisations** | **Number of projects** | **Names of projects** | **Comments** |
| --- | --- | --- | --- |
| Transport and waste handling | 12 | All projects | In the NABU-DE project, for cost-effectiveness reasons, waste is transported to the recycling centre for further sorting when 7-10 m³ ML is collected. |
| Financial responsibility for waste handling | 3 | PM-ES  NABU-DE  KIMO-NL | In the PM-ES project, the waste management organisation (EMAYA) is owned by the municipality of Palma and as such is funded by the city. EMAYA covers the cost of waste transport and treatment as part of its corporate responsibility activities.  In the NABU-DE project, the Producer Responsibility Organisation (DSD) provided the services for free in the Baltic Area. In the North Sea, a financial contribution was paid for waste management.  To support the project, two waste management companies offer KIMO-NL a preferential price for the transport and treatment of ML. A third company recycles and incinerates free of charge some of the collected ML. |
| Project coordination | 1 | VV-NL | The North Sea Directorate of Rijkswaterstaat (RWS) in the Netherlands is the leading organisation, which initiated this pilot project in collaboration with MAIN (Maritime Waste Collection Netherlands), who is coordinating the project on behalf of the North Sea Directorate of RWS. |
| Provision to port authorities of big bags | 1 | KIMO NL | SITA (waste management organisation) is providing the big bags to the northern ports. |
| Waste analysis and monitoring | 5 | NABU-DE  KIMO-SW  KIMO-BA  KIMO-SC  KIMO-NL | As part of the NABU-DE project, the waste management organisation analyses the marine litter (Baltic seas) to determine the recycling/recovery potential of the marine litter collected.  In the KIMO-SW project, the waste management company weighs and records the landed litter. This relates to the project objective to produce reports with a detailed waste analysis.  In the KIMO-BA project, it is also the harbour staff that weighs and monitors the garbage before it is taken to the PRF. This is done to acquire further insights into sources and causes of the waste as reliable information on waste in this area is scarce.  In the KIMO-SC project, six harbours were selected for monitoring using port staff and waste contractor staff on a voluntary basis.  In the KIMO-NL project, the waste management companies contracted by KIMO yearly analyse a portion (7 to 10% of the total amount of ML) of the big bags. They use the OSPAR forms for reporting on the results and submit a report to KIMO. |
| Support in segregation and recycling | 4 | NABU-DE  KIMO-SW  KIMO-BA  KIMO-NL | In the NABU-DE project the Producer Responsibility Organisation (DSD) ensures the sorting of the marine litter and invests in waste recycling.  In the KIMO-SW project, harbour staff segregated recyclable material such as scrap metal, as the price for this material rose significantly during the project-period.  KIMO-NL has developed an excellent relationship with its waste management providers, who charge preferential rates for their services and who are making an extra effort to segregate and recycle the waste. |

In some projects, the port authorities or waste management organisations have covered the cost of waste management. In other projects (NPB-ES, CBM-FR, PMD-FR, VV-NL, KIMO-SC), these costs were paid from the project budget.

Other stakeholders

Some of the ML retention projects target regional governments and producer responsibility organisations. Most ML retention projects target the general public, including also tourists.

Overall, the general public has been targeted through (general) press and media work, information leaflets while using an informative approach. KIMO-BA works together with other organisations (Keep Sweden Tidy and the Swedish Agency for Marine and Water Management) to organise seminars, press briefings, and produces (interactive) exhibitions.

The VV-NL project is the only project that only targeted fishermen to participate in the project. In addition, no specific raising awareness actions have been organised for the fishermen, nor for any other group of stakeholders (general public, land-based activities, shipping, etc.).

Table : Organisations and groups

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of organisation** | **Number of projects** | | **Project names** | **Main**  **role** | |
| Producer Responsibility Organisation | 1 | | NABU-DE | Monitoring: analysis of a sample of the collected ML and reporting on composition | |
| Public authorities and government; decision makers | 3 | | NABU-DE  KIMO-BA  KIMO-NL |  | |
| Industry | 2 | | KIMO-BA  KIMO-SC |  | |
| Shipping sector |  | |  |  | |
| (Certain) land-based activities |  | |  |  | |
| **Type of group** | | **Number of projects** | **Project names** | | **Main motivation** |
| Tourists; residents; broader public | | 5 | KIMO-SW  NABU-GE  KIMO-BA  KIMO-SC  KIMO-NL | | NABU organises coastal clean-up activities, educational activities (more directed towards the general public) or multiple events with industries, politics and other stakeholders to motivate the broader public. |
| Schoolchildren | | 2 | KIMO-SW  KIMO-NL | | Seafood Cornwall Training developed a new project to work with 300+ school children through 2013 with the assistance of EFF Flag funding. The Fishing For Litter project will visit Newlyn harbour as part of the Fishing Industry education project. |

Participating ports and vessels

The level of waste collected varies significantly from country to country and according to what fishing methods are used. For example, mid-water trawling results in much less ML collected than bottom trawling, given that ML is not present in the mid-water.

The type of fishing vessels used by the ML retention projects are listed in table 9 below:

Table 9: Participating ports and vessels

| **Project name** | **Number of ports** | **Type of vessels\* (fishing method)** | **Vessel power (hp)** | **Number of vessels** | **Average length of trips (days)** |
| --- | --- | --- | --- | --- | --- |
| **NE Atlantic** | | | | | |
| VV-NL | 1 | Eurotrawlers | N/a | 10 (2000-2006)  14 (2006-2008)  8 (2009-2012) | Up to 5-6 days |
| NABU-DE | 8 (2013) | Coastal vessels: gillnetters and small trawlers  Eurotrawlers | N/a | 80 | 1 day trips  Up to 5-7 days |
| KIMO-SW | 6 (2008-2011)  7(2012) | Trawlers  Recreational fishing vessels | N/a | 100 (2008-2011)  112 (2011-2014) | N/a |
| KIMO-SC | 15(2005-2008)  17(2008-2011)  14(2013) | Trawlers  Some smaller pelagic vessels | N/a | 207 (2013) | N/a |
| KIMO NL | 12 | Bottom trawlers (beam trawling) | less than 24m: <300kw  between 30 and 46m: <2000kw | 83 (2011) | 5 days |
| PMD-FR | 4 (2003-2012) | Gillnetters, seiners, small trawlers | N/a | Between 100 and 150 a year | Mostly one day trips  Trawlers: up to 3-4 days |
| CBB-FR | 7(2008 – ongoing) | Bottom trawlers | N/a | 220 | Coastal trawlers: 2/3 days trips  Offshore fishery: between 7 and 10 days |
| NPB-ES | 8(2009)  11(2010) | 28 coastal trawlers  103 vessels practising small scale fishery | N/a | 131 | N/a |
| PES-ES | 11 | 28 coastal trawlers  103 vessels practising small scale fishery | N/a | 131 | N/a |
| **Baltic Sea** | | | | | |
| KIMO-BA | 3 (2011)  19 (2013) | Small vessels such as gillnetters  Trawlers (pelagic and demersal trawlers) | N/a | 68 | Varying depending on the type of fisheries |
| NABU-DE | 8 (2013) | Coastal vessels: gillnetters and small trawlers  Eurotrawlers | N/a | 80 | 1 day trips  Up to 5-7 days |
| **Mediterranean Sea** | | | | | |
| CBM-FR | 1 (identified) | Trawlers (bottom trawls) | 316KW | 12 (2010)  20 (2011) | Essentially daily trips |
| PM-ES | 1 | 7 Trawlers  7 purse seiners  26 gillnetters and other small vessels practising small scale fishery | From 8 to 275KW | 40 | N/a |
| PES-ES | 11  (+ upcoming participating ports in the MED) | 28 coastal trawlers  103 vessels practising small scale fishery + trawlers in the Mediterranean | N/a | 131 | N/a |

Project Costs

The key cost items for ML retention projects are project management, infrastructure (a relatively minor cost) and waste management. The following table shows which costs items were reported by the assessed projects. Only the projects that have reported cost items are listed below.

Table : Participating ports and vessels

| **project ID** | **project name** | **Project Management** | **Infrastructure (big bags)** | **Infrastructure (containers)** | **Waste handling** | **Waste treatment** | **Fishermen remuneration\*** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **North Sea** |  |  |  |  |  |  |  |
| 1 | VV-NL | Yes | yes | yes | yes | yes | no |
| 4 | KIMO-SC | Yes | yes | ? | ? | ? | no |
| 5 | KIMO-SW | no data | | | | | |
| 7 | CBB-FR | Yes | no | no | no | yes | yes |
| 8 | PMD-FR | Yes | yes | yes | yes | yes | no |
| 9 | NPB-ES | Yes | yes | yes | yes | yes | no |
| 10 | PES-ES | Yes | yes | no | no | no | no |
| **Baltic Sea** | | | | | | | |
| 3 | KIMO-BA | Yes | yes | no | no | no | no |
| 6 | NABU-DE | Yes | yes | yes | yes | no | no |
| **Mediterranean Sea** | | | | | | | |
| 11 | CBM-FR | Yes | no | yes | yes | yes | yes |
| 12 | PM-ES | no data | | | | | |

\*This is shown for the 3 WFO projects which are marine litter collection (type a) projects (see Introduction to the report).

Cost amounts vary considerably across the projects and have not been provided in enough detail to enable comparison of values across categories. However, attempts have been made the assess the relative cost efficiency of the projects in Section 3.3.1 below.

Project financing

For the majority of projects, the financing is 100% public, with in some projects in-kind contributions from NGOs, port authorities (which are often also public) and waste management companies (which are often also public). In the French and Spanish projects, the European Fisheries Fund (EFF) co-financed the projects[[6]](#footnote-6).

Table 11: Project financing

| **Type of organisation** | **Number of projects** | **Project names** |
| --- | --- | --- |
| National government | 3 | VV-NL |
| Regional government | PMD-FR |
| Local government | PM-ES |
| Port authority (PA) |  |  |
| Private waste management company |  |  |
| Private sector (other than ports, waste management companies) |  |  |
| Environmental NGO |  |  |
| Combination of organisations: | 9 | KIMO-SW & KIMO-SC: NGO’s, government and private sector |
|  |  | KIMO-BA : national government, local government and PA |
|  |  | KIMO-NL: local government and in-kind contributions from PA and private waste management companies |
|  |  | CBB-FR; CBM-FR and NPB-ES: EU and national government. |
| . |  | PES-ES: EU, national government and PA |
|  |  | NABU-GE: regional government, private waste management organization and NGO |

Table 12 below specifies whether the financing of different project components is public (pub) or private (priv). Where possible, an indication of the ratio is provided if financing is not 100%.

Table 12: Public and private shares of project financing

| **Project name** | **Coordination** | **ML reception** | **ML treatment** | **Monitoring** |
| --- | --- | --- | --- | --- |
| **NE Atlantic** | | | | |
| PMD-FR | Pub 100% | Pub 100% | Pub 100% | No monitoring |
| CBB-FR | Pub 100% | Pub 100% | Pub 100%[[7]](#footnote-7) | No monitoring |
| NPB-ES | Pub 100% | Pub 100% | Pub 100% | Pub 100% |
| VV-NL | Pub 100% | Pub 100% | Pub 100% | Pub 100% |
| PES-ES | Pub 100% | Pub 100% | Pub 100%[[8]](#footnote-8) | Pub 100% |
| Kimo-SW | Pub 25%  Priv 75 %[[9]](#footnote-9) | Pub 25%  Priv 75 % | Pub 25%  Priv 75 % | Pub 25%  Priv 75 % |
| Kimo SC | Pub 33%  Priv 66 %[[10]](#footnote-10) | Pub 25%  Priv 75 % | Pub 25%  Priv 75 % | Pub 25%  Priv 75 % |
| KIMO-NL | Pub 100% | Pub 100% | Pub 100% | Pub 100% |
| **Baltic Sea** | | | | |
| KIMO-BA | Pub 100% | Pub 100% | Pub 100%[[11]](#footnote-11) | Pub 100% |
| NABU-GE | Pub 100% | Pub 100% | Priv 100%[[12]](#footnote-12) | Priv 100%[[13]](#footnote-13) |
| **Mediterranean Sea** | | | | |
| PM-ES | Pub 100% | Pub 100% | Priv 100%[[14]](#footnote-14) | No monitoring |
| CBM-FR | Pub 100% | Pub 100% | Pub 100% | No monitoring |

Except for the KIMO UK projects (KIMO-SC and KIMO-SW), coordination, ML reception and monitoring are supported with public funds. In some cases (NABU-DE, PM-ES), waste companies are financially involved, by offering waste treatment to the project free of charge.

Intervention areas

In all projects, the marine litter is collected during regular fishing activities. The invention areas are the fishing areas where the participating fishermen carry out their fishing activities. The concentration of large volumes of marine litter (‘hot spots’) can therefore not be used as a criterion for the selection of intervention areas. In the case of VV-NL, the availability of a well-functioning port reception facility was mentioned as the main criterion to select a specific fishing harbour.

Although some project managers provided broad indications on fishing areas (ICES areas), fishermen do generally not disclose information on fishing grounds as it is considered confidential commercial information. This means that the geograhical origin of the collected ML cannot be established.

The majority of the projects are located in the North East Atlantic. A few projects in the Baltic and the Mediterranean have been identified. None of the projects are located in the Black Sea. Two projects cover two regional seas; NABU-DE involves fishermen from the North Sea and the Baltic, PES-ES started in the Atlantic and is currently extending to the Mediterranean.

Table 13: Intervention area

|  |  |  |
| --- | --- | --- |
| **Regional Sea** | **Number of projects** | **Names** |
| NE Atlantic | 9 | KIMO-SW; KIMO-SC; KIMO-NL; CBB-FR; VV-NL; NABU-DE; PMD-FR; NBP-ES; PES-ES |
| Baltic Sea | 2 | KIMO-BA;NABU-DE |
| Mediterranean Sea | 3 | PM-ES; CBM-FR; PES-ES |

Marine litter waste management

Limited information is available on the treatment of marine litter that has been landed. . Generally, in the southern EU Member States and the UK, waste is brought to landfill. In the northern Member States (NABU-DE, KIMO-BA and VV-NL), waste is mainly incinerated with energy recovery (as a result of the strict application of the EU waste hierarchy). In some projects, nets and some separated waste are recycled, mainly metals for its market value.

Table 14: Marine litter waste management

| **Project name** | **Landfilling (%)** | **Incineration with energy recovery (%)** | **Recycling (%)** |
| --- | --- | --- | --- |
| **NE Atlantic** |  |  |  |
| PMD-FR | All except nets | 0% | nets |
| CBB-FR | All except nets | 0% | nets |
| NPB-ES | 100% | 0% |  |
| VV-NL | 0% | 100% | Attempts, but not feasible |
| PES-ES | 100% | 0% |  |
| Kimo-SW | 100% | 0% | Metals (no data avail.) |
| Kimo SC | 97.5% | 2.5% | 0% |
| **KIMO-NL** | N/a | 95% | |
| **Baltic Sea** |  |  |  |
| KIMO-BA | 0% | 100% | - |
| NABU-GE | 0% | 100% | Metals (no weight data avail.)  3 of 9 plastic fractions (no weight data avail.) |
| **Mediterranean Sea** |  |  |  |
| PM-ES | - | - | separate waste recycled |
| CBM-FR | 100% | 0% | 0% |
|  |  |  |  |

Project components and activities

There has been very little cooperation between the different ML retention projects and the approaches adopted by the projects can vary significantly. Some elements are common to all projects however, including:

Fishermen are given receptacles, mostly hard-wearing bags, to store the ML on board.

Discharge of the receptacles in the ports, mostly on the quays.

Moving receptacles to dedicated storage areas or skips, often by the port authorities.

Transport to treatment facilities: mostly final disposal, some recycling.

The table below provides the main components and activities of a typical MLR project. Good practices that can be drawn from the evaluations of the MLR projects are discussed separately in a Code of Good Practice.

Table 15: Project components and activities

| **Components & Activities** | **Description** |
| --- | --- |
| **Project coordination** | |
| Set-up | A distinction can be made between projects on a local scale and on a regional/ national scale. Except for PM-ES (municipal level), all projects have a regional approach[[15]](#footnote-15)/[[16]](#footnote-16). Schemes undertaken on a regional or national basis are more successful, have more effect and receive more publicity than projects on a local basis. This is partly because of the economies of scale and ease of management. |
| Day-to-day management | The projects are mostly managed by a public organisation and in some cases a fisheries organisation or an NGO (NABU-DE and KIMO, though given that KIMO is an association of local authorities, KIMO can be considered as a public authority) for which protection of the marine environment is stated as a main motivation.  The success of all evaluated projects depends on the day-to-day management of the project and on intensive contact with the involved stakeholders, ensuring their involvement and agreeing on roles and responsibilities.  Many project managers are doing this job as part of their regular activities. This made it difficult to estimate the effort needed by lead organisations to manage a project. Estimates vary between 0,5 to 1 FTE per project. |
| Development of a management plan and work programme | Lead organisations did not give clear information / specifications on (detailed) management plans. In general, it can be assumed that a work plan exists in most cases linking the budget to the different objectives. However, for the majority of the projects, the objectives have not been quantitied. , nor has a detailed budget break down been provided. Especially for the projects that are co-funded by the European Fisheries Fund a ‘work-programme’ has been requested by the administration managing the EFF (CBB-FR, CBM-FR, PES-ES).  Several projects mention that a key to success is to have a simple concept, rather than a complicated project structure or agreement with stakeholders (e.g. NABU, KIMO-NL, VV-NL). In addition clear definitions of roles and responsibilities are needed. PM-ES explicitly mentioned that a more clear definition of responsibilities would be needed for effective management of the project.  In KIMO-NL, as in many other projects, the participation of the port authorities and fishery organisations is not formalised. In most projects however, the relation with the waste management company is contract-based.  Only the Contrats Bleus projects work on a contractual basis, clearly defining the roles and responsibilities of the participating fishermen in order for them to receive financial compensation. |
| Develop a public relations/raising awareness strategy | The level of awareness raising differs between the projects. Awareness is stated as a main objective only for KIMO and NABU projects. KIMO-NL marks raising the awareness of policy makers as its primary objective.  Some of the KIMO projects have set out a simple awareness strategy, that contain some elements of a proper strategy, defining the target groups, activities and actions (e.g. attending major industry events). They also set an exact target for participating vessel recruitment (e.g. KIMO-SW 130 vessels in 2011-2014: 112 vessels in 2012). NABU-DE has a project strategy stating the importance of awareness (objective), but does not have a separate raising awareness strategy. Fishermen are involved by organising meetings in each new harbour (NABU) where decisions are taken about the logistics, the planning of the project and project communication.  PMD-FR mentioned that the identity of the project manager (former fishermen who became a spokesperson on the issue of ML) helped to increased trust and participation in the project by fishermen and improved awareness raising. It was mentioned by NABU that the enthusiasm of participating fishermen contributed towards a more easy-going approach and enhanced the willingness of new fishermen to join the project.  No awareness actions have been set up for some projects (VV-NL, CBM-FR, CBB-FR). Others have carried out general awareness actions (production of information leaflets, exhibitions, media coverage). Awareness mainly focuses on fishermen (active participation), and the general public (mainly informative). Only in a few cases other relevant stakeholders were directly targeted. This was the case for KIMO-SW and KIMO-SC, projects that have been co-funded by industries (TOTAL) and thus (hopefully) indirectly contributed to their awareness. The plastic industries have only to a very limited extent been targeted by awareness raising activities. |
| Develop public relations materials | The following material have been developed by the majority of the projects:   * an A4 information leaflet on the project aimed at fishermen. * display material for exhibitions. * MLR project content on the website of the lead organization.   In KIMO-BA and KIMO\_NL also stickers and flags were provided to fishermen to allow them to make their participation visible (increases motivation). In KIMO-NL, a documentary has been produced in 2011and shown in various places in Europe. |
| Organise PR events | The press has covered all projects, generally by one of the project partners.  Larger projects under the umbrellas of KIMO or NABU-DE organized press conferences. The Contrats Blues projects, also broad in scale, did not organise such PR events (in contrast to all other projects, this project is financially compensating participating fishermen).  Personal contact during meetings is considered a prerequisite to motivate potential participants. The objective of events/meetings is twofold (KIMO-BA, NABU): 1) meeting/motivating existing project participants and signing up new vessels to the scheme and 2) creating the opportunity to liaise with other stakeholders and policy makers in an informal setting. |
| Develop guidelines for fishermen | Generally, formal and written guidelines for fishermen have not been prepared by the projects. Guidance is most likely given though as oral agreements (e.g. PMD-FR), in some contractual documents (e.g. CBB-FR), or during meetings (e.g. NABU).  Some projects organized training sessions for fishermen (KIMO and NABU projects).  Guidelines for port authorities have been prepared in some projects: 3R Fish guideline to sort ML (PES-ES, NBB-ES). |
| **Ensuring stakeholder participation: awareness raising** | |
| Identification of stakeholders (sources) | The main stakeholder group that is targeted to establish a change in behaviour towards marine litter are the fishermen. Other stakeholder groups are tourists, residents and the general public. In KIMO-NL, every two years, 20 to 30 big bags with ML collected by fishermen, are sorted in the presence of the public to raise its awareness. . In two projects (KIMO-SW, KIMO NL) schoolchildren are targeted. Generally, projects have not identified stakeholders on the basis of a awareness-raising strategy.  The VV-NL project does not target any other stakeholders than fishermen. |
| Contact fishermen’s associations | Professional fishermen, the main target group, are contacted primarily through their representative organisations. . For some of the projects recreational fishermen are considered a second, minor target group (PMD-FR, NABU). |
| Involvement of stakeholders | In contrast to the fishermen, who are actively approached, , the general public (including tourists and residents) is targeted through (general) press and media work and through the distribution of information materials, such as leaflets and websites. |
| Monitoring of raising awareness | The impact of the raising awareness efforts on stakeholders is not being monitored and evaluated. |
| **Ensuring stakeholder participation: ML collection** | |
| Identification of stakeholders | No information is available regarding the precise reasons for choices/identification for fishing ports, but the willingness of ports to participate will obviously be an important criterion. An exception is the VV-NL project where the port of Den Helder was chosen for its well-functioning waste infrastructure. Choices for the waste management companies are often based on the fact that they are already active in the ports. |
| Involvement | Early involvement (in the initial phases of the project) of fishermen and other relevant actors is crucial to increase their engagement at a later stage. KIMO invested a considerable amount of time in contacting skippers to motivate them to participate. . NABU organises a meeting with fishermen and other direct stakeholders when a new port is getting involved.  In some cases (MLR projects with financial compensation; CBB-FR and CBM-FR) early involvement is necessary, also because the fishermen need to sign a contract. |
| Getting individual fishing skippers and crews to actively participate on a day-to-day basis. | The potential to persuade individual fishermen to participate depends on the port reception facilities system in place and what types of waste can be delivered ‘free of charge’.  Practical issues that must be clarified include: :   * The available port reception facilities and their accessibility to fishermen. For example, can they use the same port reception facilities as other ships (which might vary per port)? * The existing fee system: e.g. a no-special fee system; different fees for different types of waste etc. The fee system will also vary per port.   Motivation is kept high through organising events (KIMO), round table meetings (NABU), yearly visits of the waste management company to fishermen and providing them with ‘goodie bags’ (with t-shirts, pens, etc.) (VV-NL), as well as through media coverage (almost all projects). |
| Developing support with individual ports and harbour authorities. | Ports, and their waste reception facilities, are crucial as a collection point for the waste collected in the scheme.  The involvement of the port authorities differs per project:   * providing space for landing marine litter: ALL (except CBB-FR) * handing out big bags to the fishermen (KIMO-SW, NBP-ES) * support transport of big bags to waste facilities (CBB-FR; KIMO, NABU-GE, PES-ES, NBP-ES) * financial support for waste disposal (CBB-FR, PES-ES)   In the KIMO-NL project, various ports take up different roles.  Other tasks mentioned are intensive communication with the fishermen (NPB-ES) and the setting up of an area-wide system of ports where marine litter can be disposed (NABU-GE). |
| To involve waste management companies | The involvement of public or private waste management companies.  Waste companies transport the waste from the ports to treatment facilities and treat the waste. Other roles identified include:   * Financial responsibility for waste handling (PM-ES, ) * Waste analysis and monitoring ( KIMO-SW, KIMO-BA, KIMO-SC, KIMO-NL) * Support in segregation and recycling (, KIMO-SW, KIMO-BA, KIMO-NL)   In NABU-GE, a Producer Responsibility Organisation is organising the waste management.  Other roles that are mentioned are project coordination (VV-NL). |
| **ML collection** | |
| Provision of special equipment/material to fishermen | ML is collected by removing the ML that accumulated in the nets during regular fishing activities, so no special equipment is used for the collection. The majority of the participating vessels are bottom trawlers, except for KIMO-BA where netters are participating. Netters collect less litter than bottom trawlers, given that most of the ML is on the seabed. |
| Retaining on board of ML caught in nets during regular fishing activity. | Except for the Contrats Blues projects and PM-ES, special bags (big bags) are provided to the fishermen at the start of the project. It has been stated several times that the big bags are re-used, but no information is available on how this process is coordinated (who collects the big bags, etc.). It is assumed that the big bags are thrown as a whole in the containers (thus not emptied and directly re-used by fishermen), but it is unclear who collects the used big bags and re-distributes them, and on which basis this occurs (fishermen contacting lead organisation or specific collection point for big bags at a pre-arranged location).  In PMD-FR, bags are provided by the port authority/lead organisation when fishermen run out of bags. Big bags are not re-used.  Little information is available on the durability of the big bags, with other words how many times they can be re-used.  For the Contrats Blues projects, no collection facilities for storage ML on board were provided by the project and fishermen had to borrow containers used for fish within the harbour. This has led to high replacement costs for the harbour, as the containers were not adapted for ML purposes and easily damaged.  Limitation of storage capacity on board is often mentioned as an issue. In some projects, the size of the bags is tailored to the available storage capacity of the vessels, by using smaller bags. (NPB-ES, KIMO-SW and PES-ES).  In PM-ES, big trawlers have been provided with containers, while small vessels were not provided with special equipment but had to use plastic bags. |
| Clearing fishing nets from ML | In many cases no information was given on the extra time effort needed for clearing fishing nets from ML.  NABU-DE stated that participating fishermen clean their nets after each haul (compared to clearing only once at end of fishing trip) and that the extra time needed to clean the nets is estimated at 3 to 4 hours/week/vessel. For NPB-ES, it was stated that it took fishermen approx. 45-60 min/day to clean the nets and take the collected ML to the PRF. Facilitating the discharge in ports could reduce this extra time effort.  Separation of the ML by the vessels that participate in the KIMO-NL project: The fish and the ML caught in the trawl net are emptied onto a table. The table is raised and its door is opened, such that the fish lands on a conveyor belt. The fish on the conveyor belt are separated by species. The ML on the belt is removed and thrown in a basket, which will subsequently be emptied in the dedicated FFL big bag. If the fishermen would not separate the ML from the fish, it would remain on the conveyor belt and end up in the sea again. It is estimated by KIMO that separating the ML from the fish, depositing it in the big bags and putting these on the port quayside requires 6 extra hours/week. |
| Storage: depositing ML in dedicated receptacles or storage sites | Special containers are provided by waste management companies, and located at the dock or in the PRF.  Storage of ML can occur as follows:   * Use of special containers located on the dock (not in the PRF), with open access for fishermen (NPB-ES, PES-ES, PM-ES, CBM-FR, PMD-FR) * Use of closed collection sites (PRF), with access through harbour master, sorting by port staff of ML in big bags but according to ship-generated waste categories. The collected ML gets mixed with other litter brought to PRF (e.g. from fish market, other ship-generated waste); therefore no figures on what has exactly been collected through project (no weighing of big bags) (CBB-FR) * Separate containers (not clear if they are located within the PRF or outside, access by SMS-code (KIMO-SC) or via harbour masters (KIMO-SW, BA and NL) * Special containers for the project located in the PRF, individual access with key, enabling them to deliver waste at any time (NABU) * Separate containers for ML collected through project, located in the PRF, big bags daily collected on quay by waste company (MAIN) who deposits them in container (indirect access through MAIN) (VV-NL)   KIMO explicitly mentioned that the size of the containers depends on the size of the port and on the type and size of the vessels that come to this port (netters/trawlers). |
| Depositing of big bags on the quay and/or in dedicated receptacles or storage areas | Fishermen deposit the ML collected in big bags themselves on the quay (VV-NL and KIMO-NL) or in special containers located on the dock (NPB-ES, PES-ES, PM-ES, CBM-FR, PMD-FR) or in the PRF (KIMO, NABU, CBB-FR). The VV-NL project stated that this is done by using the crane of their own vessel. No other detailed information was obtained on how this is done. |
| **ML reception** | |
| Arranging for port reception facilities (with a focus on accessibility) | See description above (Storage: depositing ML in dedicated recipients).  Open access to everyone could lead to misuse of the containers by other people. Another problem observed in many cases is the high risk of mixture of ML collected with other ship-generated waste as there is no control on what is entering the big bags / containers. This risk was explicitly mentioned by the Spanish projects (NPB-ES, PES-ES, PM-ES) and by KIMO. KIMO-SC revealed this problem by doing random checks and took action. A letter was sent to the fishermen with reminder that only marine litter should be put in the big bag. As a result the percentage of galley waste in big bags declined. |
| Discharge of ML in the port (incl. handling of big bags) | The main types of discharge of ML are:   * Discharge of big bags by fishermen in the provided containers/recipients at the PRF (KIMO, NABU, CBB-FR) * Discharge of big bags by fishermen in special containers located on the dock (not in the PRF), collected by port authority for further sorting the litter (probably at PRF) (NPB-ES, PES-ES) * Discharge of big bags by fishermen in special containers located on the dock (not in the PRF), further collected by waste company and brought directly to waste facility (no intermediate stage at PRF) (PM-ES, CBM-FR, PMD-FR) * Discharge of big bags by fishermen on the quay, further collected by waste company (daily) and deposited in containers in PRF (VV-NL) * Discharge of big bags by fishermen on the quay, further collected by the port authority and deposited in containers (not clear if they are located within the PRF or outside) (KIMO-NL) |
| Transfer onshore of the recipients | The transport of marine litter from the dock to the port reception facility is done fishermen (incl. KIMO-BA; KIMO-SC, CBM-FR), with a few exceptions for CBB-FR this is done by the port authority due to access restrictions)   * For KIMO-SW and NL this is done by the port authority to facilitate the process for fishermen. |
| **ML transport** | |
| Transport from the port to the treatment facility | In all projects, the waste management company transports the waste to the waste treatment facility. For the majority of projects it is part of their existing waste management contract (CCM-FR, CCB-FR, KIMO-SW, KIMO-BA, KIMO-SC, KIMO-NL). For the projects NPB-ES, PES-ES, PMD-FR, VV-NL extra budget has been foreseen for this from the project, while for PM-ES and NABU-DE it was done for free by the waste management companies as a contribution to project and as part of a corporate social responsibility programme. |
| **ML treatment** | |
| Sorting | Fishermen are not willing to sort the ML waste due to time restrictions (all projects). Only in the PM-ES project fishermen should in theory (stated in MoU) sort ML waste in different types of containers provided by the waste management companies in the PR (e.g. glass, metal, etc)F. In practice however, fishermen are reluctant to do so and the sorting does not happen. In practice, all types of litter (e.g. galley, etc.) is dropped in the containers (big bags).  If sorting of ML occurs, it is done (to a limited extent) by the port authorities (CBB-FR, PES-ES, NPB-ES, KIMO) or waste management company (CBM-FR, PMD-FR, NABU, VV-NL). Sorting is generally done only by broad categories (often according to those for ship-generated waste), and with a focus on recyclable items (metals, nets). If done by harbour staff using the ship-generated waste categories, the collected ML often get mixed with other litter brought to the PRF (e.g. from fish market, other shipping). With the exception of KIMO, NABU and VV-NL (see monitoring) no figures exist on quantities collected through the project as the big bags are not weighed. For the PMD-FR fishermen should, collect any fishing gear (part of ML) and bring this to the lead organisation before dropping big bags on the dock; the rest of big bag is handled by port reception facility.  Limited information is available on the treatment of ML. |
| Incineration with energy recovery | KIMO-BA clearly stated that all the waste that could not be recycled, is incinerated with energy recovery (landfilling is banned here ). |
| Recycling | Some projects have the intention to recycle as much as possible (VV-NL NABU-DE). NABU-DE clearly states that the main purpose of monitoring (i.e. analyzing litter samples) is to investigate the recycling potential. Recycling is however difficult due to biofouling, contamination, bad smell, etc. Other barriers mentioned by KIMO-SW were the distance to recycling facilities. Recycling occurs to a certain extent for: metals (KIMO-SW); nets (PMD-FR, CBB-FR); separated waste (e.g. glass) (PM-ES, CBB-FR). KIMO-NL states that nearly all ML is recycled, but did not provide any further details. Generally, the main barrier to recycling is its cost. |
| Landfilling | Based on the limited recycling potential, it is assumed that the majority of the ML collected within the projects is brought to a landfill. (up to > 95%) (except for the case of KIMO-BA and KIMO NL). |
| **ML monitoring** | |
| Monitoring activities planned | Monitoring involves analysis of (mostly a portion of) the collected ML.  In approximately half of the projects, no monitoring activities are undertaken (CCB-FR, CBM-FR, PMD-FR, PM-ES) resulting in a general lack of detailed data on the composition and quantities of ML. None of the projects collects information on sources and geographical origin of the waste.  Some monitoring activities took place in half of the projects, but the level of detail and strategy used differed:  KIMO projects analyse the ML using specific guidelines, in particular on how ML should be reported. . For KIMO-BA this is done according to UNEP guidelines, for KIMO-SW and KIMO-SC this was not specified. A waste management company, CEFAS, and volunteers analyse the ML (weight) for KIMO-SW. Discussions with the port authority to let them conduct the analysis of the waste, failed. . In KIMO-SC and KIMO-BA harbour staff monitors voluntarily. In these projects, this was possible because there were small amounts of ML and therefore the analysis was a limited effort.  In the Galicia projects (NPB-ES, PES-ES) port authorities in cooperation with CETMAR monitor the volume, the weight and the composition (random sampling). This is probably done using an internal monitoring protocol.  NABU-DE in cooperation with DSD analyses the MLL to assess composition and recyclability. In theory there is a reporting sheet , similar to the one used in KIMO projects, , but in practice fishermen are reluctant to complete it.  No monitoring protocol is followed within VV-NL. Only some visual observations of special items were recorded. |
| Analysis of a sample | Only samples of ML (random checks) were analysed on their composition in the projects performing monitoring activities (see previous questions). It is not clear which fraction of the total amount of ML collected is being further analysed, except for NABU-DE, were it was stated that 100% of collected ML in the Baltic Sea (2 tonnes) will be further analysed (currently 500 kg analysed). Discussions within NABU-DE are going on about which portion should be analysed now that the project has been extended since 2013 (Baltic + North Sea). |
| Reporting | Some reports with figures are produced to illustrate project results and to support raising aawareness efforts), but no formal monitoring reports seem to have been prepared. . Some exceptions:   * In the NABU-DE case a monitoring report is produced by NABU in collaboration with DSD. However, the sample that has been analysed is not sufficiently representative for the results for the results of the analysis to underpin polic measures. * The KIMO projects are recording data on waste composition which are fed into international monitoring programmes such as OSPAR’s ML Monitoring Working group. |
| **Raising awareness** | |
| Actions undertaken to raise the awareness of participants | See above |
| Training of participants | See above |

1. Marine litter retention projects: assessment conclusions

The effectiveness and efficiency of the ML retention based on current practices in the EU is considered in this chapter.

Effectiveness

Marine litter removal

The assessment considers the effectiveness of the ML retention projects to reduce marine litter present in the seas and entering the seas, and also considers environmental impacts overall. The four assessment questions are:

1. Based on the performance of the existing projects, does the ML retention approach have the potential to lead to a significant reduction of the marine litter present in the seas?
2. Do the projects have the potential to reduce the amount of litter entering the seas?
3. Do the projects have any negative environmental impacts?
4. Do the projects have a positive environmental impact?

As discussed above in Section 1, the data that would enable concrete evaluation of the potential of ML retention projects to lead to a significant reduction of the ML present in each of the four regional seas are not available. Nevertheless, some indicative conclusions about the potential of ML retention projects to address the marine litter present in the seas can be drawn based on available information.

First, the total collection potential can be calculated as follows:

* **X:** The number of registered fishing vessels that could potentially participate in the removal of ML, i.e. that adopt fishing technologies that are resulting in the accumulation of ML in the nets.
* **Y:** The average amounts of ML that could be landed by each of the participating vessels, based on rates reported by currently active projects.

The total collection potential is X \* Y. Attempts to calculate this for each of the four regional seas have been made in the table below:

Table : Total collection potential in each regional sea if all vessels participated in ML retention projects

| **Regional sea** | **Number of vessels that could potentially land ML[[17]](#footnote-17)\*\*\***  **X** | **Average amount of ML landed per year (tonnes)**  **Y** | **Total collection potential per year (tonnes)**  **X\*Y** |
| --- | --- | --- | --- |
| North Sea and Eastern Atlantic | Demersal trawlers: 1067  Beam trawlers: 611  TOTAL: 1678 vessels | 4 [[18]](#footnote-18) | 6712 |
| Baltic Sea | Demersal trawlers/ seiners: 322  Vessels using active and passive gears: 35  TOTAL: 357 | 0.1[[19]](#footnote-19) | 35.7 |
| Mediterranean | 840 trawlers, however, this figures includes both benthic and pelagic trawlers (max. length: 12 to 35 m) = 10% the total fleet.  (Bottom trawling fleets predominate economically in many Mediterranean fisheries: responsible for a high share of total catches, i.e. 50%)[[20]](#footnote-20) | n/a | Low potential:   * Low number of benthic trawlers * Most countries are non-EU |
| Black Sea | Very low number of fishing vessels: Bulgaria & Romania catch 0,3% of the fish caught by EU-27 | n/a | Low potential:   * low level of fishing activity * Only 2 EU countries |

Concrete figures are not available for the Mediterranean and Black seas, due to the fact that there are no ML retention projects currently active there to provide figures on the amount ML landed per year. Estimates of the potential have been qualitatively deduced based on numbers of vessels. Overall, the conclusion is that the potential is relatively low, due to relatively low numbers of vessels/fishing activity.

To illustrate the challenge of quantitatively understanding the total collection potential of ML retention, we have used the example of the Baltic Sea. We have estimated the amount of non-biodegradable household waste generated for the past 30 years for the main 80 cities in the Baltic region, based on the populations in these cities and on the average amount of waste generated per person in the EU (based on Eurostat figures). From this we have indicatively assumed that 1 per cent of the generated waste ends up in the sea. This estimate is 1,103,233 tonnes of waste present in the Baltic Sea. When this is compared to the 35.7 tonnes of waste that could be removed annually from the Baltic Sea based on maximum participation of vessels in ML retention projects, the conclusion is clear: these projects do not have the potential to become serious remediation tools given the vast amounts of marine litter that are most likely present in the seas. The total collection potential is considerably lower in the Mediterranean and Black seas due to the low numbers of fishing vessels and the fisheries technologies applied (i.e. less bottom trawling). In addition, a high number of non-EU member countries border these seas. In these countries, the chances of establishing MLR projects are lower and the amounts of waste entering the seas are higher, due to the relatively poor waste management practices.

Previous attempts to calculate the effectiveness potential of MLR projects have been made by the OSPAR Commission[[21]](#footnote-21) but these have had similar data challenges (see box). They have nevertheless rated the potential for reduction of marine litter entering the North Sea each year as promising overall. However, they did not rate the potential for reduction of marine litter already present in the North Sea. The attempt of the OSPAR Commission confirms the conclusion above that MLR projects do not have the potential to become serious remediation tools in terms of removing all the marine litter present in the seas.

| **OSPAR Commission perspective** |
| --- |
| In its *Guidelines on How to develop a Fishing-for-litter Project*, OSPAR has stated that if 500 vessels would participate, that a total annual collection rate of 2,000 tonnes could be expected. OSPAR argues that this would represent 10 per cent of the estimated 20,000 tonnes annually dumped in the North Sea[[22]](#footnote-22) and suggests that this would mean a significant reduction. It should however be noted that this information on quantities of waste dumped dates from 1995 and that most likely meanwhile the amounts dumped annually have increased. Also, it is not clear whether the information refers to what is being dumped by ships only, or whether it comprises all waste from both land- and sea-based sources. But in any case, for OSPAR the potential reduction rate is on the basis of the quantities that are being dumped each year, while dumping practices have been going on for a long period. |

There are two further considerations with regard to the potential for ML retention projects to have a significant impact on marine litter quantities. First, there is the fact that most of the existing litter is located on the seabed. This means that bottom trawling is the most effective way to collect larger quantities of litter per vessel, but this method of fishing is not environmentally friendly for other reasons and is being restricted. Second there is the fact that fishing fleet capacity is reducing due to limitations on over-fishing in many areas. This means that the number of vessels that can potentially participate may decrease in some places in future years.

However, these broad attempts to understand the impact of ML retention projects on marine litter accumulations in entire regional seas may underestimate the impact that these efforts can have in the localised areas in which they operate. In addition, the ML retention projects do have many other positive qualities, which are discussed below.

Do the projects have the potential to reduce the amount of litter entering the seas?

The projects clearly are reducing the amount of litter entering the seas, for one main reason: participating vessels retain the ML that has accumulated in their nets on board and land it in the ports, instead of throwing it back over board again. This is a positive effect that would not occur in nearly all cases if the ML retention projects were not in place to offer fishermen: 1) convenient and free-of-charge receptacles in which to store the litter on board; and 2) convenient and free-of-charge opportunities to land the litter in ports.

Their potential to have a significant reduction effect is related to the discussion above regarding total collection potential of ML retention projects. As this is relatively low, the actual ‘dent’ that ML retention projects can have in the amount of litter entering the seas is relatively low. But there are complex factors surrounding the rate at which litter enters the seas, including among others waste management practices, packaging practices and citizens’ behavior. These can be impacted by legal and policy instruments, as well as practical initiatives such as awareness raising efforts. Some of these efforts are carried out by ML retention projects as discussed below.

Do the projects have any negative environmental impacts?

Given that the ML is retained on board during regular fishing activity, no extra fishing effort is involved and there is therefore no extra environmental impact that results from the retention and landing of ML.

Do the projects have a positive environmental impact?

The main potential for positive environmental impact of ML retention projects is the reduction of harm to the coastal and marine environment that is the result of large quantities of litter present in the seas. From a policy perspective, this contributes to the aim of ‘good environmental status’ for marine areas, which is an objective of the Marine Strategy Framework Directive (2008/56/EC) to be achieved by 2020.

In specific terms, the MARELITT work has not attempted to clearly measure the overall environmental impact of the existing ML retention projects, as this would be a very complex undertaking. By removing the litter from the sea that is caught during regular fishing activity, the projects clearly have a positive environmental impact, in absolute terms. The relative scale of this impact (in terms of the extent to which it contributes to the goal of ‘good environmental status’ in marine areas) is low, due to the extent of the problem, e.g. the vast quantities of marine litter present in and entering the seas.

Raising awareness

Nearly all ML retention projects have raising awareness as one of the main objectives. Raising awareness in this case tends to refer to awareness of different stakeholder groups about negative environmental impact of marine litter and the need to reduce this through behaviour change, although there are some variations across the projects.

One weakness of the existing ML retention projects is that they have not prepared proper strategies for raising awareness. This limits the extent to which the final results of the projects can be evaluated. Conclusions about the effectiveness of the projects in raising awareness are therefore derived from overall observations. The potential for the projects to have an awareness impact is also discussed here.

Methods: target groups and key messages

Most projects state that they target fishermen, policy makers and the general public for awareness raising. None of them have, however, presented a clear identification of the key messages for these groups, the actions that should be undertaken to deliver the messages, the targeted behaviour change or other factors that would enable a strategic approach to raising awareness. Furthermore, some important stakeholders are noticeably missing from the awareness efforts of most projects. Stakeholders that should be targeted by MLR projects include

The **shipping industry**, which is one of the main sources of litter.

**Port authorities** are an important stakeholder because in several fishing ports there exist no port reception facilities or they do not accept -certain types of- ML. Their awareness on the necessity of providing the necessary facilities should be raised.

**The plastic and packaging industry**, given that a significant proportion of ML is plastic packaging.

**The recycling industry,** which can contribute by applying innovative recycling techniques for ML items.

**Consumers of disposable products (mainly the general public),** who are one of the main sources of litter.

**Municipalities/local authorities,** which can improve waste collection and management, implement litter action plans, and in some cases impact the establishment of adequate port reception facilities. Several fishing ports are even municipal.

With regard to actions, very few of the projects reported dedicated attempts to target relevant groups with specific messages. However, most of the projects did directly target fishermen. To a certain extent, the targeting of fishermen can be seen as attempts to raise their awareness about the existence of the project and the opportunity to participate, rather than to increase their environmental awareness. There appears to be some confusion between these two messages.

For example, one of the projects confirmed that the project results resulted in an increase in the environmental awareness of the fisheries sector. Fishermen that participated in the NPB-ES project also participate in its successor, the PES-ES project. This was considered by the project management to be an indication of the fact that the participants view these voluntary schemes to be beneficial. This does not necessarily mean, however, that understanding of the negative environmental consequences of marine litter and the need to (voluntarily) make efforts to remediate it has been achieved.

Furthermore, most projects assume that distributing information on the projects and, in particular, press coverage of the projects is sufficient to raise the awareness of the stakeholders. More targeted efforts could be made in this regard.

Results and conclusions

It has not been possible to concretely evaluate the methods and results in raising awareness. At the same time, it has been observed that most of the existing ML retention projects have recognized the importance of raising awareness (an important start) but have not followed through with dedicated, strategic objectives and actions, nor have they monitored progress. This is therefore one key recommendation for future work.

Observations have shown that there is great potential for raising awareness about the causes and effects of marine litter across key stakeholder groups. This is most likely the reason why so many of the projects have named raising awareness as an objective.

To build on this potential, more on relevant stakeholders and how to target them is included in the Code of Good Practice and will be an important part of the MARELITT toolkit for setting up MLR projects.

Monitoring of marine litter

Six projects (KIMO-SC, KIMO-BA, NABU-GE, KIMO-SW, NPB-ES and PES-ES) have stated the monitoring of marine litter as an objective.

Generally, monitoring should aim at establishing a clear picture of the composition, origin, and amount of marine litter as well as of the relation between the marine litter problem and its main contributors. The monitoring of marine litter plays a critical role in tracking the implementation of key policy objectives. Monitoring of marine litter is one of the key common indicators for implementation of the EU Marine Strategy Framework Directive. Detailed guidelines have been produced for this by UNEP/OIC[[23]](#footnote-23) as well as the EU Technical Group on Marine Litter (TG ML)[[24]](#footnote-24). It is evident from the content of these guidelines that the activities carried out by fishermen as part of the existing ML retention projects do not provide the systematic data samples, nor the analytical information required for this type of monitoring.

For example, the UNEP/OIC guidelines have the following primary objectives:

Quantification and characterization of ML for the purposes of developing and evaluating the effectiveness of management, control, enforcement and/or mitigation strategies, in particular integration with solid waste management.

Understanding the level of threat posed by ML to biota and ecosystems.

Providing comparable datasets to support national, regional and global assessments of ML.

The TG ML guidelines state that ‘Fishing for Litter’ types of initiatives are not suitable for monitoring, and that monitoring seabed litter should not be done through voluntary initiatives.

The role that MLR projects can play in this type of big-picture, policy-focused monitoring mechanisms is therefore debatable. The capacity of fishermen, whose first objective is to fish for fish, to provide the kind of information required for monitoring marine litter in such a way that it can contribute to better scientific understanding of the issue and eventually underpin policy decisions, is limited. It is therefore important that future MLR projects consider more carefully the purpose and feasibility of any monitoring objectives they may set as part of their projects. This issue will be considered by MARELITT in future work on setting up/maintaining initiatives, and in the toolkit to be produced in 2014.

To better understand the actual on-going monitoring efforts by ML retention projects, the following assessment questions have been considered:

What data are collected? Are data collected on the composition, origin, and amount of marine litter as well as of the relation between the marine litter problem and its main contributors?

To what extent are monitoring protocols being applied?

To what extent are the data collected turned into information that is being used by policy makers to underpin the development of policy measures?

**Data collected**: Only data on composition and amount of ML are collected. A sample of the ML collected is being analysed and a report is being prepared on the composition and quantities of the ML.

**Monitoring protocols**: Comprehensive monitoring protocols are not being applied. Several projects do use a bag monitoring sheet for analysing the marine litter brought ashore, meaning that some records are kept. However, the information collected through this mechanism is more basic than what is advocated in international guidelines.

**Use of data**: the data collected are merely used to publicise the project and to raise the awareness of stakeholders. The data are not turned into information though that is being used by policy makers to underpin policy measures.

Conclusions

The ML retention projects are not carrying out the type of systematic monitoring, based on international guidelines and protocols that would be required to be of use in policy-making. This is perhaps too ambitious a goal for ML retention projects at this time. Further work, in cooperation with policy-makers and scientists such as those on the Technical Working Group for Marine Litter under the MSFD, would be required in order for future projects to somehow usefully contribute to these monitoring efforts.

At the same time, monitoring can be a useful aspect of ML retention efforts, for a number of reasons:

1. Monitoring encourages more strategic project implementation, which has already been identified as a weakness of the projects.
2. Monitoring does bring some information about the waste collected, and this information can be put to good use for awareness raising and publicity efforts.
3. Monitoring marine litter for policy purposes is evolving effort, and there may be more important roles that MR retention initiatives can play in the future.

The potential effectiveness of monitoring for ML retention initiatives has been addressed in the Code of Good Practice and will form part of the future MARELITT work.

Efficiency

Generally, ML retention can be considered an efficient practice, because it takes place during regular fishing activities and enables the collection of litter that is anyway already in the fishermen’s possession. Nevertheless, there are a number of cost items associated with these projects (see Section 2.6 above) and the costs of some of these items can be minimised through efficient practices. Based on available data, we have attempted to assess the relative efficiency of the existing ML retention projects according to management costs and to other project costs.

Efficiency of management costs

The table below provides an indication of the management costs for each project, and efficiency of the use of management time, in terms of the number of participating vessels. This ratio ranges from 19 vessels per full-time manager to 207, with most projects falling in just over the 100 mark. It should be noted that complete information about what is included (and not included) in the management tasks (e.g. delivery of big bags, monitoring, awareness raising, etc) or other in-kind support is not available, meaning that the figures are by no means strictly comparable.

Table : Key indicators on management costs for ML retention projects

| **Project name** | **Project duration** | **Management FTE\* for the project** | **Management FTE per participating vessel** | **Number of vessels per FTE** |
| --- | --- | --- | --- | --- |
| **NE Atlantic** | | | | |
| VV-NL | since 2000 | N/a | N/a | N/a |
| KIMO-SC | since 2005 | 1 FTE | 1 FTE /207 vessels | 207 |
| KIMO-SW | since 2008 | N/a | N/a | N/a |
| KIMO NL | Since 2002 | 1 FTE | 1FTE/83 vessels | 91 |
| CBB-FR | since 2008 | N/a | N/a | N/a |
| PMD-FR | since 2003 | 1 FTE | 1 FTE/110 vessels | 110 |
| NPB-ES | since 2009 | N/a | N/a | N/a |
| PES-ES | since 2012 | N/a | N/a | N/a |
| **Baltic Sea** | | | | |
| KIMO-BA | since 2011 | Max 1 FTE | Max 1 FTE / 19 vessels | 19 |
| NABU-DE | since 2012 | 0.5 | 0.5 FTE/60 vessels | 120 |
| **Mediterranean Sea** | | | | |
| CBM-FR | since 2011 | 0.5 | 0.5 FTE/50 or 80 vessels | 100 - 160 |
| PM-ES | since 2003 | N/a | N/a | N/a |

\*Full-time equivalent of management staff for the total duration of the project

Efficiency of project costs

In order to bench mark the cost-effectiveness of the ML retention projects[[25]](#footnote-25), the total amount of litter collected per project has been compared with the costs per project. We have also looked at the costs per vessel to get a relative idea of spending. The analysis of project costs is subjective, due to the fact that a large part of costs are for treatment of collected litter. These costs are fixed and depend on the treatment option chosen and on the local context, and do not necessarily have to do with project efficiency. Furthermore, environmentally sound management should be a requirement, and probably, recycling should be the preferred option. However, it is recognized that this option may be cheaper than options that are less desirable from an environmental point of view, such as landfilling. Furthermore some of the projects do not include waste treatment as this is provided in-kind by a waste management organization (which might be considered an efficiency aspect in itself, see 3.2.2 on Sustainability above). Projects in bold are those for which waste treatment costs are included.

Table : Key indicators on project costs for ML retention projects

| **project name** | **cost per year (EUR)** | **cost per ton of litter collected** | **costs per vessel** | **costs per vessel per year** |
| --- | --- | --- | --- | --- |
| **NE Atlantic** | | | | |
| **VV-NL** | **27,605** | **353** | **37,958** | **3451** |
| KIMO-SC | 66,521 | 1297 | 3168 | 453 |
| KIMO-SW | no data | no data | no data | no data |
| **CBB-FR** | **588,000** | **490** | **2673** | **2673** |
| **PMD-FR** | **84,000** | **770** | **672** | **672** |
| **NPB-ES** | **41,578** | **1419** | **368** | **317** |
| PES-ES | 93,567 | 5198 | 714 | 714 |
| **Baltic Sea** | | | | |
| KIMO-BA | 100,000 | 19286 | 2941 | 1471 |
| NABU-DE | 31,000 | 15500 | no data | no data |
| **Mediterranean Sea** | | | | |
| **CBM-FR** | **46,500** | **756** | **2325** | **2325** |
| PM-ES | no data | no data | no data | no data |

Given the lack of data comparability, attempts to rank and comment on the relative efficiency of the projects are of limited value. What this analysis does show is that there are great variations across the projects that cannot be explained by simple factors, meaning that it is not possible to objectively assess the projects for cost effectiveness.

Nevertheless there are some lessons that can be learnt from the limited information that is available regarding project costs. This refers in particular to size and scale of projects, the type of materials chosen and other aspects of the actual ML retention practice. These are addressed in the Code of Good Practice.

Conclusions

Overall, the practice of retaining ML that is accumulated in fishing nets on board and depositing it for efficient transport and treatment on land as waste is a positive one. It clearly contributes to improving the state of the marine environment. Fishermen frequently regard themselves as guardians of the sea and therefore appear to be willing to apply this good practice, when the conditions are right. This implies that there are systems in ports for the reception of the ML receptacles; that these services are available during the working hours of fishermen (which may fall outside normal business hours); and the discharge of ML does not require extra fees. In many EU ports, these conditions do not exist, giving fishermen less motivation to collect and discharge the ML. There is some potential to improve the efficiency and effectiveness of the existing ML retention projects, mainly through the application of good practice.

The practice also has strong potential to raise the awareness of a range of stakeholders, including many, such as industry, that have previously had a limited role in remediation of marine litter, despite their role as producers. While the monitoring potential for ML retention is limited by the capacity and willingness of fishermen to carry out monitoring procedures, there is potential use for the information about marine litter obtained through these initiatives.

At the same time, the analysis has estimated that the broader collection potential for these initiatives is limited. Even if the entire EU fleet of vessels that routinely get ML in their nets would participate in ML removal projects, these projects would still not have the potential to become serious remediation tools given the vast amounts of marine litter that are most likely present in the seas. The total collection potential situation is therefore low, and even considerably lower in the Mediterranean and Black seas than in the NE Atlantic and the Baltic Sea, due to the low numbers of appropriate fishing vessels and the fisheries technologies applied (i.e. less bottom trawling). In addition, a high number of non-EU member countries border these seas. In these countries, the chances of establishing MLR projects are lower and the amounts of waste entering the seas are higher, due to the relatively poor waste management practices.

1. Derelict fishing gear retrieval projects: main findings

Five projects aiming at the removal of derelict fishing gear (DFG) have been identified and evaluated. Three projects are located in the Baltic Sea, in Sweden. Of these, two are in the Öresund (NPS-SE and SPS-SE) – the stretch of water separating Denmark and Sweden – and one in the Stockholm Archipelago and Gotland (SGO-SE). A fourth project, led by WWF Poland, occurs in the waters of Poland and Lithuania (WWF-PL). The fifth project is located in the North East Atlantic in Norway (LGN-NO).

Table 19: Projects and project acronyms

|  |  |
| --- | --- |
| **Project acronym** | **Project name** |
| **North East Atlantic** | |
| LGN-NO | Norwegian retrieval survey for lost gillnets |
| **Baltic Sea** | |
| NPS-SE | Retrieval of derelict fishing gear in Sweden, Northern Part of the Sound |
| SPS-SE | Retrieval of derelict fishing gear in Sweden, Southern Part of the Sound |
| SGO-SE | Retrieval of derelict fishing gear in Sweden, Stockholm-Gotland |
| WWF-PL | WWF Poland (Collecting ghost nets in the Baltic Sea) |

The projects consist of targeted retrieval of DFG during special purpose trips. In all projects, the fishermen were paid for their time and their costs were reimbursed. The LGN-NO project focuses on gill nets – especially from the Greenland Halibut Fishery – whereas the other projects recover all types of DFG without a specific focus. The WWF-PL projects also made use of divers to recover nets from shipwrecks.

Introduction - The scale of the problem of DFG[[26]](#footnote-26)

There remain significant gaps in knowledge about DFG in EU waters, including the amounts and location of DFG. A literature review suggests that in relation to the total number of nets being used in EU waters, the rates of permanent net loss appear to be rather low – well below one per cent of nets deployed.

This is largely because most nets are deployed in shallow waters, and after they are first lost, a significant proportion of nets are then recovered through the use of global position systems. Fishermen will use a GPS and make notes on where they have left or lost them, making subsequent retrieval easier. Also, fishermen are becoming more and more responsible and cautious of their fishing equipment. They typically go to considerable lengths to recover nets given their cost.

However, as is shown by the Swedish DFG projects assessed by MARELITT, the total length of netting permanently lost may be significant, because the total length of nets being set is high. This is despite the fact the level of fishing activity in the area has been significantly reduced the past 20 years. Under the EU funded research project FANTARED (2002), it has been estimated that approximately 1 per cent of gillnets used in the Swedish fleet is lost each year, which means that approximately 165 km of nets are lost each year.

An exception to the low loss rates seen in most European fisheries is in the deep water net fishery in the north east Atlantic. In deep water fisheries, conditions are more conducive to net loss, and there is strong evidence of net dumping and significant levels of ghost fishing in the deep water north east Atlantic fishery for shark and monkfish. The deep water gillnet fisheries targeting deep water shark and monkfish almost certainly represent a problem that is of a greater scale than all other net fisheries in European waters. However, even in these fisheries some fishing gear is being lost, abandoned or otherwise discarded. For fisheries in deeper water where the risk of gear loss may be unavoidable and where the costs of retrieval programmes could be considerably greater given the need for larger vessels and increased power of retrieval hydraulics, government-organised retrieval programme, may be more appropriate.

In Europe, Norway is the only country that organizes such retrieval programmes. This project has been described and evaluated by MARELITT.

| **Deep water fisheries in the North East Atlantic** |
| --- |
| Since the mid-1990s, a fleet of up to 50 vessels have been conducting a gillnet fishery on the continental slopes to the West of the British Isles, North of Shetland, at Rockall and the Hatton Bank. The fishery is conducted in depths between 200 and 1200 meters, with the main target species being monkfish and deep water sharks.  It is very likely that a large quantity of nets are lost or dumped, due to the following factors:   * The amount of fishing gear used in the fisheries (Vessels are reported to use up to 250km of gear The total amount of nets constantly fishing at the same time by the fleet is conservatively estimated at between 5800 and 8700 km * The lengths of the fleets * The fact that the nets are unattended much of the time (vessels leave their gear fishing whilst they land their fish; the nets are hauled every 3-10 days with trip lengths varying between 4 - 8 weeks). * Gear conflicts: the vessels are competing on the same grounds as demersal trawlers and long liners. * Illegal dumping of sheet netting. The vessels are not capable of carrying their nets back to port and only the headline and footropes are brought ashore while the net sheets are discarded, either bagged on board, burnt or dumped at sea.   The total amount of loss and discarding of nets is not known, although anecdotal evidence suggests up to 30kms of gear are routinely discarded per vessel per trip.  It is not known how much and for how long these nets are fishing after they are lost. Norwegian investigations in the deep slope gillnet fishery for Greenland halibut have shown that gear losses can be significant and that the nets can fish for at least 2-3 years and sometimes even longer. |

DFG projects in Europe

There are very few projects in the EU. In fact only in the Baltic Sea DFG retrieval projects are being undertaken. WWF has undertaken a pilot project in Poland and Lithuania, while KIMO Baltic is making some ad-hoc efforts. Sweden is the only European country where fishermen undertake periodically special trips to retrieve DFG.

This means that there is very limited practical experience, though there is also experience from a few pilot and large research projects (e.g. FANTARED). Also two new new EU research/pilot projects have just started, in the Adriatic.

Outside the EU, but still in Europe, the Norwegian Directorate of Fisheries has been undertaking an annual routine DFG retrieval campaign since 1983. The campaign is undertaken with a single vessel, for a five-week period. The objective is to recover or destroy lost gill nets, particularly in deep waters. The intervention area includes northern part of the North Sea, Norwegian Sea and Barents Sea. The annual total distance over which the retrieval gear is being towed is 1000 nm. The amounts of gill nets retrieved are high, i.e. over 14,000 gill nets of 30 m. standard length have been retrieved in the period 1983 – 2010. However, gear removed also include anchors, pots, purse seines, trawl wires and longlines. Under the programme, the marine species retrieved are also being recorded. In the period 2010-2011, 20 tons of fish, 12000 crabs (mainly King crab), one seal and one whale were retrieved. The results of the Norwegian campaign confirm the observations in the previous section on the high loss rates in the deep water net fishery in the north east Atlantic.

Under the Swedish DFG retrieval projects, a fisherman spends on average 40 days at sea each year, when his ship lays idle in port, to retrieve DFG. We have considered an annual period at sea by 1 fisherman that got funding, as a project. The projects started in 2005. In total, 21 “projects” (periods), involving 8 fishermen, have been implemented since then. Of those 21 “projects”, 10 were undertaken by one fishermen (the NPS-SE project) fishermen, while two other fishermen undertook 3 (SPS-SE project) and 2 projects (SGO-SE) respectively. This means that the bulk of the 21 projects has been undertaken by 3 fishermen.

The projects undertaken by each of those fishermen have been evaluated in detail. The results of the detailed evaluation are included in the Project Assessment Sheets (PAS), that have been completed for the group of projects that each fishermen undertook. The main type of DFG that has been retrieved are gill nets and eel traps. The projects are being co-funded from the European Fisheries Fund (50%).

Project objectives and duration

All the projects clearly state the retrieval of derelict fishing gear as their objective. The main motivation for this objective is the protection of the marine environment and the reduction of ghost fishing. Ghost fishing is the term used for lost or abandoned fishing gear that continues to catch fish.

Table 20: Objectives of the DFG projects

| **Objectives** | **Number of projects** | **Project Names** | **Actions** |
| --- | --- | --- | --- |
|  |  |  | **Actions undertaken while not stated objective** |
| **Derelict fishing gear retrieval** | 5 | All | - |
| **Raising awareness / change of culture** | - | - | Awareness raising is a stated objective of none of the DFG projects and no such efforts are implemented. Some indirect awareness raising effects can however be noticed.  In the WWF-PL project, although awareness raising was not a stated objective, some information and dissemination activities took place.  For the LGN-NO project it was stated by the project manager that a consequence of the project was increased awareness of fishermen.  In the SPS-SW and NPS-SW projects, awareness raising have been noticed e.g. through the participation of the projects in various seminars organised on the topic. Awareness raising in this case relates to disseminating knowledge about the problem as well as of the possibility to engage into similar DFG retrieval projects. |
| **Monitoring** | - | - | In the WWF-PL project, monitoring was not a stated objective, however some monitoring activities took place and a monitoring system was set in place to measure the amount and type of fishing gear collected.  In the NPS-SE project, monitoring is not a stated objective. Monitoring is however being performed on the amount and type of DFG retrieved and the amount and species of fish contained in the nets, as well as sea birds and other mammals. |

Retrieval operations are usually conducted during the fishing closed season (early spring to October, corresponding for instance to the closed season for cod in the Baltic), to facilitate the involvement of fishermen and avoid interference with active fishing vessels.

In Norway, retrieval operations are conducted from the end of August until the end of September, to leave enough time after the Greenland Halibut fisheries is closed to the fishermen to retrieve their own nets.

The standard duration for projects is five weeks. As retrieval operations highly depend on the weather conditions, the number of days at sea actually performed varies.

Table 21: Duration of DFG projects

| **Project name** | **Starting date** | **End date** | **Project duration** | **Reason for ending the project** |
| --- | --- | --- | --- | --- |
| SPS-SE | 2011 | 2013 | 2011: 21 days  2012: 38 days  2013: 38 days | Project approved for one year, renewed each year |
| NPS-SE | 2005 | 2013 | 30-40 days each year | Project approved for one year, renewed each year |
| SGO-SE | 2012 | 2013 | 40 days each year | Project approved for one year, renewed each year |
| LGN-NO | 1980 | On-going | 1980-2010: 3 weeks a year  since 2010: five weeks a year | The funding of the project appears to be sustainable for the coming years. |
| WWF-PL | April 2012 | October 2012 | Poland: 2.5 months  Lithuania: 2 months | The project was only funded for one year. |

Lead organisations

A lead organisation is defined as the organisation that is responsible for the coordination of the project. The lead organisations that have established the DFG projects vary. In three cases, fishermen lead the project; one of which (NPS-SE) was led by a research institute in its first year. In the other two other projects, an NGO (WWF Poland) and a national government (Directorate of Fisheries) perform as lead organisation.

Table 22: Lead organisations of the DFG projects

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of lead organisation** | **Nr. of projects** | **Project names** | **Cooperation** | **Main motivation** |
| Fishermen | 3 | SPS-SE | Project managed by an individual fisherman. The County Administrative Board (CAB)[[27]](#footnote-27) of Skåne is coordinating. | A professional fisherman, was aware of complaints from fishermen colleagues about lost nets getting stuck in the vessels propellers and applied for funding by the County Administrative Board (CAB).  The interest to start up a DFG retrieval project (NPS-SW) was raised during the EU project FANTARED 2 in which the Institute of Marine Research (IMR) of Sweden participated. Sweden enhanced its commitment to the project by contributing with additional national funds in order to implement a pilot project to develop and test a large-scale gill net retrieval system suitable for open sea operation in the Baltic Sea area. The fishermen applied for funding for DFG retrieval projects with support of the IMR. |
| NPS-SE | During the first year, the Institute of Marine Research acted as a lead organisation but since 2005, the fishermen themselves are the project owners – as recommended by the County Administrative Board (CAB) of Skåne. |
| SGO-SE | Project managed by an individual fisherman The project is approved of the Swedish Board of Agriculture and the County Administrative Boards act as coordinator | A professional fisherman, received information about the possibility to apply for the retrieval project by the County Administrative Boards (CAB). His objective was to improve the environmental situation in the Baltic Sea. |
| National  government | 1 | LGN-NO |  | The Norwegian Directorate of Fisheries initiated the project to reduce the negative impact of lost gillnets and to prevent ghost fishing. |
| Environmental NGO | 1 | WWF-PL | WWF Poland initiated the project and promoted the initiative in collaboration with the Lithuania Fund For Nature | The main motivation for the project is the protection of the Baltic Sea, where ghost fishing poses threats to the marine flora and fauna. |

Participating vessels

A total of eleven fishing vessels participate in the existing DFG projects, as shown in the table below.

Table : Vessels participating in the DFG projects

| **Project name** | **Type of vessels\* (fishing method)** | **Vessel power** | **Number of vessels** |
| --- | --- | --- | --- |
| **Baltic Sea** | | | |
| NPS-SE | Gillnetters | N/a | 2 |
| SPS-SE | Gillnetter | N/a | 1 |
| SGO-SE | N/a | N/a | 2 |
| WWF-PL | 4 demersal trawlers (3 pair trawling vessels / 1 bottom trawling vessel) and 1 recreational fishing vessel | between 110 and 297KW | 5 |
| **North East Atlantic** | | | |
| LGN-NO | Pelagic trawler  (until 2006, a stern trawler) | 2250hp | 1 |

Awareness raising

None of the projects state awareness raising as an objective. However, awareness raising activities took place in some of the projects, aimed at getting more fishermen to participate.

Motivations for fishermen to participate in the DFG projects that have been mentioned by the different project managers are the protection of the environment, reduction of ghost fishing and reduction of economic damage to fishing vessels – such as through nets in propellers. Another strong motivation mentioned is the creation of a better image of the fishing profession in the eye of the public, which is largely sensitised to the problem of ghost fishing (notably by images of seals and birds caught in the ghost nets). Moreover, payment for the work and reimbursement of costs (e.g. fuel) is considered a significant benefit.

Some DFG projects (WWF-PL, NPS-SE) also target public authorities such as regional governments, as well as tourists, students, children and the general public.

Fishing gear manufacturers have not been targeted. They could contribute to combatting the problem of derelict fishing gear by changing gear design to minimise loss, or by marking the fishing gear.

Table 24: Targeting stakeholders beyond fishermen

| **Target group** | **Number of projects** | **Project names** | **Main motivation** |
| --- | --- | --- | --- |
| Public authorities and government; decision makers | 1 | WWF-PL | Relevant national authorities expressed their interest in changing the existing legal and policy situations related to ghost nets. For example, WWF Poland has full support from the Environmental Ministry to include ghost fishing activities as one of the priorities that could be funded from the Polish Operational Program for fisheries (under the European Maritime and Fisheries Fund). |
| Industry (*fishing gear manufacturers* ) | - |  | None of the projects targeted this group. |
| Tourists , students, children | 1 | WWF-PL | As part of the WWF-PL project, students, tourists, fishermen and children were targeted through information brochure and were encouraged to report cases of lost nets and other ML lying on the beach. |
| General public | 1 | WWF-PL  NPS-SE | The WWF-PL project targeted the general public through press and media work.  The NPS-SE project does not identify any other stakeholders (awareness raising is not a stated objective of the project). The projects have however been documented by a film producer and have been shown to the broad public (Swedish public television, BBC). |

DFG retrieval and processing

***Role of the port authorities***

Port authorities are not involved in any of the DFG projects. The waste management company directly handles retrieved nets without them being stored in the ports. For two projects (WWF-PL and NPS-SE), the port authority reserves special areas to place containers, but lead organisations or municipalities organise the final waste disposal. It was mentioned by the Swedish fishermen and WWF Poland that there are not adequate reception facilities for disposing DFG in the ports in Sweden and Poland.

***Role of waste management organisations***

In one project in Sweden (SPS-SE), the fishermen have some responsibilities in waste management. They transport the DFG directly to the waste management centre. Retired fishermen are also paid to sort what can be re-used (fishing nets in good conditions) or recycled (disassembled parts). The rest is sent to the management centre for further sorting and treatment.

In SGO-SE (Stockholm and Gotland), as no reception facilities are available in the ports, fishermen are burning the retrieved nets.

Table 25: Role of waste management organisations in DFG projects

| **Role of waste management organisations** | **Number of projects** | **Names of projects** | **Description** |
| --- | --- | --- | --- |
| Transport and waste handling | 2 | LGN-NO | Since 2010, Norsk Fiskeriretur (a private recycling company) ensures the transport and processing (including recycling) of the retrieved fishing gear. |
| NPS- SW | Since 2011, the municipality provides containers for the landed DFG, which are transported and handled (separated, recycled and land filled) in the municipal waste management centre. |
| Waste handling | 2 | WWF-PL  SPS-SE | In the WWF-PL project, nets were transferred to landfills by services secured by WWF. In Lithuania, there was no need for disposal activities as the nets were used for decoration purposes in restaurants.  In the SPS-SW project, the non-recyclable (parts of the) nets are transported to waste management centres. |
| Covering the costs of DFG treatment | 3 | NPS-SE  SPS-SE  LGN-NO | In both projects in Sweden, the municipalities cover the costs of DFG treatment. In SPS-SE, the transport costs are covered by the project.  Norsk Fiskeriretur is handling the waste for free. The company wants to contribute to resolving the problem of lost fishing gear. It also provides the company a green image. |

Project financing

The financing for the DFG projects is mainly public, with the exception of WWF-PL which was financed by a private foundation. Some participation from private waste management companies takes place.

Table 26: Project financing

|  |  |  |
| --- | --- | --- |
| **Financing source** | **Number of projects** | **Project names** |
| Combination of private funding - NGO & private foundation | 1 | WWF-PL |
| Combination of public and private funding - nat. gov. & private recycling company | 1 | LGN-NO |
| Combination of national/municipal and EU funding (EFF) | 3 | NPS-SE, SPS-SE, SGO-SE |

Table : Public and private shares of project financing

| **Project name** | **Coordination** | **ML reception** | **ML treatment** | **Monitoring** |
| --- | --- | --- | --- | --- |
| WWF -PL | Priv 100% | Priv 100% | Priv 100% | Priv 100% |
| NPS-SE | Pub 100% | Pub 100% | Pub 100% | Pub 100% |
| SPS-SE | Pub 100% | Pub 100% | Pub 100% | Pub 100% |
| SGO-SE | Pub 100% | Pub 100% | Pub 100% | Pub 100% |
| LGN-NO | Pub 100% | Pub 100% | Priv 100% | Pub 100% |

Intervention areas

In most of the projects, the selection of the intervention area is based on the identification of potential hotspots. The main criteria for the selection are the extent of the fishing activity in the area; the type of nets used (as gillnet fishing has the highest rate of lost nets); the extent of the shipping traffic in the area; and in some projects the currents (strong currents around the Öresund bridge making the risk of losing nets very high).

The selection method varies greatly among the project (see table below). All projects rely on the fishermen expertise or reporting, while most also identify hotspots on the basis of previous research project and the input of research institutes.

Table 28: Intervention areas

| **Project** | **Intervention area** | **Selection method** |
| --- | --- | --- |
| **Baltic Sea** | | |
| NSP-SE | The intervention area covers the Northern area of the Öresund, between the cities of Landskrona and Helsingborg. During 2013, a larger proportion of the work than previously was performed on the Danish side of the Sound. | Hot spots are identified on the basis of the local knowledge of fishermen and on the results from an EU funded project between Denmark and Sweden implemented in 1997-1998 which has mapped the area of the Sound. |
| SPS-SE | The intervention area was the South Sound (Öresund) of the Baltic Sea, more precisely the area around the Öresund Bridge (both on the north and south side). The area is located between 0.10-4 nautical miles from the coast. | The fisherman Bo Landen identifies hot spots on the basis of the local knowledge of fishermen and the systematic mapping of the position of retrieved nets during the operation. Hot spots have also been identified based on results from the same EU project. |
| SGO-SE | One project was implemented in the archipelago of Stockholm, between Söderarm and Simpnäs. The second project was implemented around the Island of Gotland. | The selection area in Stockholm was selected based on the fisherman’s expertise and knowledge and from his large network of contact with other fishermen. |
| WWF-PL | The project intervention area is situated in the Baltic Sea (Polish and Lithuanian waters) | In Poland, the intervention area was primarily selected on the basis of a conference with fishermen, information provided by the Maritime Institute in Gdansk, and experience acquired from a pilot project. Shipwrecks were selected by using ROV robots.  In Lithuania, the intervention areas were selected from the fishing grounds where Lithuanian fishermen use set nets, whereas the shipwrecks selected are situated in the vicinity of the Klaipeda port. |
| **North East Atlantic** | | |
| LGN-NO | Fishing gears are being removed from selected areas along the continental slope on the coast of Norway between 61’ and 72’ North West to the Russian border (Northern part of the North Sea, Norwegian Sea and Barents Sea). | The Directorate of Fisheries selects intervention areas each year on the basis of the annual collected information. This contains the amount and position of lost fishing gears through fishermen’s surveys, questionnaires to the local fishermen’s organisations and information collected at meetings of the different Fisheries.  Some areas that are not highlighted as a hot spot in a particular year can still be included in the retrieval program because they have not been surveyed for a long time. |

Retrieval equipment and waste management

In Sweden and Norway, the aim is to recycle as much as possible of the materials contained in the nets (especially metals such as copper, stainless steel and lead). Only what is not recycled is disposed in landfilled or incinerated. In Norway, the largest obstacles for recycling identified are bad smell and old material.

Table 29: Equipment in DFG projects

| **Activity** | **Equipment** | **Selection method** |
| --- | --- | --- |
| Selection of intervention area | In WWF-PL, ROV robots have been used for identifying the location of the shipwrecks. |  |
| Gear retrieval | In Sweden, the three participating fishermen use creepers to retrieve the gears.  In NPS-SE, a double-sided creeper is mainly being used during latest years as it was considered more efficient a single one.  In WWF-PL, the device used for retrieval consisted of a bar connected to a rubber weight, with searching hooks attached to the bar and 9 steel weights between the bar and the rubber weight. A team of divers was hired to retrieve the nets from shipwrecks.  In LGN-NO, the retrieval gear consists of a 3 meter long steel bar and 1 or 3 dredges (hooks), hinged from the bar connected with steel chains. | The equipment used is selected based on the expertise of the fishermen and improved over the years based on experience.  Specifically, in SPS-SE, the equipment used was selected based on test drags in 2011 and experiences from 2012 |

Table 30: Waste management for DFG projects

| **Project name** | **Landfilling (%)** | **Incineration without energy recovery** | **Recycling (%)** |
| --- | --- | --- | --- |
| **NPS-SE** | The non-recycled part |  | Maximum possible |
| **SPS-SE** |  | All the non-recycled part | Maximum possible (when not re-used) |
| **SGO-SE** |  | 100% |  |
| **WWF-PL** | 100% |  |  |
| **LGN-NO** | All the non-recycled part |  | Maximum possible |

Project components and activities

The table below provides the main features from the project evaluation for the different stages of the project. Good practices and lessons learned that can be drawn from these evaluations are discussed separately in the Code of Good Practice.

Table 31: Project components and activities for DFG projects

| **Components & Activities** | **Description** | **Number of projects** |
| --- | --- | --- |
| **Project coordination** |  |  |
| Set-up | All projects have been set on a local scale. Four projects have been initiated by public authorities (Swedish and Norwegian governments); one by an NGO. |  |
| Application for funding | Swedish fishermen receive help from Per-Olof Larsson, a retired official from the Institute of Marine Research, acting as an expert and coordinator supporting the work especially through project applications and reporting. | Swedish projects |
| Selection of intervention area | See table 28 in section 4.7 Intervention areas | All |
| Recruitment of fishermen | In all projects, a written agreement is signed with participating fishermen (with the lead organisation in WWF-PL, through the application for funding in Sweden).  In Sweden, the participation of the fishermen is mainly a matter of personal commitment (they have to apply for the funding).  In LGN-NO, the fishing vessel is selected based on technical criteria. The regular crew of the vessel performs the retrieval activities. | All |
| Identification of number of days necessary for the retrieval | In Sweden, fishermen apply for periods of 40 days at sea, over a 6 month period maximum.  In LGN-NO, the retrieval period is set by the Norwegian Directorate of Fisheries (three then five weeks). | All |
| Selection of the number and type of vessels | In LGN-NO, the fishing vessel is selected on technical criteria.  In WWF-PL, Euro-cutter vessels of 17m length are chosen as they are adaptable for use as a SCUBA divers base.  In Sweden, the vessels are the ones used by participating fishermen for standard fishing activity. | 2 |
| Selection, purchase/construction of the retrieval equipment | In NPS-DE, the fishermen are manufacturing and modifying the tools themselves.  In SPS-SE, the equipment used was selected based on test drags in 2011 and experiences from 2012, and also from the advice of a fisherman already implementing this type of project. |  |
| Training of the fishermen to retrieval technique | In WWF-PL, the fishermen involved in the pilot project trained the crew and fishermen taking part in retrieval actions.  In SPS-SE, no formal training sessions have been set up. One fisherman advised other fishermen starting up retrieval projects on the use of equipment based on his experience with such projects. | 2 |
| **Ensuring stakeholder participation** |  |  |
| Financial compensation for fishermen |  | All |
| Involvement in the preparation of the project (selection of area/equipment) |  | All |
| Presentation of results | In LGN-NO, the results are presented to the fishermen during an event in order to keep good contacts. | 1 |
| **DFG retrieval** |  |  |
| Gear retrieval |  | All |
| Storage on board | In WWF-PL, typical boxes for fishes were used to collect the ghost nets on vessels’ decks.  In LGN-NO, retrieved nets are being hauled onto the net drum of the survey vessel. | All |
| Sorting on board of the vessel | In LGN-NO, retrieved fishing gears are separated on board of the vessel (rope, steel, net…) and then separately stored in baskets. | 1 |
| **DFG Reception** **and storage** |  |  |
| Discharge of the DFG in the port in containers | WWF Poland/ Lithuania Fund for Nature and the municipality of Landskrona are providing containers in their respective ports. In the three other projects, no reception facilities are available in the ports. DFG are directly sent to waste management centers. | 2 |
| Sorting of the DFG landed in the port | In SPS-SE, retired fishermen are paid to sort the DFG landed; the material that can be easily recycled and is possible to sell is separated. | 1 |
| Re-use | In SPS-SE, fishing nets in good conditions are separated from the rest in the port and are re-used. | 1 |
| **Transport** |  |  |
| Transfer of DFG to management centre by fishermen | In SPS-SE, fishermen are transporting the retrieved nets directly to the management center. | 1 |
| Transfer of the DFG to waste centre by waste management company |  | 3 |
| **Treatment** |  |  |
| Sorting of the DFG in treatment facilities | In SPS-SE, further separation is done at the waste management centre, especially to take out metals, such as copper, stainless steel and lead. | 3 |
| Recycling | In SPS-SE, NPF-SE, LGN-NO the maximum of the DFG is recycled | 3 |
| Disposal of DFG in landfills or incineration without recovery | In the WWF-PL project the nets are disposed of in the landfill; in the SGO-SE project in incineration. | 2 |
| **Monitoring** |  |  |
| Measurement of the results | The fisherman Bo Landen (SPS-SE) started on his own initiative to systematically map the position of retrieved nets during the operation. In NPS-SE, the fishermen also gather information. Both use a simple template developed by Per-Olof Larsson (retired official from the Institute of Marine Research, supporting fishermen on monitoring).  In WWF-PL, monitoring sheets are filled in by vessels and the amount of fishing gear collected is weighed in the port.  In LGN-NO the information is gathered by the Norwegian Directorate of Fisheries. | 4 |
| Type of information reported |  |  |
| Number of DFG collected | LGN-NO, NPF-SE, SPS-SE |
| Length of DFG collected | LGN-NO, NPF-SE, SPS-SE |
| Weight of DFG collected | WWF-PL |
| Position of DFG collected | NPF-SE, SPS-SE |
| Composition of DFG collected | NPF-SE, SPS-SE |
| Number / type of entangled species | NPF-SE, SPS-SE, LGN-NO |
| Reporting of the results | In LGN-NO, the Norwegian Directorate of Fisheries records all survey data in annual survey reports, including the amount and composition of retrieved fishing gear and the amount of entangled organisms (e.g. fish).  In SPS-SE and NPS-SE, the fishermen report to the Swedish Board of Agriculture for each project period on the positions of the drags, amount and composition of DFG retrieved and the amount of fish, birds and mammals as well as other items contained in the nets. | 3 |
| **Raising awareness** |  |  |
| Dissemination of results | In LGN-NO, the results are presented to the fishermen during an event and the press is invited.  Swedish fishermen have presented their results in seminars organised by individual municipalities or KIMO Baltic. | 3 |
| PR material | WWF-PL made use of information brochures to encourage reporting of cases of lost nets and other marine litter laying on the beach and TV programmes. | 1 |

1. Derelict fishing gear retrieval: assessment conclusions

The effectiveness and efficiency of DFG retrieval based on current practices in the three Swedish projects is considered in this chapter as these are the only ones in which fishermen undertake periodically special trips to retrieve DFG; this is the type of project that will be considered for replication or maintenance by MARELITT.

Effectiveness

Removal of DFG

The assessment considers the effectiveness of the ML retention projects to reduce marine litter present in the seas and entering the seas, and also considers environmental impacts overall. The three assessment questions are:

1. Are the DFG retrieval projects significantly reducing the amount of DFG?
2. Do the projects have a positive environmental impact?
3. Do the projects have any negative environmental impacts?

Are the DFG retrieval projects significantly reducing the amount of DFG?

The results of the three participating Swedish fishermen vary considerably, but demonstrate that under DFG retrieval projects significant amounts can be retrieved and that the effectiveness greatly depends on the design of the projects. As such, one fisherman did not retrieve any DFG at all during 40 days at sea.

Table : Overview of performance of three Swedish DFG projects

| **Project** | **Number of days at sea** | **Amount of gill nets retrieved (km)** | **Amount of traps retrieved** | **Number of fish retrieved** |
| --- | --- | --- | --- | --- |
| NPS-SE | 265 (2009-2013) | Total: 103  Average per day: 0.39 | Total: 276  Average per day: 1.04 | Alive and recently died : 366  Decomposed: 500 |
| SPS-SE | 97 (2011-2013) | Total: 16  Average per day: 0.16 | Total: 579  Average per day: | Alive and recently died: 60  Decomposed: 86 |
| SGO-SE | 2012: 40  2013: 40 | Total:  2012: 1.1  2013: no DFG retrieved | No information available | No information available |

DFG retrieval projects may be considered necessary where there is a high concentration of lost nets. They may be less necessary in areas of high trawl activity, where nets are picked up over time, providing nets are landed ashore. Gear loss rates are also likely to be higher in deeper waters and in areas where there is a high number of vessels involved. DFG projects that target these high concentration areas will obviously be the most effective.

To determine these high concentration areas, an understanding of the most common factors which cause fishing gear to be abandoned, lost or otherwise discarded, is required. Each fishery is very different and should be judged on its own merit. The causes and extent of fishing gear loss vary considerably, but common factors include the following:

* **Direct causes**:
  + Challenging currents and adverse weather, making it more likely that gear will be left or discarded
  + Operational fishing factors, including the cost of gear retrieval
  + Gear conflicts (between static and towed gears, when trawlers tow through set-nets), resulting in the loss or damage of gear (spatial pressure)
  + Illegal, unregulated and unreported (IUU) fishing: enforcement pressure may cause those operating illegally to abandon gear.
* **Indirect causes:**
  + the unavailability of onshore waste disposal facilities, as well as their accessibility and cost of use, which may encourage dumping of unwanted fishing gear at sea rather than disposal onshore. (economic pressure)

Trawling is the most common cause of DFG in the Baltic Sea – it is responsible for 64.5 per cent of lost nets according to results from the FANTARED 2 project[[28]](#footnote-28). Trawling is forbidden, however, in the area in which several of the Swedish fishermen undertook their retrieval efforts. It is therefore not gear conflicts with trawlers that is the common cause of gear loss, but the heavy maritime traffic in the area which causes conflicts as they run over the nets and cut the lines. In addition, the currents are occasionally so strong that they can pull of the lines and make the nets drift away.

Some intervention areas may not be suitable for dragging to the rocky seabed. On some occasions, some of the Swedish fishermen have used divers to locate the gear and to help with the retrieval.

To encourage fishermen to target their retrieval efforts, the granting of public funding could be made conditional upon meeting certain requirements, and even on performance requirements (i.e. a minimum average amount of DFG to be retrieved per day).

The Swedish fishermen mainly fish in areas that they are familiar with and as such manage to target their retrieval efforts. The use of various technologies to locate lost gear using such as the side scan sonar for sea-bed surveys, can also increase the efficiency.

An important factor that may increase the effectiveness is the use of retrieval gears with a high recovery efficiency. The Swedish fishermen have managed over the years to increase the efficiency of their retrieval gear that they devised themselves.

The speed of the vessel is also a success factor, and the Swedish fishermen over the years have optimized the speed and know now what speed is optimal for the purpose and for the specific areas from which they retrieve gear. Self-retrieval by fishermen immediately after loss is the most effective, and given the cost of fishing gear, fishermen will be eager to do so, wherever technically possible and definitely in relatively shallow waters.

Knowing the exact location of lost gear greatly enhances chances of recovery. Close to shore this can be achieved by using landmarks. The use of GPS systems allows to know and to record in many cases the position in offshore waters. Accurate reporting of gear losses by fishermen is required.

Regarding the organizational aspects, the effectiveness of the efforts of the individual fishermen could probably be increased if they would be incorporated in a project that is managed by a lead organisation that provides technical, logistical and administrative support to the projects. This would also enhance the sharing of expertise and experience between fishermen, and the information on potential concentration areas.

The two most active fishermen, referred to as projects NPS-SE and SPS-SE, seem to greatly benefit from the support of a retired Swedish official that during his career build up experience with DFG. If all fishermen could receive such support from a lead organisation, the effectiveness of their efforts would likely be improved.

A lead organisation could also help with securing funding for the projects and involve stakeholders other than fishermen. One example would be recycling companies, which could enable the recycling of retrieved DFG[[29]](#footnote-29). Manufacturers of fishing gear are another stakeholder for potential involvement[[30]](#footnote-30).

Do the DFG retrieval projects have a positive environmental impact?

The main negative environmental impact of DFG remaining in the seas is ghost fishing. The catching efficiency of lost nets decreases rapidly at first, with the rate of decline in catching efficiency decreasing over time. For DFG retrieval projects to be most effective, the fishing gear should be retrieved shortly after it has been abandoned, lost or otherwise discarded.

It is unlikely though that DFG projects are able to prevent the high levels of ghost fishing immediately after fishing gear is lost, unless they take place very frequently. The Swedish DFG retrieval projects do not take place frequently, mostly only once per year, for a consecutive period of approximately 40 days, when the ships lay idle in ports.

They do however target the gears that most likely to ghost fish, i.e. gillnets and traps (while other gear, such as trawl nets and longlines, are more likely to cause entanglement of marine organisms and habitat damage).

The number of fish retrieved by the Swedish DFG retrieval projects seems to indicate that the environmental impact of DFG that is ghost fishing is minimal, when taken in the context of overall catches, and when compared to the environmental impacts of active gear (e.g. bottom trawling).

However, reduction in ghost fishing is just one of the environmental benefits of DFG. More importantly, it should be noted that once DFG has ceased to fish as they degrade and break up, they may still pose a threat through its accumulation on the strand line and its contribution to beach litter and the eventual fate of the constituent (slowly degrading) synthetic materials in the marine environment.

To enhance the positive environmental impact of DFG it is crucial that easily accessible onshore waste disposal facilities are foreseen. The cost of using them should not encourage dumping of unwanted fishing gear at sea rather than disposal onshore. In some of the Swedish DFG projects, the disposal and recycling of the retrieved DFG is a problematic issue. Appropriate reception facilities do not exist in some of the ports and the recycling potential (of the metals and the plastics) have not been researched. Some of the DFG that is retrieved is even burnt in the open air, which obviously reduces the positive environmental impact of retrieval.

Do the projects have any negative environmental impacts?

DFG retrieval projects have potentially a negative environmental impact that should be considered when designing and implementing DFG projects. The environmental costs of DGF retrieval may include among other:

Some negative impacts of removing lost gear form the sea on scavenger species that may depend on ‘ghost’ nets and pots

Potential costs in terms of resource productivity of removing lost gear from the sea, if fouled ghost nets are acting as reefs rather than actively catching fish

Some ghost nets may be better left alone rather than retrieved, if already completely bio-fouled and embedded in the seabed

Potential habitat damage from retrieval gear. The environmental impacts of gear retrieval techniques need to be considered, especially in sensitive habitats.

According to the fishermen that implement the Swedish DFG projects, their efforts do not have any negative environmental impacts; however this statement is difficult to verify. In any case, they seem to be aware of the potential environmental impacts, and it can therefore be expected that they take them into account.

Raising awareness

Raising awareness is not an objective of the projects and raising awareness actions have not been undertaken. Nevertheless, raising awarenessof the extent of the DFG problem in general and on the impacts of DFG on marine ecosystems is a cross-cutting measure that can aid the development and implementation of any of the preventive or curative measures. Greater awareness would probably lead to better compliance with policies and laws (including those prohibiting dumping and littering).

Greater awareness will also help to gain and to sustain support for preventive measures (such as the provision of adequate port reception facilities for DFG) and to build support for funding DFG retrieval efforts. Raising awareness campaigns can target fishers themselves, other marine users and port authorities.  
  
To raise awareness effectively, the DFG problem needs to be fully understood (e.g. the direct cause of gear loss, the types of gear that are most frequently lost etc.) so that actions can be appropriately targeted, i.e. so that the right messages are delivered to the right target audience. The information gathered under DFG retrieval projects can be used to build up this understanding.

Monitoring of DFG

With respect to the effectiveness of monitoring, because only small areas of fishing ground can be covered, retrieval programmes are not considered a reliable research tool to estimate gear loss. However, it is worthwhile to investigate how DFG projects may help to provide better information on the extent of the DFG problem and related environmental impacts and how this information may be effectively used.

Monitoring can be a useful aspect of DFG projects for a number of reasons, including the fact that monitoring encourages more strategic project implementation, which has already been identified as a weakness of the projects. And also, monitoring does bring some information about the DFG collected, and this information can be put to good use for awareness raising and publicity efforts. The lack of use of the information that is being gathered under the Swedish retrieval projects is one aspect that could be significantly improved.

Efficiency

The economic benefits of DFG retrieval relate to:

* Enhanced income/value-added resulting from reduced ghost fishing mortality which is therefore able to be caught by fishermen
* Reduced gear/engine entanglement with lost/discarded gear, resulting in less sorting/disentanglement time, more fishing time

The retrieval of fishing gear is costly. The economic costs of DFG retrieval relate to the cost to fishermen (and administrations) of DFG retrieval projects. From the assessment of the Swedish projects undertaken by the individual fishermen, it can be concluded that the approximate average cost per day at sea amounts to EUR 1,600. The budget items included in this cost are: boat hire, fuel and crew (98%) and meetings and administrative costs (2%). The cost of the treatment of the retrieved DFG is not included.

It is likely that the economic benefits of DFG retrieval projects outweigh the costs, provided that they are undertaken in an effective manner, which includes among other the targeting of high concentration areas.

Conclusions

There remain significant gaps in knowledge about DFG in EU waters, including the amounts and location of DFG. A literature review suggests that in relation to the total number of nets being used in EU waters, the rates of permanent net loss appear to be rather low – well below one per cent of nets deployed. An exception to the low loss rates seen in most European fisheries is in the deep water net fishery in the north east Atlantic.

There are very few DFG retrieval projects in the EU and they are all in the Baltic Sea. Sweden is the only country that co-finances, with the EFF, special purpose trips by a small group of fishermen to retrieve DFG. There is thus limited opportunity to derive good practices from existing initiatives. Some good practices can be derived though from a few pilot and large EU funded research projects (e.g. FANTARED or DEEPNET). Also, two new EU research/pilot projects have just started in the Adriatic.

Addressing the problem is challenging, as it depends to a significant degree on changing human behaviour in addition to providing the relatively straightforward technological fixes. The information gathered under DFG retrieval projects can be used to build up the necessary understanding to manage the problem and to raise the awareness.

Preventative measures to tackle DFG are generally more effective than removal measures, as they avoid the occurrence of DFG and its associated impacts, including the impact on the marine environment and the potentially high costs associated with DFG retrieval projects. However, to successfully reduce the problem of DFG , and more generally to reduce its contribution to marine litter, DFG retrieval projects are necessary and are likely to be cost-effective when considering the costs of leaving the DFG in the marine environment, provided that high concentration areas are targeted and the potential negative environmental impact from sea-bed disturbance are considered. .

Examples of preventive measures include:

The provision of adequate, affordable, accessible onshore port reception/collection facilities that accept retrieved DFG and damaged gear

The application of a no-special fee system (as in the Baltic Sea region)

The development of innovative recycling solutions

Gear marking, to identify ownership

Use of onboard technology to avoid loss or improve the location of gear

Measures to reduce operational gear losses, including limits tothe amount of gear that can be used (e.g. pot/trap limits) and the soak time (the amount of time gear can remain in the water)

Measures to reduce gear conflicts: spatial management (e.g. zoning schemes)

Measures to reduce the abandonment of gear: effective tackling of illegal, unreported and unregulated (IUU) fishing

1. Other considerations

The assessment of the effectiveness of the ML retention projects has given insight on the extent to which the projects meet their stated objectives regarding ML removal, awareness raising and monitoring. To get a full picture of the performance of the ML retention projects and the context in which they operate, as well as better understand the potential of this practice for the future, we have reviewed sustainability and legal considerations.

Sustainability

A key consideration for projects of this sort is their sustainability of operations, or long-term viability without a source of external financing. MLR projects as currently structured will always need some sort of subsidy in order to operate: their internal operations do not cover costs, including project management, supplies and waste management. This subsidy may come from a public or private source, include from within the lead organisation (e.g. the KIMO association of local authorities runs projects financed by its members) or an external grant source. Typically financing implies a fixed budget for a fixed time frame, meaning that once grants run out, project operations cease, unless a renewal or new external source of financing is found.

There are a number of ways in which projects can seek greater sustainability, e.g. the capacity to continue operations once an external grant has run out and will not be renewed. Typically, grant sources (e.g. EU and national funding for environmental projects, etc.) as these are often considered start-up funds and do not entail a long-term commitment. Among these are:

Participation by the private sector, particularly industries that are part of the source of marine litter, such as the shipping industry, plastics and packaging manufacturers. Such work can be part of a corporate social responsibility programme, for example.

In-kind (or even cash) contributions from private sector project participants. Some current projects have received this from waste management companies (see Section 2.6).

Likewise, if the lead organisation is a local authority, port authority or other organisation with a sustainable budget, support to fishermen for ML retention activities could be integrated into regular operations. This would also provide a greater incentive to improve efficiency and keep costs down.

These considerations will be part of the work carried out for future ML retention projects in 2014, as they are critical aspects for which there is not much existing good practice.

Legal considerations

To better understand how ML retention projects can operate within the legal and policy mechanisms of the EU Member States, as well as the requirements that are legally placed on fishermen with regard to marine litter that is ‘fished’, two legal questions can be addressed.

1. Can fishermen throw back into the sea litter that was caught in their nets, or is this illegal dumping?
2. Does the waste collected at sea during ML retention activities fall under the PRF Directive?

This section considers both MARPOL and the PFR Directive. The Directive aims to implement the MARPOL 73/78 Convention, which is designed to minimise the pollution of the seas from ships, covering dumping, oil and exhaust pollution.

1. Can fishermen throw back into the sea litter that was caught in their nets, or is this illegal dumping?

This question essentially concerns the legal status of marine litter. At the basis of the international law requirements regulating marine litter are the provisions set by the MARPOL Convention[[31]](#footnote-31), regulating operational vessel-source pollution[[32]](#footnote-32). Overall, the MARPOL Convention seeks to eliminate and reduce the amount of garbage being discarded into the sea from ships.

MARPOL defines garbage as ‘all kinds of victual, domestic and operational waste excluding fresh fish and parts thereof, generated during the normal operation of the ship and liable to be disposed of continuously or periodically except those substances which are defined or listed in other Annexes to the present Convention’ [emphasis added][[33]](#footnote-33). Under its recently revised Annex V (Regulations for the Prevention of Pollution by Garbage from Ships)[[34]](#footnote-34), it provides a legally binding ban on the discarding of plastic waste from ships into the seas/ocean (for the contracting parties that ratified this optional Annex V)[[35]](#footnote-35). The revised Annex V is stricter and prohibits the discharge of all garbage into the sea, except as provided otherwise.

‘Fresh fish’ or ‘bycatch’ is explicitly excluded from the definition of garbage, which could imply that taking nets onboard with more content that the targeted fish is covered by the ‘normal operations of a vessel’. Therefore, as marine litter is not explicitly excluded by Annex V it can be concluded on the basis of the strict interpretation required by Annex V that the discarding of marine litter in the sea is prohibited.

This interpretation should however be confirmed by the European Commission[[36]](#footnote-36). If this strict interpretation is correct, ML retention projects would not go beyond what is legally required. However, even in this case, they have the significant merit of contributing to better implementation of existing legislation. In addition, they encourage the establishment of adequate waste reception facilities in fishing ports.

1. Does the waste collected at sea during ML retention activities fall under the PRF Directive?

In other words, is it necessary to set up separate systems for the disposal of marine litter or can marine litter be disposed of as part of the existing systems that are required under the PRF Directive?

Marine litter is covered by the PRF Directive if it is considered to be ‘ship-generated waste’. The scope of the PRF Directive states that it applies to all ships, including fishing vessels[[37]](#footnote-37). The definition of ‘ship-generated waste’ reads[[38]](#footnote-38) ‘all waste, including sewage, and other residues, other than cargo residues, which are generated during the service of the ship and fall under the scope of Annexes I, IV and V of MARPOL 73/78 and cargo associated waste as defined in the guidelines for the implementation of Annex V of MARPOL 73/78’.

Based on a strict interpretation marine litter can be considered ship-generated waste as marine litter is caught in the nets of the fishermen, which are the normal activities of a fishing vessel. Again, this needs to be confirmed by the Commission. There is no obligation for the port however, to accept marine litter free of charge – this is up to the discretion of the port authorities.

**Adequate port reception facilities**

All European fishing ports are obliged to have adequate port reception facilities for ship-generated waste to meet the needs of ships without causing undue delay to them[[39]](#footnote-39). No definition of ‘adequate’ is provided; this is left to the discretion of the Member States.

In conclusion, the port facilities must accept all the waste that cannot be discarded into the sea. This means that, when marine litter caught in the nets of fishermen cannot be thrown back in the sea, port reception facilities are obliged to accept the litter.

**Charging systems**

Ports must ensure that they have a charging system in place in order to levy the fee required under Article 8 of the Directive. Article 8 requires the implementation of a cost recovery system - applying a waste fee - providing an incentive to ships not to discharge ship-generated waste at sea. Article 8(2) states that ‘all ships calling at a port of a Member State shall contribute significantly to the costs referred to in paragraph 1, irrespective of actual use of the facilities’. The Commission interprets the word ‘significantly’ as a figure of the order of at least 30 % of the costs referred to in Article 8(1).[[40]](#footnote-40) Ports are thus to establish cost recovery systems which encourage the use of facilities whilst at the same time placing the burden of cost on ships (PPP). This is left to the discretion of the Member States. This system applies to ships other than fishing vessels and recreational craft authorised to carry no more than 12 passengers (Article 8(2)).

Based on this review of legal instruments applicable in the EU Member States, if marine litter is considered ship-generated waste, then it is illegal for fishermen to throw it back into the sea once it is brought on board the ship in the course of normal fishing activities. Furthermore, in this case, ports have an obligation to accept the litter at port reception facilities for waste. They may charge a fee for this, at their discretion.

1. Contrats Bleus (Brittany); Memorandum of Understanding FFL (Palma Mallorca). [↑](#footnote-ref-1)
2. Contrats Bleus (Mediterranean). [↑](#footnote-ref-2)
3. CETMAR Nada Pola Borda and Pescal (Galicia). [↑](#footnote-ref-3)
4. A stakeholder is defined as ‘an entity that can be affected by the results of that in which they are said to be stakeholders, i.e., that in which they have a stake’. [↑](#footnote-ref-4)
5. This amount comes from the port authority’s budget – the regional chamber of commerce and the tax paid by fishermen and wholesaler (the PA only received external funding for building the port infrastructure). The tax does however not cover the full 250 000 EURO. [↑](#footnote-ref-5)
6. For the Contrats Bleus projects (Brittany and Mediterranean), the EFF funded 20% additional to the 80% financed by the French government. For the Spanish projects (NPB & Galicia), the division of funding between the government and the EFF is unknown. [↑](#footnote-ref-6)
7. Waste mgt is financed by the levy of a tax on kg of fish sold. [↑](#footnote-ref-7)
8. Waste mgt is financed by the Port Authority. [↑](#footnote-ref-8)
9. No data on budgets. Repartition based on division private/public funders. [↑](#footnote-ref-9)
10. No data on budgets per funder. Repartition based on division private/public funders. [↑](#footnote-ref-10)
11. Waste mgt is financed by the Port Authority & local municipalities. [↑](#footnote-ref-11)
12. Waste mgt is financed by the waste mgt company. [↑](#footnote-ref-12)
13. Waste mgt is financed by the waste mgt company. [↑](#footnote-ref-13)
14. Monitoring is financed by the waste mgt company: to assess recyclability. [↑](#footnote-ref-14)
15. The Vuilvisproject Den Helder (VV-NL) was set up as pilot project for a regional approach financed by the North Sea Directorate of RWS. Therefore it is also considered under regional/national projects. [↑](#footnote-ref-15)
16. The Contrats Blues projects set up both on the Atlantic coast (CBB-FR) and in the Mediterranean coast (CBM-FR) aim for a regional approach, but due to financial constraints had to cut down in scale or even tend to stop in 2013, as financial compensation for the fishermen became a problem. [↑](#footnote-ref-16)
17. Source: the 2013 Annual Economic Report on the EU Fishing Fleet, European Commission [↑](#footnote-ref-17)
18. Source: KIMO the Netherlands - Fishing for Litter project [↑](#footnote-ref-18)
19. Source: KIMO Baltic – Fishing for Litter project [↑](#footnote-ref-19)
20. *The use of trawling nets in the Mediterranean. Problems and selectivity options*, Sacchi J. in Basurco B. ( ed.). *The Mediterranean fisheries sector.* A reference publication for the VII meeting of Ministers of agriculture and fisheries of CIHEAM member countries ( Zaragoza, Spain, 4 february 2008), Zaragoza : CIHEAM / FAO / GFCM; Options Méditerranéennes : Série B. Etudes et Recherches; n. 62, 2008, pages 87- 96. [↑](#footnote-ref-20)
21. OSPAR is the Convention for the Protection of the Marine Environment of the North-East Atlantic. [↑](#footnote-ref-21)
22. Oslo and Paris Conventions for the Prevention of Marine Pollution, Working Group on Impacts on the Marine

    Environment (IMPACT), Stockholm: 10-13 October 1995 – Summary Record [↑](#footnote-ref-22)
23. *UNEP/IOC Guidelines on Survey and Monitoring of Marine Litter, Regional Seas Reports and Studies No. 186* - IOC Technical Series No. 83 [↑](#footnote-ref-23)
24. *Monitoring Guidance for Marine Litter in European Seas.* MSFD GES Technical Subgroup on Marine Litter (TSG-ML). DRAFT REPORT, July 2013 [↑](#footnote-ref-24)
25. For 2 projects, KIMO NL and KIMO SW, cost and effect data were not available. KIMO SW will probably become available via an interview. [↑](#footnote-ref-25)
26. The assessment conclusions in this section are based on the assessment of the DFG projects and on a review of the following reports:

    Macfadyen, G.; Huntington, T.; Cappell, R. Abandoned, lost or otherwise discarded fishing gear. *UNEP Regional Seas Reports and Studies* No.185; *FAO Fisheries and Aquaculture Technical Paper,* No. 523. Rome, UNEP/FAO. 2009. 115p.

    Brown, J, G. Macfadyen, T. Huntington, J. Magnus and J. Tumilty. *Ghost Fishing by Lost Fishing Gear*. Final Report to DG Fisheries and Maritime Affairs of the European Commission. Fish/2004/20. Institute for European Environmental Policy / Poseidon Aquatic Resource Management Ltd joint report. 2005. 151p.

    Hareide, N-R., Garnes, G., Rihan, D., Mulligan, M., Tyndall, P., Clark, M., Connolly, P., Misund, R., McMullen, P., Furevik, D., Humborstad, O.B., Høydal, K. & Blasdale, T. *A Preliminary Investigation on Shelf Edge and Deepwater Fixed Net Fisheries to the West and North of Great Britain, Ireland, around Rockall and Hatton Bank.* Bord Iascaigh Mhara, Fiskeridirecktoratet, Northeast Atlantic Fisheries Commission, Sea Fish Industry Authority, Joint Nature Conservation Committee, Marine Institute Foras na Mara. . 2005. 47 pp. [↑](#footnote-ref-26)
27. Sweden is divided into 8 regions (NUTS II) and 21 counties (NUTS III). Each county has a County Administrative Board, which is a coordinating authority with supervisory responsibilities. [↑](#footnote-ref-27)
28. EU Study Contract FAIR CT98-4338 [↑](#footnote-ref-28)
29. In the EU, recycling facilities for DFG reportedly exist in Denmark and in Slovenia. [↑](#footnote-ref-29)
30. An interesting, most likely very recent practice, has been reported in Sweden, with respect to a FG manufacturer that takes back old nets from fishermen that buy a new one and that in exchange gives a discount on the new net. While this example does not relate to DFG retrieved from the sea, it is worth considering whether gear manufacturers could also play a role in DFG retrieval projects. [↑](#footnote-ref-30)
31. 1973/1978 International Convention for the Prevention of Marine Pollution from Ships (opened for signature 15 January 1974, entry into force 2 October 1983) 12 ILM 1319. [↑](#footnote-ref-31)
32. See for detailed discussion: Trouwborst, A (2011), Managing marine Litter: Exploring the Evolving Role of International and European Law in Confronting a Persistent Environmental Problem, in: *Merkourios, Utrecht Journal of International and European Law*, Volume 27/Issue 73, Article pp. 4-18. [↑](#footnote-ref-32)
33. Appendix B, Annex V of MARPOL 73/78 Regulations for the Prevention of Pollution by Garbage from Ships, Regulation 1(1). [↑](#footnote-ref-33)
34. The Correspondence Group for the Review of Annex V on Garbage completed its work and reported to the sixty-first session of the Marine Environment Protection Committee (MEPC) in 2010. The MEPC at its sixty-second session (2011) adopted the amendments to Annex V by resolution MEPC.201(62), which entered into force on 1 January 2013.  [↑](#footnote-ref-34)
35. Regulations for the Prevention of Pollution by Garbage from Ships (entry into force 31 December 1988) [↑](#footnote-ref-35)
36. At the project intermediate meeting on 9 December 2013 with the Commission it was agreed that this interpretation would be reviewed by DG MARE. [↑](#footnote-ref-36)
37. These are defined as ‘any ship equipped or used commercially for catching fish or other living resources of the sea’. [↑](#footnote-ref-37)
38. Art. 2. PRF Directive. [↑](#footnote-ref-38)
39. Art. 4(1) PRF Directive [↑](#footnote-ref-39)
40. PRF Directive. [↑](#footnote-ref-40)