MARELITT Baltic

Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

Harbour Survey

Survey on Harbour Reception Facilities at selected Baltic Sea fishing harbours

Marek Press, Keep the Estonian Sea Tidy
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Cover photo: Marek Press

Abstract

The survey was carried out within the scope of the MARELITT Baltic project, work package 4. The objective was to assess the readiness, capability and capacity of Baltic Sea fishing harbours to receive, separately collect and sort the derelict fishing gear (DFG) collected from the sea as well as end-of-life fishing gear. Fifty fishing harbours by the Baltic Sea were visited during the survey. The level of the port reception facilities (PRF) and the waste reception and handling procedures (operations related to the separate collection and sorting of DFG) used at the harbour were observed and assessed. Data was collected for the survey in the course of on-site visits, interviews and background checks.

The results reveal that more than half of the harbours selected for participation in the survey have organised waste management services at a reasonably good level. The survey results also indicate that fishing harbours in Germany and Poland have somewhat better general ability to organise waste management than those in Sweden and Estonia. The survey reveals that almost half of the harbours do not have enough containers suitable for the separate collection of waste. However, it must be noted that adding more containers alone will not solve the deficiencies and problems of waste management at harbours. The addition of containers and other reception facilities must be accompanied by an increase in the quantity and quality of suitable supporting waste management services. The principles set out in the EU waste hierarchy, which promote waste prevention, reuse and recovery of materials, must be followed when developing and implementing harbour waste reception and handling plans (which is not the case at the moment).

Fishing gear (DFG and end-of-life fishing gear) is not separately collected in almost half of the fishing harbours at present. Instead, it is placed in the same container as other municipal waste. In most cases, the harbour personnel do not know what happens next to separately collected fishing gear – if the waste management companies to whom the waste is transferred have the competency and technical facilities required for reprocessing and recovery of the material. Such a lack of knowledge and information does not promote the separate collection and handling of fishing gear at harbours.

There are also deficiencies in the provision of information to the harbour users. Fishermen do not always know where and when end-of-life fishing gear must be collected. No attention has been given to ICT opportunities for introducing the waste management rules and organisation of work at harbours (e.g. the harbour's website does not provide enough information). A few exceptions aside, it can be said that regional cooperation in solving the problems caused by derelict fishing gear is lacking. Baltic Sea countries also lack a common national understanding of the challenges related to the collection and handling of DFG at harbours.

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1. Introduction

Derelict fishing gear (DFG) is addressed worldwide as a source of marine litter with extensive hazardous effects on the marine ecosystem. Despite intense media focus, the problem is poorly known in the fisheries industry and among politicians. The MARELITT Baltic project is one of the first transnational initiatives in the world to provide an operation oriented all-in-one solution for how to approach DFG. It will turn a diffuse problem into a clear and apprehensible topic that can contribute to an enhanced international readiness to act.

The aim is to develop cost-efficient, safe and environmentally friendly cleaning, prevention and recycling methods for derelict fishing gear that is retrieved in both open water, on seafloor and on wrecks. The project will constitute a baseline for future cleaning measures and develop a sustainable plan and methodology that can be implemented in post-project operations and be used by other countries and organisations in the future.

The project is divided into five work packages (WP), where package 2, 3 and 4 are the major parts concerning the cleaning, prevention and recycling of DFG. This survey was carried out within the scope of the MARELITT Baltic project, work package 4: Marine litter reception facilities and recycling.

1.1 The aim of activity 4.1

The survey aims to obtain an overview of the current situation at the selected Baltic Sea fishing harbours regarding:

1. Collection and handling of derelict fishing gear
   (DFG = abandoned and retrieved fishing gear)
2. Collection and handling of old, redundant, damaged, retired or otherwise non-operational fishing gear (= end-of-life fishing gear).

The objective was to describe and define the strengths of the harbours' facilities as well as gaps that might hinder DFG and end-of-life fishing gear collection and treatment.

1.2 Scope and limitations

The survey of harbour reception facilities for marine litter was conducted with a specific focus on facilities to collect and treat DFG and end-of-life fishing gear. The focus has been more on the practical aspects of fishing gear collection and not so much on the political, legislative and economic aspects of the same topic.

Several interviews with harbour personnel, local fishermen and representatives of regional fishery organisations were carried out within the scope of the survey. The survey results will provide an overview of the existing harbour reception facilities

for DFG and end-of-life fishing gear and the appropriate DFG storage practice for pre-processing at the harbours. The results will help define the current status of DFG treatment, including the strengths of the harbours' facilities as well as weaknesses.

The scope of this survey did not include an analysis of the national legislation that regulates the waste management and port reception facilities. Neither have the requirements established by the national agencies that supervise ports and fisheries for the contents of waste management plans or the accessibility and adequacy of reception facilities been analysed.

1.3 Legal framework and international commitments

The methodology, and especially the definition of assessment criteria used in this survey, has been formed in accordance with the following legal framework and international commitments.

1.3.1 MARPOL 73/78

International Convention for the Prevention of Pollution from Ships

MARPOL 73/78 is one of the most important international marine environmental conventions. The revised MARPOL Annex V prohibits the discharge of all garbage into the sea. The effectiveness of ships to comply with the MARPOL requirements depends largely upon the availability of adequate port reception facilities, especially within special areas. The Baltic Sea is considered a Special Area established under Annex V. The Annex obliges Governments to ensure the provision of adequate reception facilities at ports and terminals for the reception of garbage.

1.3.2 The PRF Directive

Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues (currently under revision)

The main objective of the PRF Directive is "to reduce the discharges of ship-generated waste and cargo residues into the sea, especially illegal discharges, from ships using ports in the EU, by improving the availability and use of port reception facilities".

The requirements of the PRF Directive in brief

Ports must provide facilities for receiving waste. The facilities must:

- Be available
- Be adequate
- Meet the needs of all users (all vessel sizes) with respect to types and quantities of waste.

The requirements of the PRF Directive generally apply to all ships, of all flags, and all ports in the EU, although there are exemptions for notification and charges for all fishing vessels and small recreational vessels (<12 people) (Eunomia, 2016).

1.3.3 The Waste Directive *(currently under revision)*

On March 14, 2017 the European Parliament voted on the proposal to revise the 2008 Waste Directive (along with revisions to a series of other EU waste rules). The revised legislative proposals on waste set clear targets for reduction of waste. Key elements of the revised waste proposal include:

- Concrete measures to promote re-use – turning one industry's by-product into another industry's raw material.

- Economic incentives for producers to put greener products on the market and support recovery and recycling schemes.

- For the first time, Member States must identify which products are the main sources of littering in the natural environment and take measures to reduce them. This can help address the marine litter problem.

- For the first time, producers will be required to pay for public information and communication campaigns on prevention of littering. The producers have to take their share of responsibility in changing consumer behaviour by adequately financing awareness campaigns to encourage consumers to do the right thing with their rubbish (CEN Bulletin, 2017).

1.3.4 An EU action plan for the circular economy

Part of the EU's shift to a circular economy involves preventing the littering of resources which could be used again instead of polluting our environments. Parliament is considering various ways to finance greater litter prevention efforts, including by imposing part of that cost on producers of items that end up as litter, for example, by making the cost of participating in extended producer responsibility schemes (EPRS) vary in proportion with a product's occurrence as litter. Generally, litter prevention measures on the table are becoming increasingly specific, with some even proposing to require that EU countries develop specific measures to target items that "are the main source of littering", including the top 10 items found littered on beaches (CEN Bulletin, 2016).

2. Material and Methods

2.1 Methodology in brief

The survey was conducted in the form of site visits, visual observations and interviews with harbour masters, technical managers and fishermen working at the harbours. Questionnaires were used to record and document the answers from the

persons interviewed. Site visits were documented using a photo camera. Keep the Estonian Sea Tidy Association (KEST) was leading the survey, and the other partners supported KEST by networking and providing translations during the interviews.

Some interviewees (local fishermen) were guaranteed anonymity to encourage them to be more open and express their opinions. Three interviewed fishermen wanted to remain anonymous to ensure good labour relations and continuing cooperation with colleagues, port authorities, waste management companies and local government representatives after highlighting any possible deficiencies.

General questions asked at the harbours:

1. What harbour reception facilities are there, and what type of marine litter can be handled?
2. What is the general practice of storage and treatment of DFG and end-of-life fishing gear?

Based on the background data about the selected harbours as well as the knowledge obtained during site visits and interviews, the reception facilities and waste-handling practices of the harbours that participated in the survey were assessed.

The objective of the assessment is to characterise the suitability and adequacy of the harbour reception facilities for receiving, discharge and (separate) collection of marine litter collected during the recovery/retrieval operations, including DFG. In addition to the conditions for receiving DFG and other types of marine litter the possibilities for the reception, discharge and separate collection of end-of-life fishing gear at ports were also assessed.

2.2 Harbour selection criteria

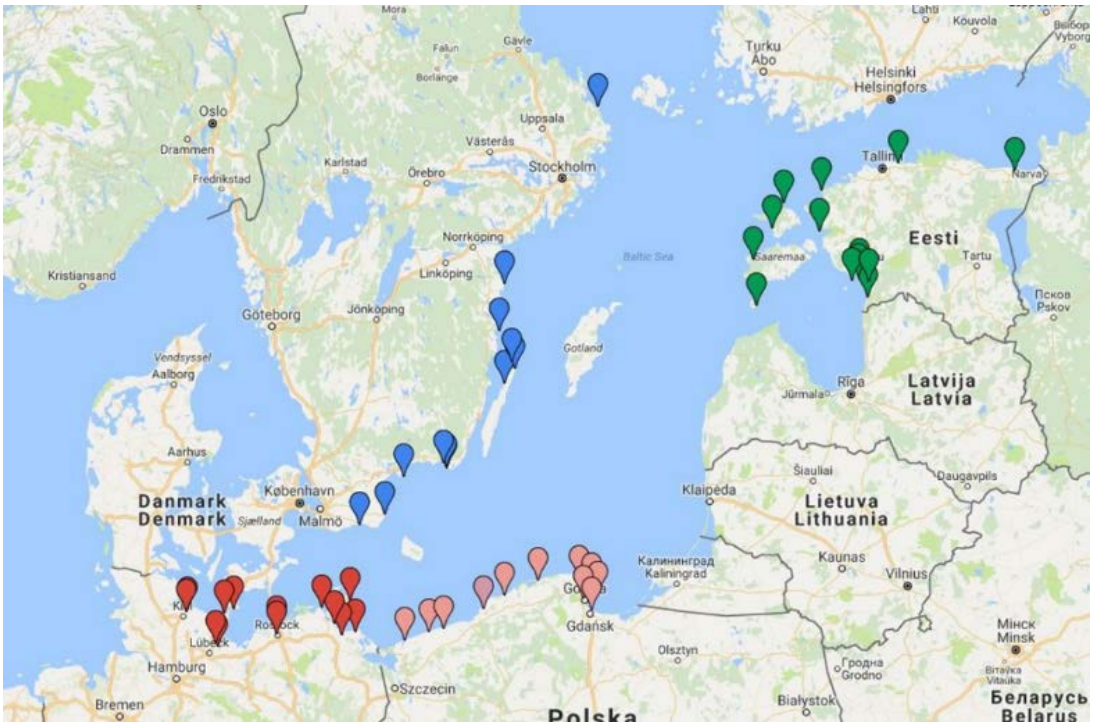
The selection criteria for including fishing harbours in the survey:

1. Location: the harbour is situated in the INTERREG Baltic Sea Region (BSR) Programme area; the location of the fishing harbour is in one of the four participating countries (Germany, Poland, Sweden, Estonia);
2. The importance of the harbour for fisheries/ fishermen, i.e. fish landing capacities at the harbour or presence of active fishing vessels;
3. Recommendations of local project partners regarding the harbour's suitability for participating as a project fieldwork base and DFG landing site; proximity to potential DFG host areas; accessibility by land (road transport) and by sea (marine transport);
4. Fishermen and the staff of the port authority are interested in and in favour of taking part in environmental projects, such as *MARELITT Baltic* or the *Fishing for Litter* initiative.

2.2.1 Selected fishing harbours

Based on the criteria described in the previous section, a selection of typical fishing harbours in four participating countries was put together in cooperation with WWF Poland, WWF Germany, Keep the Estonian Sea Tidy Association and Simrishamns Municipality.

German harbours	Polish harbours	Swedish harbours	Estonian harbours
1. Freest	1. Gdańsk	1. Grisslehamn	1. Haldi
2. Greifswald - Wieck	2. Gdynia	2. Gryt	2. Dirhami
3. Stahlbrode	3. Hel	3. Händelöp	3. Jaagupi
4. Sassnitz	4. Jastarnia	4. Sandvik	4. Lehtma
5. Barhöft	5. Łeba	5. Böda	5. Lindi
6. Warnemünde	6. Władysławowo	6. Byxelkrok	6. Liu
7. Rostock	7. Ustka	7. Ekenabben Karlskrona	7. Munalaiu
8. Niendorf	8. Darłowo	8. Sanda	8. Mõntu
9. Fehmarn	9. Kołobrzeg	9. Saltö	9. Puise
10. Heiligenhafen	10. Mrzeżyno	10. Nogersund	10. Toila
11. Laboe	11. Dziwnów	11. Simrishamn	11. Veere
12. Heikendorf		12. Ystad	12. Võiste
13. Kappeln			
14. Eckernförde			
15. Travemünde			



Map of survey locations, total statistics: 50 harbours visited (15 in Germany, 11 in Poland, 12 in Sweden, 12 in Estonia).

2.3 Description of the system for assessment

The European Commission has promised to develop guidelines, including instructions and advice about assessing the adequacy of port reception facilities and developing waste acceptance and management plans. Until these guidelines are prepared, port authorities and the organisations that manage ports as well as the authorities that perform inspections must assess the situation at a port themselves and decide on the suitable service standard and the application of the measures necessary for delivering ship-generated waste.

This survey considered the general IMO guidelines in the assessment of port reception facilities as well as the survey and analysis prepared in 2016 about the assessment of the impact of the PRF Directive of the European Commission. As the type of waste/litter in question (i.e. DFG) is more specific than usual, an independent unique assessment scale from one to four was developed, where Score 1 means a situation with apparent deficiencies (the port reception facilities and waste management services of the assessed harbour are obviously deficient and inadequate) and Score 4 characterises the situation at a harbour whose reception facilities are at a good technological level and where exemplary and contemporary waste management services are provided.

2.3.1 Definition of assessment criteria

Score 1: The port reception facilities and waste management services of the assessed harbour are obviously deficient and inadequate, i.e. the fishing harbour does not have enough waste containers that are accessible to visitors, fishermen and other harbour users; containers are overflowing and/or there is loose litter in the harbour area; there is no or very little information about the delivery and collection of waste in the harbour area displayed in a place visible to harbour users.

Score 2: A fishing harbour must comply with elementary waste management requirements to score at least 2 in the assessment.

1. After visual observation, it is possible to say that there is no or very little litter in the harbour area (there is no loose litter in the territory and waters of the harbour).
2. There are enough garbage bins and waste containers for (unsorted) household waste in the harbour area that are accessible to visitors, fishermen and other harbour users. The waste containers are not overflowing.
3. Contracts have been entered into with waste management companies. The waste containers are regularly emptied.
4. There is a (preferably lockable) waste station or site for sorting and separate collection of waste, as well as for the collection of hazardous waste, in the harbour area.

Score 3: A harbour that scores 3 during the assessment must offer at least four (out of five) of the following options in addition to complying with the criteria described above:

5. The harbour has a no-special-fee system in place for delivering ship-generated waste. In other words, this means that the fee for delivering ship-generated waste is included in the harbour fee (groundage) either partly (until a certain agreed quantity is reached) or entirely (the delivered amount of waste is not limited).
6. The harbour has separate containers for glass; paper and cardboard; PET bottles and plastic; (mixed) household waste; and seperate collection of hazardous waste. The service contract entered into between the port authority and the waste company takes into account that the waste collected separately at the harbour is transported and managed considering the specific properties of each type of waste.
7. Adequate information and instructions about the delivery and collection of waste at the harbour are displayed in a place visible to visitors, fishermen and other harbour users.
8. The harbour has collection containers (or a designated place in the waste station; or a special square with a hard (concrete or asphalt) surface) for end-of-life fishing gear (old, damaged, retired or otherwise non-operational fishing gear).
9. There is the existence of possibilities for the discharge of sewage and bilge water at the harbour, taking into account the use and quantity of the ships visiting the harbour.

Score 4: A harbour that scores 4 during the assessment must offer at least two of the following options in addition to complying with the criteria described above:

10. The delivery, collection and recovery of the waste generated at the harbour and on ships is considered in the waste management plan of the harbour and the municipal waste management plan (in the waste management plan of the local government).
11. It has the infrastructure, equipment and containers for handing over and separate collection of the DFG collected from the aquatic environment. This includes cooperation with waste management companies that have the technological capacity for preparing derelict fishing gear for the reuse of their materials.
12. Information and instructions about the delivery and collection of DFG and end-of-life fishing gear are displayed in a place visible to fishermen and other harbour users. Information is detailed, understandable and easy to find.

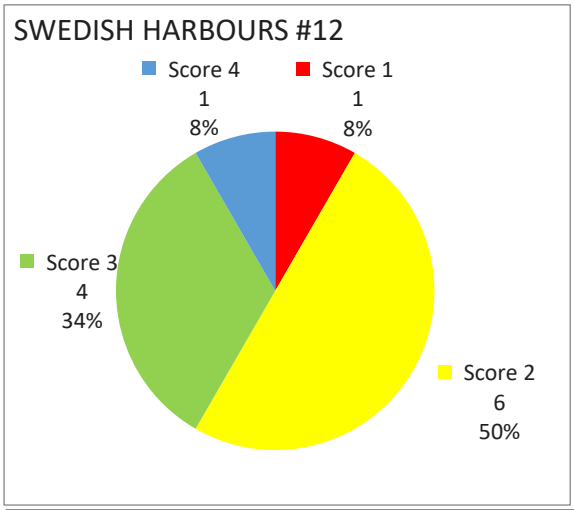
13. There are regional cooperation and coordinated joint activities between fishermen, fisheries organisations, fishing harbour owners and local governments in order to facilitate and promote the delivery and collection of derelict fishing gear.

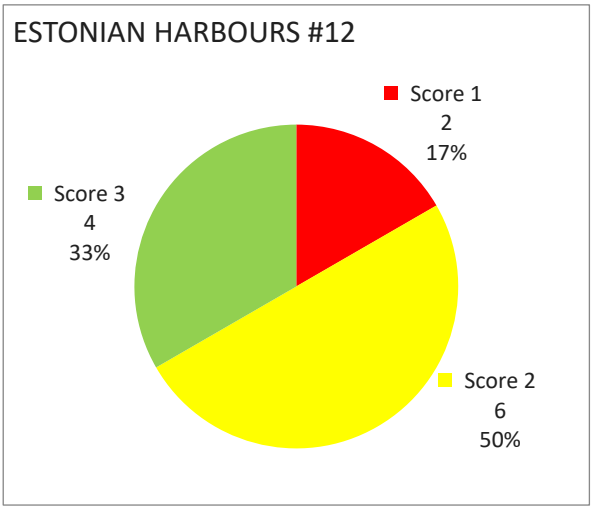
14. In addition to everyone involved being well informed, the fishermen, ship owners, port authorities, environmental and waste specialists of local governments and others are included in regional development work in order to prevent and reduce waste generation and promote the reuse of end-of-life fishing gear and recovery of materials contained in DFG.

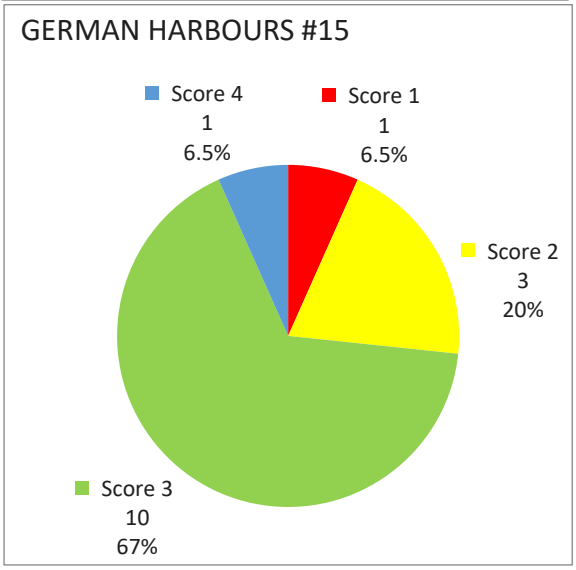
3. Results

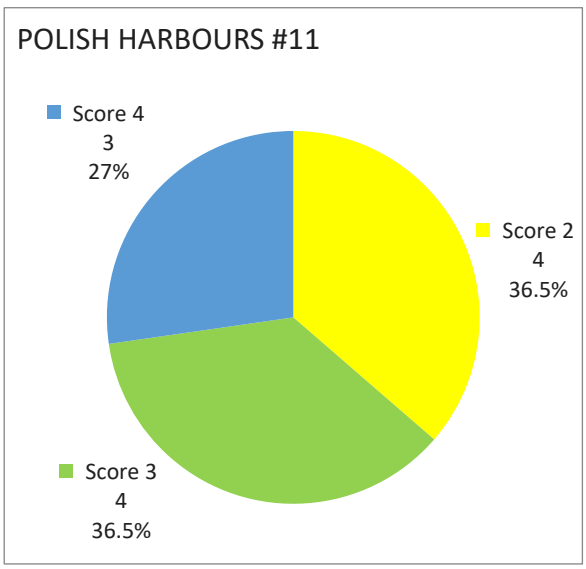
The assessment results presented in the table and charts in paragraph 3.1-3.2 describe the general organisation of waste management at harbours and the level of their port reception facilities.

3.1 Overview of the assessment results









3.2 Scoreboard

Assessment criteria → / Name of harbour ↓	Obvious deficien-cies in waste collection	No or very little litter in harbour area	Enough garbage bins and containers	Contracts have been entered into with waste management companies	Waste station or site for sorting & separate collection	No-special-fee system in place	Waste collected separately is managed considering specific properties of waste	Adequate information about collection of waste	Separate collection of end-of-life fishing gear	Possibility to discharge sewage and bilge water	The harbour fulfils at least two of the additional criteria re: collection of DFG and end-of-life FG	*Total score* **1, 2, 3, 4**
Number (Assessment Criteria)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-14**	
Swedish harbours												
1. Grisslehamn		V	V	V	V	V				V		**2**
2. Gryt		V	V	V	V	V	V			V		**2**
3. Händelöp		V	V	V	V							**2**
4. Sandvik		V	V	V	V	V	V			V		**2+**
5. Böda		V	V	V	V	V	V	V		V		**3**
6. Byxelkrok		V	V	V	V	V	V	V		V		**3**
7. Ekenabben Karlskrona		V	V	V	V	V						**2-**
8. Sanda	V	V	V	V		V						**1**
9. Saltö		V	V	V	V	V	V	V		V		**3**
10. Nogersund		V	V	V	V	V	V			V	V	**2**
11. Simrishamn		V	V	V	V	V		V		V	V	**3-**
12. Ystad		V	V	V	V	V	V	V	V	V	V	**4**
Estonian harbours												
1. Haldi	V											**1**
2. Dirhami		V	V	V	V	V	V	V		V		**3**
3. Jaagupi	V	V		V								**1**
4. Lehtma		V	V	V	V	V	V	V		V		**3**
5. Lindi		V	V	V	V	V	V			V		**2**
6. Liu		V	V	V	V							**2**
7. Munalaiu		V	V	V	V	V	V			V		**2**
8. Mõntu		V	V	V	V	V	V	V	V	V		**3**
9. Puise		V	V	V	V	V						**2**
10. Toila		V	V	V	V	V	V	V	V	V		**3**
11. Veere		V	V	V	V	V				V		**2**
12. Võiste		V	V	V	V	V						**2**

German harbours												
1. Freest		v	v	v	v			v		v		**2**
2. Greifswald - Wieck		v	v	v	v	v	v		v	v		**3**
3. Stahlbrode		v	v	v	v	v	v	v		v		**3**
4. Sassnitz Stadthafen		v	v	v	v	v	v		v	v	v	**3**
5. Barhöft		v	v	v	v	v	v	v	v			**3**
6. Warnemünde Alter Strom	v	v								v		**1**
7. Rostock Fischereihafen		v	v	v	v	v	v	v		v		**3**
8. Niendorf		v	v	v	v	v				v		**2+**
9. Fehmarn Burgstaaken		v	v	v	v	v	v	v		v		**3**
10. Heiligenhafen		v	v	v	v	v	v		v	v	v	**3**
11. Laboe		v	v	v	v		v			v		**2**
12. Heikendorf Möltenort		v	v	v	v	v	v	v		v		**3**
13. Kappeln		v	v	v	v	v	v	v	v	v		**3**
14. Eckernförde Stadthafen		v	v	v	v	v	v		v	v		**3**
15. Travemünde Fischereihaf		v	v	v	v	v	v	v	v	v	v	**4**
Polish harbours												
1. Gdańsk		v	v	v	v	v	v	v		v		**3**
2. Gdynia		v	v	v	v			v		v		**2**
3. Hel		v	v	v	v	v	v	v		v		**3**
4. Jastarnia		v	v	v	v	v	v	v	v	v	v	**4**
5. Łeba		v	v	v	v	v	v			v		**2**
6. Władysławowo		v	v	v	v	v	v			v		**2**
7. Ustka		v	v	v	v	v	v	v	v	v	v	**4**
8. Darłowo		v	v	v	v	v	v	v	v	v	v	**4**
9. Kołobrzeg		v	v	v	v	v	v	v	v	v		**3**
10. Mrzeżyno		v	v	v	v	v	v	v	v	v		**3**
11. Dziwnów		v	v	v	v	v		v		v		**2+**
Number (Assessment criteria)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10-14**	
	Obvious deficiencies in waste collection	No or verylittle litter in harbour area	Enough garbage bins and containers	Contracts have been entered into with waste management companies	Waste station or site for sorting & separate collection	No-special-fee system in place	Waste collected separately is managed considering specific properties of waste	Adequate information about collection of waste	Separate collection of end-of-life fishing gear	Possibility to discharge sewage and bilge water	The harbour fulfils at least two of the additional criteria re: collection of DFG and end-of-life FG	

3.3 Analysis of the results

Observing and analysing the general capability of harbours to organise waste management indicated that harbours in Poland and Germany are in a somewhat better situation. The Swedish and Estonian fishing harbours that were selected for participation in the survey included harbours with deficiencies in the organisation of waste management. It must be noted that half of the Estonian and Swedish harbours visited were rather small, where only a few fishing vessels and coastal fishermen operating with smaller boats are still seasonally fishing. Thus, these fishing harbours have few users, the period of use is short and the finances available for operation, management and investments are also limited.

Harbours that scored 3 or 4 during the assessment

- **73.5%** of German harbours
- **63.5%** of Polish harbours
- **42%** of Swedish harbours
- **33%** of Estonian harbours

On average, 53% of the harbours selected for participation in the survey scored 3 or 4 during the assessment.

The analysis based on the survey results reveals that slightly more than half of the harbours selected for participation in the survey have organised waste management services at a reasonably good or very good level. Generally, larger and medium-sized harbours have a higher capability to organise waste management. Consequently, they scored better than smaller harbours during the assessment.

All bigger and medium-sized harbours have developed waste reception and handling plans (WRH Plans) that proceed from environmental requirements and the needs of harbour users.

According to the survey:

- **90%** of harbours have a designated collection place, a room or containers for reception of hazardous waste.
- **84%** of the participating harbours have implemented a *no-special-fee system* (NSF) for the reception of ship-generated waste.
- **82%** of harbours offer an advance notice service for the discharge of sewage and bilge water at the harbour.
- **68%** of harbours offer separate recycling containers for glass, paper and packaging waste.

Harbours with separate recycling containers for glass, paper and packaging waste:

- **81.8%** of Polish harbours
- **80%** of German harbours
- **58.3**% of Swedish harbours
- **50%** of Estonian harbours

At harbours where the level of waste management is satisfactory or good, it is possible to pre-order containers for the collection of bulky waste. The harbours arrange for the full containers to be taken to the nearest waste management centre. All German harbours (except Warnemünde Alter Strom) and all Polish harbours selected for the survey offer this service. 70-80% of the surveyed harbours in Sweden and Estonia offer this service too.

70% of the participating harbours have informed that the separate collection of end-of-life fishing gear can be organised if the harbour users pre-order the service. Usually, this service is offered once or twice a year at the selected harbours.
The fishermen who operate at harbours can take their end-of-life fishing gear to the designated container, and the port authority manages the delivery to the waste management company. Harbours where the described service has been offered: Toila, Mõntu, Lehtma; all Polish harbours; all German harbours (except Warnemünde); Sandvik, Byxelkrok, Böda, Saltö, Nogersund, Ystad, Simrishamn.

The interviews did not reveal exactly if this additional service was offered free of charge for the harbour users or if fishermen were required to pay an extra fee depending on the quantity of the transferred material.

28% of the harbours informed that they have a permanent designated place or special container for the collection of end-of-life fishing gear in the territory of the harbour. Harbours that have reported that they have a permanent solution for the collection of end-of-life fishing gear include Greifswald-Wieck, Sassnitz, Barhöft, Heiligenhafen, Kappeln, Eckernförde, Jastarnia, Ustka, Darłowo, Kołobrzeg, Mrzeżyno, Ystad and Toila.

A hard-cover area was recently built in the Port of Darlowo where fishermen can dispose of their end-of-life fishing gear free of charge. The collection site is in the centre of the port basin and is easily accessible to fishermen by sea (by ship) and to waste trucks by a public road, while not disturbing tourists, holiday-makers and other users of the port.

The author considers it positive that 15-20% of the harbours selected for the survey have already participated in the *Fishing for Litter* initiative or the DFG collection activities of the MARELITT Baltic project. Fishing harbours themselves do not offer reception facilities suitable for marine litter caught in fishing gear or for DFG in said harbours – the services and facilities have been purchased by the initiators of the projects. However, harbour authorities have had to deal with the problems and specific features of marine litter collection when taking part in the projects. This means that such harbours are better prepared for receiving and handling DFG independently in the future, i.e. for acquiring the suitable facilities.

The Port of Niendorf, Germany, participates in the Fishing for Litter initiative coordinated by NABU. The photos depict the collection site and a container for marine litter.

In 52% of the participating harbours, the information concerning waste management is displayed on the information board of the harbour office. The information usually contains contact details of the port authority or harbour master (or both), so the harbour user has an opportunity to ask for more detailed information about the PRF.

4. Discussion

4.1 Identified deficiencies and omissions

On average, 47% of the participating harbours in all four countries scored 1 or 2 during the assessment, implying insufficient waste handling facilities in a series of fishing harbours. While there are no management-deficient harbours (selected for the survey) in Poland, all other countries contain harbours without an established waste management system. In addition, 38% of all investigated harbours only have the most basic reception facilities available.

The survey reveals that 32% of the participating harbours do not have enough containers suitable for the separate collection of waste at the harbour. Harbour authorities can and should improve separate collection of waste *in situ*, and that is why there should be more containers available for separate collection of various types of waste. All too often plastic and glass waste items are collected in unsorted household (municipal) waste containers. However, it must be noted that adding more containers alone will not solve the deficiencies and problems of waste management at those harbours. The addition of containers and other reception facilities must be accompanied by an increase in the quantity and quality of suitable supporting waste management services. The principles set out in the EU waste hierarchy, which promotes waste prevention, reuse and recovery of materials must be followed as well when developing and implementing harbour waste reception and handling plans (which is not the case today).

Simrishamn, Sweden: At this port, the users have access to a large number of containers for the separate collection of waste. Still, old fishing gear, oily rags, aluminium beverage cans, solvent bottles and paint cans (which should be collected and handled separately), have been dumped in the unsorted consumer waste container. This shows that even in larger fishing harbours with many users and all the preconditions for exemplary waste handling, the actual level of waste handling might not meet current requirements.

The interviews revealed that harbour users have not been adequately consulted in the preparation of the WRH Plans of harbours. This may be one of the reasons why port authorities often have no information about the types and quantities of waste collected at the harbour, which in turn makes ordering or developing suitable/optimal waste management solutions difficult.

Harbour authorities should improve the visibility and accessibility of waste management information. More than 1/3 of the harbours did not display enough information about the delivery and collection of waste in a place visible to harbour users. The harbour's waste reception and handling plan and the names and contact details of the persons and companies responsible for waste management should be displayed in a place clearly visible to all harbour users.

Although most harbours provide the service of receiving sewage and bilge water from ships by ordering a sewage or bilge-purging vehicle to come to the harbour when given advance notice, modern waste management expects harbours to be equipped with the relevant stationary pump-out systems, which makes discharge of sewage and bilge water more regular, easier and convenient for the harbour users. Only half of the harbours selected for the survey had stationary pump-out systems in place (25 harbours).

Different pump-out solutions for the reception of sewage at the harbours of Byxelkrok, Darlowo, Kappeln and Toila.

There should always be a separate lockable room or container for hazardous waste like chemicals, oily waste from the machinery room, oily filters and batteries. According to the survey, 10% of the surveyed harbours do not have a designated collection area, room or containers for reception of hazardous waste. Information about the options for delivering hazardous waste should be displayed in a place clearly visible to harbour users.

Containers for the collection of oily waste at the harbours of Sandvik, Mrzezyno, and Wladyslawowo.

No harbour visited during the assessment has taken full advantage of modern digital communication platforms to promote its waste management procedures, reception facilities available and information relating to other harbour services. The information uploaded and made available should include the type of facilities, the capacity of the facilities, contact details of the persons and companies responsible for waste management and information relating to fees/cost to use facilities.

4.2 Differences

There were some large ports among the harbours selected for participation in the survey in every country except Estonia. Such ports are Rostock in Germany, Gdansk and Gdynia in Poland and Karlskrona and Ystad in Sweden. Based on the collected data, it can be said that waste management has been organised at a rather good contemporary level at these ports. They have employed specialists who have a good overall picture and specific data of the types and quantities of waste brought to the ports. Port users are consulted at large ports to better understand their needs and expectations regarding the waste management services offered at ports, both in terms of port infrastructure as well as the additionally outsourced services. Due to the large numbers of port users, operating large ports is economically easier and the ports also have the financial capacity to invest in contemporary port reception facilities.

On the other hand, the survey also included small fishing harbours with long historical traditions, where the numbers of fishermen actively engaged in fishing and fishing vessels have decreased drastically in recent decades. Such ports include Eckernförde Stadthafen, Warnemünde Alter Strom, Greifswald-Wieck, Stahlbrode in Germany; Gryt, Händelöp, Grisslehamns Fiskehamn, Sandvik, Böda, Byxelkrok in Sweden; Dziwnów in Poland; and Toila, Jaagupi and Võiste in Estonia.

The decrease in fishing activity has forced smaller harbours to look for alternative uses and activities as sources of income. This mostly means the provision of food and accommodation services to visitors and tourists, acting as a guest harbour for pleasure boaters and yachting tourists or offering a camping site for people travelling by car. The development of new services requires investments, which is why it is somewhat understandable that taking care of the needs of new clients, who are mostly tourists, is considered a priority at these harbours. However, this means that the needs of the declining and ageing fishing fleet are pushed to the background when the harbour infrastructure is maintained and developed (the needs of fishermen may become less important to the port authority).

A brand new marina side by side with the older fishing harbour at the Port of Dziwnów.

A modern waste collection station at the Port of Dziwnów. The new waste station is mainly targeted at the tourists visiting the yacht harbour.

The situation at some of the participating German harbours *(Eckernförde Stadthafen, Warnemünde Alter Strom, Greifswald-Wieck, Kappeln)*, located in historical city centres and where the development of waste management infrastructure is restricted by the lack of space (small harbour territory), should be separately explained. Thus, the port authority must initially consider the opinions of the owners of neighbouring properties of the location and dimensions of the port reception facilities before they can start redesigning the waste management infrastructure on their territories.

The hygiene requirements established for the nearby primary fish processing and cooking sites may also create restrictions. For example, it is impossible for Warnemünde Alter Strom, which mainly focuses on restaurant services aimed at tourists and fish products made on site, to expand its PRF.

The crews that use the harbour try to organise the transfer of waste themselves, incl. by transferring it at nearby harbours or by pre-ordering the waste management service when the need for this arises. In order to cope with the situation, crews are encouraged to sort the waste on board before arriving at the harbour. The described situation underlines that the adequacy of PRF should be assessed by approaching each harbour individually, considering its geographic location, historical background, the types of waste generated by harbour users and the potential quantity of waste.

The harbour of Warnemünde

The harbour of Eckernförde

4.3 Collection of DFG and end-of-life fishing gear

The assessment results presented in the table and charts in paragraph 3.1-3.2 describe the general organisation of waste management at harbours and the level of their PRF. In this section we will take a look at the capability of collection, sorting and depositing of DFG and end-of-life fishing gear and the existence of the necessary infrastructure at the harbours that participated in the survey.

MARPOL Annex V obliges Governments to ensure the provision of adequate reception facilities at ports and terminals for the reception of garbage. The Directive on port reception facilities for ship-generated waste and cargo residues sets out the responsibilities of the various operators involved in the delivery of ship-generated waste. Ports must provide facilities for receiving waste; the facilities must be available, be adequate, meet the needs of all users, meet the needs of the environment etc. The directive also stipulates the principle of the mandatory delivery of all ship-generated waste.

The interviewed harbour personnel and fishermen were of the opinion that DFG is not ship-generated waste, but historical litter – a problem generated by third parties. Only a few fishermen have systematically mapped and retrieved DFG. Activities of the *Fishing for Litter* initiative as well as DFG retrieval actions with government or EU financing have been carried out in recent years, but then the initiators of the initiatives have been responsible and paying for the collection of DFG and its transfer to waste management companies. Therefore, the organisations that operate harbours have not considered it necessary to invest in the permanent/stationary facilities required for the collection of DFG or the acquisition of containers. According to fishermen, the extent of the problem has decreased considerably in recent years due to the decrease in fishing activity and the use of better navigation and hydrographic equipment. Therefore, such investments are not considered necessary or reasonable in the future.

Annex 1 presents the statistical data regarding changes in fishing activity in the four participating countries (Germany, Poland, Sweden and Estonia). Fishing fleet data for 2004 and 2016 have been used for comparison. On average, the capacity and volume of the fishing fleet in the countries participating in the MARELITT Baltic project have decreased by 30%.

Considering the given background, explanations and reasons, it is not strange or surprising to concede that, a few exceptions aside, fishing harbours do not have the conditions or infrastructure suitable for the transfer, temporary storage, cleaning, sorting and pre-processing of DFG at the harbours. While most harbours have cranes that can be used to lift the DFG (collected in big-bags at sea) and place it on land at the harbour, they generally do not have the closed area or rooms suitable for cleaning, sorting and pre-processing it at the fishing harbours.

The cleaning and sorting of DFG are usually made complicated by the unpleasant smell of the DFG material as well as the dirt and small particles of litter (which are redistributed by the wind) generated when DFG is cleaned and processed.

Therefore, DFG should preferably be cleaned and sorted in a closed room that has electricity, water, sewerage and ventilation. The organisations that operate harbours do not consider investing in the equipment and rooms for receiving and cleaning DFG to be reasonable while DFG is mapped and collected irregularly and on a project basis in conditions where financing is fragmentary.

Marine litter including derelict fishing gear retrieved by local fishermen at the Heikendorf Möltenort harbour.

There are exceptions where suitable rooms and equipment exist or could be made suitable easily and at low cost. These are the fishing harbours where the majority of fishermen have stopped engaging in professional fishing or they fish very small quantities during a short season. Fish is not processed and packaged at the harbour in such places. There are no marinas aimed at tourists, pleasure boaters or sea tours, camping sites, food service or accommodation establishments nearby. Such harbours could be well suited as regional collection and pre-processing centres for DFG and end-of-life fishing gear. Instead of establishing suitable conditions for the reception and cleaning of DFG at all functioning fishing harbours, it would be reasonable and less expensive to select and adapt regional centres with proper preconditions, which would then deal with the reception and pre-processing of DFG on site.

It is observed and noted that collection of both DFG as well as end-of-life fishing gear is rare at present. Even with recycling systems in place, fishing gear is not considered a recyclable item.

There is substantial room for improvement regarding the collection of fishing net and rope. First, recycling paths need to be developed, because waste management companies currently do not have recycling options for fishing gear. At present collected gear will either be incinerated or deposited in a landfill, which is not desirable. Second, where DFG is concerned, the mix of materials and contamination with metals and toxic substances such as lead lines or copper is even harder to handle. This material must be treated independently of regular recycling material, as it is entangled and can contain a substantial fraction of hazardous substances.

End-of-life nets collected by fishermen at the designated place in the territory of the Darlowo harbour.

Further, it is observed that there are no adequate reception facilities for DFG and only 28% of the surveyed harbours have a permanent designated place or special container for the collection of end-of-life fishing gear in the territory of the harbour. At the same time, gillnet fishermen sort out torn netting on a yearly basis.

At the harbour of Ystad, fishermen repair old broken fishing gear and partly recycle or re-use fishing nets. The photograph depicts a floatline separated from the rest of the gear.

Unless they have special agreements with manufacturers taking back and repairing net fragments, these nets will typically end up as unsorted municipal waste and will be incinerated or landfilled, thereby contributing to environmental pollution and CO_2 emissions rather than being re-used. It is therefore desirable to establish separate collections of fishing gear, especially uncontaminated and relatively pristine end-of-life fishing gear as part of the harbour services. Waste management companies are recommended to develop waste streams and recycling options for these valuable materials, which however do not yet exist.

A container for the separate collection of end-of-life fishing gear at the harbour of Ustka.

DFG is a particularly difficult case in terms of waste management, because the material is highly inhomogeneous: besides being composed of mixed polymer types (PP, PE, PA, PET), the sink-lines include toxic lead weights, ropes can consist of copper as antifouling treatment, and metal pieces are generally caught as marine litter in the retrieved DFG. Establishing a collection system for DFG is required to encourage and support fishermen in their collection of DFG, as waste discard fees will decrease incentive to return DFG to harbour.

When it comes to future planning of the collection and pre-processing of DFG and end-of-life fishing gear, it would be reasonable for port authorities to integrate such operations with the relevant activities of the local government and neighbouring harbours, which means joint procurement, joint waste collection rounds, joint development and implementation of waste reception and handling plans and coordinated planning and making of investments.

4.4 Findings from the interviews

The interviews were held with fishermen and representatives of the port authorities.

In the opinion of some professional fishermen, the DFG problem is caused mainly by fishermen from "neighbouring countries" or tourists and amateur fishermen. Approximately one in three fishermen operating at smaller fishing harbours feels that DFG is not a major problem at present. Fishermen often found derelict fishing gear 15 years ago, but the extent of the problem has now decreased. This is explained by the fact that the stock of fish in the Baltic Sea has decreased, so many fishermen have stopped fishing and engage in other work and activities to earn a living.

The fishing gear used by professional fishermen is so expensive that they do everything they can to make sure that the gear is not lost. Today's fishing vessels are equipped with excellent navigation and hydrography tools, which allow the vessels to avoid any underwater obstacles and thereby reduce the risk of accidental loss of trawling nets to a minimum.

The majority of fishermen feel that collecting, recovering and reusing old, derelict nets and other fishing gear also requires financial support from the public sector. The opinion of fishermen and port authorities is that funds for dealing with the historically caused DFG problem must be found in the state budget and European Union funds.

The income of fishermen and their investment capability are low and the establishment of additional rules and financial obligations is forcing more and more small fishing collectives and fishing harbours to abandon their present activities. The continuation of this tendency will lead to loss of jobs in fishing regions, which results in the disappearance of the traditional way of life in fishing villages as well as the knowledge and practical skills related to fishing.

Fishermen belonging to the older generation still work at many harbours and they have the manual skills that allow them to mend and reuse damaged and partly unusable fishing nets. It is necessary to encourage older fishermen to demonstrate their skills and train younger professional fishermen.

Professional fishermen understand the need to mark fishing gear correctly and collect the waste generated in fishery separately. Many Swedish fishermen are prepared to pay a small deposit when purchasing fishing gear, which is later used for the collection and environmentally friendly recovery of gear that has turned to waste.

The majority of fishermen and port authorities have expressed their willingness to cooperate on the local and regional level to ensure the proper collection, storage and treatment of DFG as well as end-of-life fishing gear. In their opinion, most challenges lie upstream in the waste management chain (i.e. waste management companies currently do not have recycling options for fishing gear).

4.5 Common waste-handling practices

A common sight at the fishing harbours is solid, bulky waste, plastic litter, etc. that is not especially well sorted, stored and treated.

Does this harbour have adequate port reception facilities? It depends.

Common sight at fishing harbours.

A fenced waste collection site at the harbour of Saltö, Karlskrona.

A port must have a separate lockable room or a fenced area in its territory for the collection of bulky waste. The photograph depicts a storage room for bulky items, including waste, at the harbour of Lindi.

Good and adequate practices? Probably, yes.

The Port of Mrzezyno has a sufficient number of containers for consumer waste in an easily accessible place. The information displayed on the containers indicates that fishing gear cannot be disposed of in a consumer waste container. Fishing gear has to be left next to the container for the port staff to collect it in a special container.
A similar system could be used at most ports but unfortunately is not. All that is needed for an effective system is an enthusiastic and environmentally aware harbour master and adequate information on organising waste handling at the harbour (displayed understandably and visibly for harbour users).

Ustka harbour has provided a simple solution for the sorting of waste for recycling. The harbour personnel are enthusiastic and environmentally aware, and information on the collection and delivery of waste has been made visible to all users of the harbour.

The waste station at Lehtma harbour, Estonia.

Containers for the collection of hazardous waste (chemicals, oily waste from the machinery room, oily rags and filters) at Jastarnia harbour.

The waste station at the harbour of Ystad has good modern planning. Information on waste handling (in Swedish, English and German) is available from the harbour office and visibly displayed near containers in the waste room.

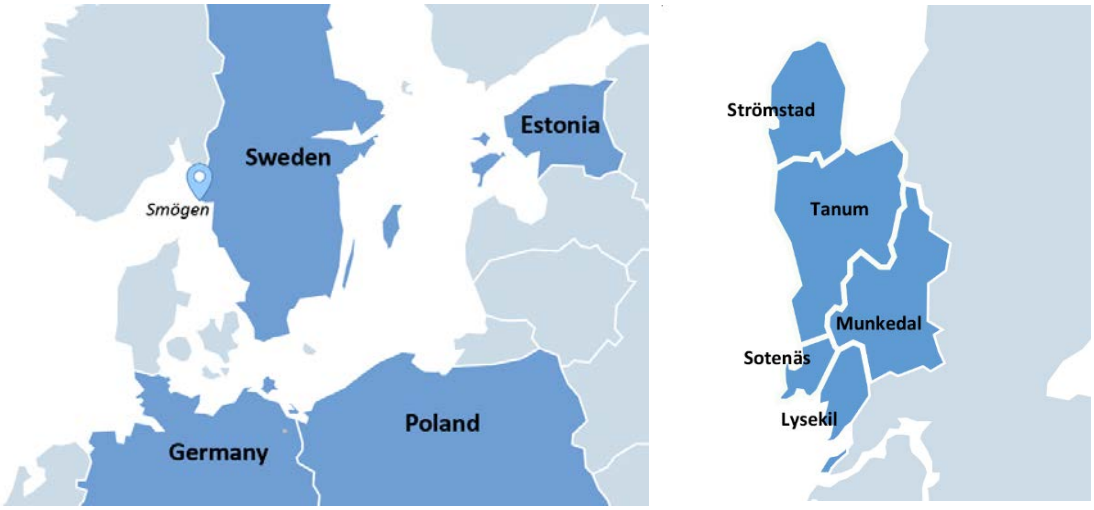
The harbour of Travemünde has an effective system for collecting diverse types of waste. Information (in German and English) about the options for separate collection of waste has been made clearly visible to harbour users.

4.5.1 Best practice in regional co-operation

FF Norden (Fishermen´s Association Norden) is a perfect example when it comes to regional co-operation. The association has coordinated the collection and pre-processing of end-of-life fishing gear in the region of West Sweden for many years. Fishermen and fishery organisations of nearly ten harbours participate in the effort.

The fishing gear is cleaned and pre-sorted at the local harbours before it is sent for recycling. The staff of FF Norden divide the materials into 4–5 different fractions and classes of materials. FF Norden partners with the PLASTIX plant in Denmark, whose technology can be used to produce raw material (pellets) for the plastics industry from pre-sorted fishing nets.

The association (in cooperation with five municipalities in West Sweden) plans to establish a new collection and recycling centre for fishery waste in the Hogenäs industrial area. The planned capacity and technological level of the centre would allow it to receive fishery waste, especially end-of-life fishing gear, from the entire territory of Sweden. The main challenge is how to cover the transportation cost of end-of-life fishing gear, which is remarkably high compared to the whole volume of the collection and recycling process for this type of waste. The management of the association believes that an alternative can be found in implementing an EPR system for companies producing and selling fishing gear.



Map of West Sweden´s 5 municipalities: Strömstad, Tanum, Sotenäs, Munkedal and Lysekil.

The fishermen in the association understand the need to mark their fishing gear better so that it can be more easily found when lost, and this action would also allow the owners of fishing gear who have abandoned their gear intentionally to be identified and found.

Most of the fishermen in that particular area are prepared to pay an upfront deposit fee to ensure the proper collection and treatment of DFG and end-of-life fishing gear. However, the same system must be applied nationwide, or even better, in the whole Nordic-Baltic fishing area. Otherwise, it will discriminate against people who are doing things the right way. Secondly, the system is not self-sufficient from day one. It will cost money to initiate and launch the system. Member States (the public sector) must ensure that there is a proper legal framework in place and the option to apply for financial contributions to launch the new system of collection and treatment of old fishing gear.

A lockable waste container for end-of-life fishing gear at the harbour of Smögen.

Pre-sorted and cleaned end-of-life fishing gear at the harbour of Smögen.

Trawl nets are repaired in a workshop on the premises of FF Norden in Smögen.

Collection container for end-of-life fishing gear provided by the PLASTIX plant in Denmark.

The Port of Smögen has a collection container for pre-cleaned and sorted fishing gear, which is then recycled. The contents of the container in the photograph will be sent for recycling to the PLASTIX plant in Denmark.

5. Conclusions and recommendations

This final chapter presents the essential findings, and some recommendations for how to improve fishing harbours in the Baltic Sea region to become better prepared to receive, collect and recycle DFG and end-of-life fishing gear.

The general conclusion is that collection of both DFG as well as end-of-life fishing gear is rare at present, because fishing gear is not considered a recyclable item. First, recycling paths need to be developed, because waste management companies currently do not have recycling options for existing fishing gear. Second, the principles set out in the EU waste hierarchy, which promote waste prevention, reuse and recovery of materials, must be better followed not only when developing and implementing harbour WRH plans, but at each stage of product (fishing gear) lifecycle management (PLM).

PLM is the process of managing the entire lifecycle of a product from inception, through engineering design and manufacture, to service and disposal of manufactured products.

5.1 Variations in waste management capacity

The survey reveals that larger and medium-sized harbours have higher capability to organise waste management than smaller harbours. German and Polish harbours were found to have better organised waste management than Swedish and Estonian.

More than half of the harbours visited have organised waste management services at a reasonably good level, whereas 38% of them only have the most basic reception facilities available. Almost half of the harbours do not have enough containers suitable for the separate collection of waste at the harbour.

Adding more containers alone will not solve the deficiencies and problems of waste management at harbours. These facilities must be accompanied by qualitative supportive waste management services.

There are also deficiencies in the provision of information to the harbour users. More than 1/3 of the harbours do not display enough information about the delivery and collection of waste in a place visible to harbour users.

Recommendations

- **Improved availability and accessibility of collection containers**
  Improved harbour reception facilities design, and good availability and accessibility (location) of PRF at harbours; develop technical guidance for proper design, placement of (low-cost) gear and litter disposal facilities at harbours; the availability of different types of collection containers for the separate collection of waste should be improved at harbours.

The addition of containers and other reception facilities must be accompanied by an increase in the quantity and quality of suitable supporting waste management services.

- **Waste reception and handling plans**
  WRH plans should be prepared to provide efficient PRF services that meet the needs of harbour users including, among other things, a description of proper collection and recycling procedures for DFG and end-of-life fishing gear.

- **Communication using digital media**
  Harbour authorities or PRF providers are urged to communicate accurate and up-to-date information about the reception facilities available at the harbour. This information can be communicated to the harbour users via the harbour website, social media platforms, national Port Registry databases or IMO's PRF online database, accessible to all users. At a minimum, the information uploaded and made available should include the type of facilities, the capacity of the facilities and contact details of the port authority or harbour master, a link to the harbour website, a link to the port waste management plan, and information relating to fees/cost to use facilities.

- **Advanced notice of waste delivery**
  If applicable, port authorities and reception facility providers should request shipmasters and other harbour users to provide advance notice of waste delivery to ensure that the necessary containers, equipment and vehicles are prepared for receipt and further handling of the material.

5.2 Poor collection capacity

Today in almost half of the fishing harbours, retrieved fishing gear and end-of-life fishing gear is not separately collected. Instead, this waste is placed in the same container as with unsorted municipal waste. Even with recycling systems in place, fishing gear is not considered a recyclable item.

28% of the harbours informed that they have a permanent designated place or special container for the collection of end-of-life fishing gear in the territory of the harbour.

70% of the harbours informed that the separate collection of end-of-life fishing gear can be organised as a pre-ordered service. Harbour operators indicate that fishermen show only little interest in this service.

15–20% of the harbours have some experience of handling retrieved fishing gear during shorter periods, often while participating in a project (e.g. Fishing for Litter, national or local ghost net retrievals or MARELITT Baltic). In these cases, the services and facilities have been provided and financed by the projects.

Recommendations

- **Promote responsible recycling**
  Improve end-of-life fishing gear disposal procedures; promote responsible recycling initiatives for end-of-life fishing gear.

- **Economic incentives**
  Reasonable cost recovery systems (CRS); economic incentives to hand over/collect and recycle fishing gear; promote full implementation of the no-special-fee system (NSF) at fishing harbours.

- **Educational initiatives**
  Better awareness about damaging environmental and socio-economic effects of DFG (what happens if / when lost fishing gear is not reported and retrieved); educational initiatives about responsible collection and recycling of fishing gear.

- **Proper lost gear reporting**
  Information available and clearly visible at harbours about proper lost gear reporting and retrieval procedures; guidance on DFG recovery options/possibilities.

- **Common code of practice**
  Fisheries/fishermen organisations should strive to achieve a common code of practice on the regional level (targeting, reporting and monitoring gear losses and recycling procedures for end-of-life fishing gear).

5.3 Infrastructure

Fishing harbours seldom have the conditions or infrastructure suitable for the transfer, temporary storage, cleaning, sorting and pre-processing of DFG at the harbours. While most harbours have cranes that can be used to lift the DFG (collected in big-bags at sea), they generally do not have the closed area or rooms suitable for cleaning, sorting and pre-processing.

The organisations that operate harbours do not consider investing in the equipment and rooms for receiving and cleaning DFG to be reasonable while DFG is mapped and collected irregularly and on a project basis in conditions where financing is fragmentary.

In most cases, the harbour personnel do not know what happens next to the collected fishing gear. The waste management companies to whom the waste is transferred do not have the competency and technical facilities required for reprocessing and recovery of the material. Fishermen do not always know where and when end-of-life fishing gear must be collected.

5.4 General findings

No harbour visited during the assessment has taken full advantage of modern digital communication platforms to promote its waste management procedures, reception facilities available and information relating to other harbour services. The information uploaded and made available should include the type of facilities, the capacity of the facilities, contact details of the persons and companies responsible for waste management and information relating to fees/cost to use facilities.

A few exceptions aside, it can be said that regional cooperation in solving the problems caused by DFG is lacking. Baltic Sea countries lack a common national understanding of the challenges related to the collection and handling of DFG and end-of-life fishing gear at harbours.

Recommendation

- **Regional co-operation**
  Harbour authorities and PRF operators should work with national and local government officials, regional administrators and local waste disposal infrastructure managers to develop proper environmentally friendly waste management procedures, including waste segregation, that encourage reduction, reuse and recycling of ship-generated waste landing at PRFs (IMO 2014 Consolidated Guidance for PRF providers and users).

The most significant regional and national challenge is that due to the varied sizes, scales of use and geographic locations of harbours and the differences between countries, it is difficult to find universal rules, requirements and recommendations that would guarantee the adequate and economically reasonable collection and handling of DFG and end-of-life fishing gear at harbours. The situation of the fishing harbours should be approached individually, and the flexibility of the system should be maintained without losing sight of the general objective.

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Waste Framework Directive; Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

MARELITT Baltic

Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

The MARELITT Baltic project

Derelict fishing gear (DFG) is addressed worldwide as a source of marine litter with extensive hazardous effects on the marine ecosystem. From 5.500 to 10.000 gillnets and trawl nets are lost every year and despite intense media focus – the problem is poorly known in the fisheries industry and among politicians.

The MARELITT Baltic project is one of the first transnational initiatives in the world to provide an operation oriented all-in-one solution for how to approach DFG. It will turn a diffuse problem into a clear and apprehensible topic that can contribute to an enhanced international readiness to act.

The project is divided into five work packages (WP), where package 2, 3 and 4 are the major parts concerning the cleaning, prevention and recycling of lost fishing gear.

Cleaning the sea and planning future action at sea
The aim of WP 2 is to plan and execute DFG retrievals in Sweden, Estonia, Poland and Germany both on the seafloor and wrecks. The activities will be based on methodologies and techniques tested in earlier national projects. These experiences will contribute to a common methodology which is crucial given the extreme hydrographic and morphological variation in the Baltic Sea. The new operation platform will make cleaning operations both transparent and demonstrate if the task is physically possible.

Responsible fisheries prevention scheme
The aim of WP 3 is to develop an overall approach to mitigate the problem of lost fishing gear in the future. It can roughly be divided into three types of actions. Firstly, the project will increase knowledge on fishing technological and strategic changes over time and how these changes have influenced the evolution of gear loss. In the second step, the project will focus on the potential causes to why fishing gears are lost. The third category of action includes development of preventive methods such as gear marking technologies helping to track irresponsible fishermen or assisting responsible fishermen to locate lost gears.

Marine litter reception facilities and recycling
The aim of WP 4 is to identify the options for a safe and fully sustainable handling and recycling of the lost fishing gear in a circular approach. Within this work package the phase from reaching the harbour through cleaning, sorting, transport until processing of recycling of the nets will be dealt with. The work encloses a variety of approaches such as creating a knowledge baseline about the transnational status and capacities of harbours, waste handling systems and industries in the Baltic Sea countries.

Projectpartners

Sweden
Municipality of Simrishamn, Lead partner
Keep Sweden Tidy

Germany
WWF Germany

Poland
WWF Poland Foundation
Maritime University of Szczecin
Kolobrzeg Fish Producers Group
Institute of Logistics and Warehousing

Estonia
Keep the Estonian Sea Tidy
Estonian Divers Association

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Annex 1

Fishing fleet by type of gear and engine power

Source of data Eurostat

UNIT Number
ENG_POW Total
GEAR Total

GEO/TIME	2004	2016	% Change
Germany	2 163	1 414	-35%
Estonia	1 050	1 557	48%
Poland	1 248	843	-32%
Sweden	1 605	1 277	-20%

UNIT Gross tonnage (GT)
ENG_POW Total
GEAR Total

GEO/TIME	2004	2016	% Change
Germany	66 301	63 722	-4%
Estonia	24 926	14 253	-43%
Poland	45 569	34 871	-23%
Sweden	44 849	28 860	-36%

UNIT Kilowatt
ENG_POW Total
GEAR Total

GEO/TIME	2004	2016	% Change
Germany	161 987	140 014	-14%
Estonia	63 234	45 485	-28%
Poland	147 080	83 047	-44%
Sweden	219 653	161 362	-27%