

Biodiversity Series

Background Report on Fishing-for-litter Activities in the OSPAR Region



OSPAR Commission
2007 Update

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention") was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède et la Suisse et approuvée par la Communauté européenne et l'Espagne.

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Executive Summary/Récapitulatif

Marine litter has a serious negative impact on the aesthetic qualities of many important coastal stretches, and has a significant detrimental economic effect on local coastal communities worldwide, including in the North-East Atlantic region. The assessment made within the framework of the OSPAR Commission, and reported in the OSPAR Quality Status Report (QSR) 2000, indicated that there had been no improvement in the situation with regard to marine litter since the previous quality status report for the region.

Les déchets marins ont un impact négatif considérable sur la qualité esthétique de nombreuses zones côtières importantes. Ils ont également un effet préjudiciable sur l'économie des communautés côtières locales dans le monde entier, notamment dans la région de l'Atlantique du nord-est. L'évaluation qui a été réalisée dans le cadre de la Commission OSPAR et qui figure dans le Bilan de santé d'OSPAR, le QSR 2000, ne révèle aucune amélioration de la situation par rapport au QSR précédent pour la région, en ce qui concerne les déchets marins.

Marine litter has been discussed at a high political level and included in declarations and statements from several ministerial meetings, including the Bergen 5th North Sea Conference in 2002 and Bremen OSPAR Ministerial Meeting in 2003.

Des déclarations de plusieurs réunions ministérielles, notamment la Cinquième conférence sur la mer du Nord et la réunion ministérielle d'OSPAR qui se sont tenues à Brême respectivement en 2002 et en 2003, mentionnent les déchets marins qui font également l'objet de débats politiques à un haut niveau.

OSPAR 2004 agreed on work to consider various measures for combating marine litter in the North-East Atlantic region. As one outcome of the products of this work this report presents background information on procedures to implement Fishing-for-litter activities in the OSPAR Region. The report considers decisions and initiatives to reduce marine litter in the OSPAR region as well as the socio-economic impact of marine litter on the fisheries sector and reviews existing experience of fishing for litter activities, including within the Save the North Sea Fishing for Litter initiative.

OSPAR 2004 est convenue de travaux permettant de considérer diverses mesures de lutte contre les déchets marins dans la région de l'Atlantique du Nord-Est. Le présent rapport comporte des informations contextuelles sur les procédures de mise en oeuvre des activités de "pêche aux déchets" dans la Région OSPAR qui résultent de ces travaux. Il examine les décisions et les initiatives qui visent à réduire la quantité de déchets marins dans la région OSPAR ainsi que leur impact socioéconomique sur le secteur de la pêche. Il passe en revue l'expérience acquise dans la pêche aux déchets, notamment les activités dans le cadre de l'initiative pêche aux déchets du programme "Save the North Sea" (SNS).

On the basis of some experiences from the activities implemented so far (see section 4) the report proposes a number of issues that need to be considered when discussing an expansion or initiation of Fishing-for-litter initiatives in additional countries or harbours in the OSPAR region (see section 5). Such issues include (see section 6), e.g., what is required from the participating countries and local communities, existing legislation on reception facilities, the need for a long-term commitment, coordination responsibilities, equipment on board vessels, options for delivery and reception ashore, and capacity and schemes for waste handling/management/disposal in local communities. Economic issues – fee systems, economic compensation for additional costs incurred – also have to be discussed. Furthermore, the implementation of legislation on mandatory reporting to the authorities of loss of nets at sea throughout the OSPAR area has been suggested.

Le rapport propose un certain nombre de questions, dont il convient de tenir compte lors des discussions sur l'expansion ou la création d'initiatives de pêches aux déchets dans de nouveaux pays ou ports de la région OSPAR (voir la section 5), à partir de certaines expériences acquises dans la mise en oeuvre des activités à ce jour (voir la section 4). Il s'agit, par exemple (voir la section 6): de ce que l'on attend des pays et des communautés locales qui participent, de la

législation existante sur les modalités de prise en charge, de la nécessité d'engagements à long terme, de la responsabilité de la coordination, de l'équipement à bord des navires, des possibilités de livraison et de prise en charge à terre, de la capacité de traitement/gestion/élimination des déchets dans les communautés locales et des projets que s'y rapportent. Il faut également discuter de questions d'ordre économique, telles que les systèmes de redevance, les dédommagements économiques pour les coûts supplémentaires encourus. On a de plus suggéré de mettre en oeuvre une législation sur la notification obligatoire aux autorités de la perte de filets en mer dans l'ensemble de la zone OSPAR.

The report concludes that the SNS Fishing-for-litter initiative has demonstrated on a limited scale that the objectives of the scheme can gain the support of the fishing industry, port authorities and local authorities. It can contribute to changing practices and culture within the fishing sector, provide a mechanism to remove marine litter from the sea and seabed, and raise awareness among the fishing industry, other sectors and the general public.

Le rapport conclut que l'initiative pêche aux déchets du SNS a démontré que, à une échelle limitée, les objectifs de ce projet peuvent rallier le soutien de l'industrie de la pêche et des autorités portuaires et locales. Il a également été démontré que cette initiative peut contribuer à modifier les us et coutumes du secteur de la pêche, à fournir un mécanisme permettant de retirer de la mer et du fond de la mer les déchets marins et à promouvoir la sensibilisation de l'industrie de la pêche, d'autres secteurs et du public en général.

It could be argued that if similar schemes were to be implemented throughout the OSPAR region, significant amounts of marine litter could be removed from the sea thus reducing both environmental impacts and economic costs to the fishing industry and other sectors. However, in order to keep up with the present likely rate of accumulation of litter on the seabeds in the region, Fishing-for-litter activities would probably have to be complemented with large-scale, regular and targeted clean-up operations operated and funded by, e.g., governments and government agencies.

On pourrait exposer comme argument que si des projets similaires étaient mis en oeuvre dans l'ensemble de la région OSPAR, on pourrait retirer de la mer une quantité considérable de déchets marins. Ceci permettrait de réduire l'impact environnemental et les conséquences économiques pour l'industrie de la pêche et des autres secteurs. Cependant, si l'on veut faire face au rythme actuel probable auquel les déchets s'accumulent sur les fonds marins, il faudra probablement accompagner les activités de pêches d'opérations à grand échelle de nettoyages réguliers et ciblés qui seront financées par exemple par les gouvernements et les agences gouvernementales.

As a result of this report, the 2006 OSPAR Commission meeting has instructed the Working Group EIHA to develop further during autumn 2006 the draft guidelines for implementing Fishing-for-litter in the OSPAR area for consideration by BDC in 2007.

L'une des conséquences de ce rapport est que la réunion 2006 de la Commission OSPAR a chargé le Groupe de travail EIHA de développer plus avant, durant l'automne 2006, le projet de lignes directrices de la mise en oeuvre de la pêche aux déchets dans la zone OSPAR afin qu'il soit étudié par le BDC en 2007.

1. Introduction

Marine litter is causing widespread ecological effects, has a serious negative impact on the aesthetic qualities of many important coastal stretches, and has a significant detrimental economic effect on local coastal communities worldwide, including in the North-East Atlantic region. The assessment made within the framework of the OSPAR Commission, and reported in the OSPAR Quality Status Report (QSR) 2000, indicates that there had been no improvement in the situation with regard to marine litter since the previous quality status report for the region.

At the OSPAR Commission meeting in 2002, Sweden and KIMO International presented a report announcing that "Save the North Sea" (SNS), a major project aimed at tackling the problems of marine litter in the North Sea, had attracted € 5.8 million from the European Union under the

Interreg IIIb Programme. The project was to encompass the environmental, financial and ecological aspects of the problems in activities undertaken by each of the project partners. The North Sea Conference in the Bergen endorsed the project in 2002, and by the OSPAR Environment Ministers in Bremen Statement in 2003, in which the ministers emphasise that they shall do their utmost to eliminate the problem of marine pollution.

It was agreed that KIMO International would report progress to the BDC on an annual basis. In the second progress report, KIMO informed the BDC that an application to extend the project for another three years (2005–2007) had been submitted to the EU. However, as this application was unsuccessful, the project came to an end in December 2004.

Given that the SNS project would not continue, KIMO International presented a document¹ at the OSPAR Commission meeting in 2004, asking OSPAR to take a proactive approach to marine litter in terms of programmes and measures. KIMO International recommended the inclusion of the products identified in the document under the OSPAR BDC Work Programme. The Commission considered the document² and the proposals were supported by Sweden and other countries, who stated their intent to act as Lead Countries for the products suggested. The Commission agreed to include these products in the BDC Work Programme³. In this context, Sweden and KIMO International undertook to cooperate on Product 18, i.e., to produce a background report on Procedures to implement Fishing-for-litter activities in the OSPAR Region, to be presented to the BDC meeting in 2005.

2. Decisions and initiatives to prevent and eliminate marine litter in the OSPAR region

The problems caused by marine litter have been a longstanding issue within OSPAR and the North Sea Ministerial Conferences. Thus, marine litter has been discussed at a high political level and included in declarations and statements from several ministerial meetings, most recently at the Bergen 5th North Sea Conference in 2002 and Bremen OSPAR Ministerial Meeting in 2003.

The OSPAR Pilot Project on Monitoring Marine Beach Litter (2000–2006), and the designation of the North Sea as a Special Area for the purpose of Annex V to MARPOL 73/78, are two examples at the practical level of action taken to deal with marine litter in the OSPAR region. Apart from this, very little progress has been achieved, however, to develop and implement programmes and measures to reduce the input of marine litter from its many sources, or to introduce mechanisms for the remediation of existing litter in the coastal and marine environments. Marine litter therefore remains one of the major unresolved outstanding pollution issues throughout the Northeast Atlantic region.

Annex V to the *MARPOL 73/78 Convention*, the main international convention aimed at controlling pollution from the shipping sector, deals with garbage (that may become marine litter). Annex V has been in force since 1988. The MARPOL Convention regulates types and quantities of waste that ships may discharge into the sea, taking into account the ecological sensitivity of different sea areas. The disposal of plastics is prohibited in all seas. All OSPAR Contracting Parties have ratified the Convention, including Annex V.

In Annex V, it is required that all ships of 400 gross tons and above, or ships certified to carry more than 15 persons, develop and follow a written garbage management plan. Such plans should have been developed by 1 July 1997 and include the following:

- Description of the collection, processing, storage and disposal of each type of waste generated by the ship, and waste that may be further categorised by local requirements, e.g., hazardous and medical waste;

¹ OSPAR 04/5/4

² OSPAR 2004 Summary Record (OSPAR 04/23/1), § 5.27

³ OSPAR 2004 Summary Record (OSPAR 04/23/1), § 5.32 and ANNEX 17

- List of waste management techniques/equipment available and to be employed;
- Provisions for the discharge of garbage in compliance with Annex V; and
- Designation of a person to be responsible for carrying out the plan.

The North Sea and adjacent areas have been designated as Special Areas with regard to Annex V. In accordance with the regulations for Special Areas, discharges of garbage (except food waste) into the sea are prohibited. The Convention also comprises an obligation for countries surrounding Special Areas to provide appropriate reception facilities for ship-generated waste in their ports and harbours.

The *London Convention* (LC) was signed in 1972 and covers solely the control of dumping of wastes at sea. All OSPAR Contracting Parties have ratified the Convention. Annex I of the LC lists wastes and other matters which must not be dumped. It is recognised that plastic materials, and other materials that may cause problems of entanglement and ingestion by marine organisms, constitute an environmental hazard. As a consequence, dumping of such materials is prohibited.

The EC Directive on Port Reception Facilities for Ship-generated Waste and Cargo Residues (2000/59/EC) was adopted in 2000. The objective is to “reduce the discharges of ship-generated waste and cargo residues into the sea, especially illegal discharges, from ships using ports in the Community, by improving the availability and use of port reception facilities for ship-generated waste and cargo residues, thereby enhancing the protection of the marine environment”. As a majority of Contracting Parties to OSPAR (with the exception of Iceland and Norway) are also members of the EU, they are required to implement the Directive and provide reception facilities for all types of ship-generated waste in their commercial ports, fishing harbours and marinas. Norway and Iceland are expected to implement the Directive as part of the EEA agreement.

The Directive is aimed at ensuring a major reduction in marine pollution by the provision of adequate waste reception facilities in all EU ports, including fishing harbours and marinas. In addition, it requires all ships, fishing vessels and recreational crafts visiting these ports to make use of the facilities provided. More specifically, ports and marinas are to provide adequate reception facilities for ship-generated waste and cargo residues; a waste management plan is to be developed for each port which is monitored and approved by Member states; it is to be ensured that fee systems adopted by ports will encourage vessels to use the facilities rather than discharge their wastes at sea; ships should notify their intention to use facilities and quantities of waste on board before arriving in port; Members States should monitor compliance with the Directive and apply sanctions; and authorities should forward information on non-compliance to other EU ports which such ships may intend to visit.

An evaluation of the implementation of the Directive {EC is being made} will be made in 2005/2006. This will, hopefully, clarify the availability of reception facilities in various types of ports in the countries bordering North-East Atlantic. However, it is not clear whether waste caught in fishing gear and brought onboard fishing vessels is covered by the Directive. This waste is not generated by the individual fishing vessel, but accidentally brought on board the vessel. This and other issues related to the implementation of the Directive are presently being considered by an informational EU expert group.

The legal aspects of waste caught in fishing gear are one of the issues. According to one view put forward, such waste is to be considered as the fisherman's responsibility, since the fisherman has, in a legal sense, loaded the waste onboard his vessel when collecting his fishing gear. When doing so, the fisherman becomes the legal "owner" of the waste. Needless to say, if that will be the official standpoint, it will be detrimental to any attempts to encourage fishermen to assist in Fishing-for-litter schemes.

3. Socio-economic impacts of marine litter on the fishing sector

The problem of marine litter is a common problem for coastal local communities and other organisations throughout the world. A wide range of studies and surveys employing many different methodologies have been undertaken over the years to assess the problem. These have attempted to address the problems of collecting data on the volumes, types, origin and other factors relating to marine litter and oil. There is much less research and data available about the economic and social impacts of these substances. In 2000, KIMO International presented the results of a two-year project to investigate the economic and social impacts of marine litter on coastal communities⁴. The report demonstrates the significant costs to coastal communities not previously acknowledged and demonstrates not only that polluters of the oceans are not being caught but that they are not being made to pay for their actions either.

The fishing industry has long been associated with the contribution of marine pollution but little work has been done on the effects on the industry itself of marine debris and other pollution. When questioned about the effects of marine debris on their fishing activities, Shetland fishermen responded that 92% had recurring problems with accumulated debris in nets, 69% had had their catch contaminated by debris and 92% had snagged their nets on debris on the seabed. Many also experienced fouled propellers and blocked intake pipes. On average, 1-2 hours per week were spent clearing debris from nets. Debris could cause a restricted catch and many boats avoided particular fishing areas altogether due to the high concentrations of debris. The catch, net and other equipment could be contaminated by oil containers, paint tins, oil filters and other chemicals, resulting in a potential loss of revenue of up to £2,000 per incident. Large items such as wires and old nets may be collected off the seabed and may damage the nets. A fouled propeller could cost up to £300 for the hire of a diver to disentangle it and result in a substantial amount of lost fishing time. It is estimated that each boat could lose between £6,000 and £30,000 per year due to the effects and presence of marine debris. If 50% of the Shetland fishing fleet was affected in the same way, the cost to the local industry could be £492,000–2,460,000 per year. Similarly, the cost of marine debris to the fishing community of the Swedish Bohus region was estimated to be over £620,000 each year.

According to reports from fishermen in both Shetland and Esbjerg (Denmark), small inshore boats appear to be more susceptible to marine debris than large pelagic boats. This may be because the larger offshore boats are fishing mid-water and are therefore less likely to collect debris on or near the seabed. Smaller boats may also notice the presence of marine debris more than larger boats as they have less crew and a lower profit margin, so any time or money lost will affect them more.

Fishing vessels, along with the fish farming industry, are perhaps the main sources of discarded fishing net, line, rope, crab pots, floats, fish feed bags, polystyrene blocks and fish boxes⁵. In turn, fishermen are finding an increasing amount of plastic debris amongst their catch, which not only takes time to remove, but plastic bottles and old net can themselves damage freshly caught fish. Moreover, there have been cases whereby plastic has blocked cooling systems causing engines to overheat. In some areas around the UK, such as the Bristol Channel, the problem has reached such a state whereby fishermen, when removing plastic items entangled in their nets, voluntarily place them in plastic bin liners for disposal by the local council at their base ports⁶. It has been noted⁷ that much of what is known about the impact of litter on fishing activities is based on anecdotal evidence. Litter found in an offshore fishing bank caused a serious economic loss to fishermen in Swansea Bay⁸. The UK National Federation of Fishermen's Organization have

⁴ Hall, Karen (2000): Impacts of Marine Debris and Oil. Economic and Social Costs to Coastal Communities. KIMO

⁵ Dixon and Dixon, 1983

⁶ Earl and Gilbert, 1996.

⁷ Lart, 1995. According to this report, the two major types of litter interfering with fishing gear were plastics and sewage related debris.

⁸ Williams *et al*, 1993) although no figures are quoted.

confirmed that marine litter is a cause of concern around Britain's coasts, but no attempts have been made to quantify the extent of the problem.

Problems with propeller fouling, blocked intake pipes and damaged drive shafts have been reported in the North Sea, Alaska and the East Coast of North. According to two studies done in the Bering Sea and the Gulf of Alaska, 40–60% of bottom trawls collected plastic and metal debris. Inshore fishing is particularly important for Orkney, Shetland and the West Coast of Scotland, where the majority of small vessels are based. Scotland's fishing industry handled 71% of all UK fish landings into the UK in 1994, with a market value of some £279.3 million. Peterhead, Scotland's major fish market, is the largest in Western Europe. The fishing industry is also a vital source of employment in Scotland. It is estimated that there are over 8,500 people directly employed as fishermen, with a further 13,000 employed onshore in fishing related activity. Many of these people live around the coastline of Scotland.

Shetland fishermen have estimated the value of one hour of their time to £30–120 per hour (average £67). Using the average figure, the losses to an average Shetland fishing vessel would, annually, be as follows:

- £3,500–7,000 due to lost time clearing nets of debris
- £250–1,000 cleaning equipment and nets of contaminants
- £100–10,000+ due to time lost fixing nets
- £60–500 due to time lost with fouled propeller
- £2,000–10,000+ to repair nets
- £50–300 to un-foul propeller
- £100 for gear box inspection
- £6,000–30,000 per vessel assuming only one incident per year and working only 40 hours per week.

4. Seabed surveys and Fishing-for-litter activities

There is limited knowledge about the qualitative and quantitative occurrence of various types of marine litter on sea beds as compared to the knowledge about marine litter on beaches and other land in the coastal zone. In the OSPAR region, data is available from surveys made in Norway and the Netherlands. In addition, results of surveys made in the Mediterranean and in Japanese waters have been published.

4.1 Norway

A major survey, mapping and cleaning up of Norwegian sea beds was made in the period 1982–1997⁹. In 1980, the Norwegian Oljedirektoratet (Norwegian Petroleum Directorate) and Fiskeridirektoratet (Fisheries Directorate) initiated a project leading to an area of 1,200–1,400 km² being surveyed annually for presence of waste and garbage. The objective was to survey and clean up waste that could originate from the extraction of oil and natural gas in Norwegian waters, particularly in the vicinity of important fishing areas, but also to get an idea of the waste situation on Norwegian sea beds in general. Much of the garbage found on the sea beds was collected and removed ("seabed cleaning") during those years, and the project was closed down when it was concluded that the remaining waste did not originate from activities by the oil industry. As a spin off effect of the project, several ship wrecks and other major obstacles that could cause damage to fishing gear were located and marked on the sea charts. Some seabed areas, with huge amounts of marine litter is still left, were described as "horror sights". For example, there is one area in the

⁹ Information provided by Norwegian consultants in a study commissioned by the Nordic Council of Ministers (2004) on the situation in the Nordic countries regarding management of waste from fishing vessels.

Skagerrak, where such a huge amount of marine litter has been trapped at a depth of 500–700 metres due to the specific currents prevailing in the area.

According to the Norwegian Fisheries Directorate, efforts to collect and take up lost fishing nets have been made regularly since 1983. On average, about 500 nets are found and removed every year (with a peak in 1992, when some 1,200 nets were taken care of). However, it is assumed that considerably larger amounts of fishing nets are lost and not reported. Since 1989, it is laid down in Norwegian legislation that when nets are lost during fishing for cod, haddock and saith, this should be reported to the Norwegian Coastguard.

4.2 The Netherlands

A systematic survey and investigation of marine litter accumulated on the seabed was carried out in the years 1987–1995 by the Netherlands in the Dutch sector of the North Sea. Results from the survey indicated an average of 116 pieces of marine litter per km² of seabed. Extrapolated to the entire Dutch sector of the North Sea at the time, these results would imply a total of 6.6 million pieces of marine litter, or approximately 8,600 tonnes of marine litter, on the seabed. Assuming that similar quantities of marine litter can be found all over the bottom of the North Sea, at least some 600,000 m³ of marine litter could be resting on the seabed.

In March 2000, the Dutch North Sea Directorate in co-operation with the fisheries association started the Vuilvisproject Den Helder. The aim of the project was to clean up the North Sea from marine litter by bringing ashore the litter gathered in nets during fishing. The pilot project was initiated to investigate whether the amount of collected litter would be high enough in relation to the efforts needed to collect, process and destroy the litter. Since the beginning of the project in 2000 until March 2006, approx. 500 tonnes of litter were collected. Just over 1500 big-bags were collected, with an average weight of 300 kg. Note that a growing amount of fished up litter is collected separately since it's too big to effectively fit a big-bag. This is litter such as truck tires, fridges and large tree trunks. The litter consisted mainly of parts of shiploads, wood, packing material, decaying fishing gear and rope. After being delivered ashore, the litter is properly destroyed. The fishermen receive no remuneration for taking part in the project. Ten ships that land their fishing products at the harbour of Den Helder have participated. The North Sea Directorate has contracted the local port reception facility to collect the fished litter from the fishing vessels, in addition to their operational waste. New big bags for the collection of the litter have been regularly supplied to the ships. The North Sea Directorate have paid the costs for the collection and processing of the litter.

A gradual extension of the project to all of the fishing harbours in the Netherlands with a port reception facility and a maximum number of fishing vessels has been considered. All participating vessels must be members of the Stichting Financiering Afvalstoffen Visserij (SFAV; Foundation for the Financing of Ship-generated Waste in the Fishery) to be allowed to participate. SFAV, founded in 1994, is an initiative by the fishing sector in cooperation with the Ministerie van Verkeer en Waterstaat. All Dutch fishing associations are SFAV members.

4.3 Sweden

In 2004, a small pilot survey was made of the seabed on the Swedish west coast, in the Kattegat, along transects 50–60 kilometres long, at water depths ranging from 6–30 metres. The sea beds in the area vary, from rocky hard bottoms to soft bottoms, including one area sloping from a depth of 12 to a depth of 30 metres. Marine litter, including lost/discarded fishing gear, was found on all bottom types. The items were scattered and no major accumulations of marine litter were found. The sea beds were video-filmed by means of special underwater video equipment as an alternative to side-scan sonar. At the speed of 3 knots (ordinary trawling speed) an area of around 40,000 m² can be filmed during one hour.

The objective of the pilot survey, funded by the Swedish EPA, was twofold, to be used in the OSPAR Pilot Project on Monitoring Marine Beach Litter, and in the Swedish component of the SNS Fishing-for-litter project.

4.4 The Mediterranean and other European sea areas

In the period 1992–1998, the distribution and abundance of large marine debris were investigated on continental shelves and slopes along European seas, including the Baltic Sea, the North Sea, the Celtic Sea, the Bay of Biscay and different areas in the northwestern basin of the Mediterranean Sea and the Adriatic Sea. On the basis of 27 oceanographic cruises “different types of debris were enumerated, particularly pieces of plastic, plastic and glass bottles, metallic objects, glass, and diverse materials including fishing gear. The results showed considerable geographical variation in concentrations, which ranged from 0 to 101,000 pieces of debris per km². In most stations sampled, plastic (mainly bags and bottles) accounted for a very high percentage (more than 70%) of total number of debris, and accumulation of specific debris, such as fishing gear, was also common. In some areas, only small amounts of debris were collected on the continental shelf, mostly in canyons descending from the continental slope and in the bathyal plain where high amounts were found down to more than 500 m. Dives using the manned submersibles at depth between 50 and 2700 m allowed accumulation areas to be detected on the sea floor. Analysis of these results revealed the influence of geomorphologic factors, local anthropic activities and river inputs. Temporal trends indicated a stable situation in the Gulf of Lion and seasonal variations in the northern part of the Bay of Biscay. Accumulation areas were detected 200 km west of Denmark, in the southern part of the Celtic Sea and along the south-east coast of France”¹⁰.

4.5 Japan

In Japan, researchers at the Tokyo University of Fisheries investigated marine litter on the seabed of Tokyo Bay during the period 1995–2000. Although it is prohibited in Japan to discard marine litter into the sea, large amounts of litter flow continually into Tokyo Bay. Some is washed ashore and then cleaned by local municipalities, supported by the local-government, but some of the litter sinks and accumulates on the seabed.

At Kanagawa Prefecture area in Tokyo Bay, small-trawl fishermen brought litter caught in their small trawls (6.5 metres-wide bottom-beam trawls, each towed at 3 knots for one hour) back to their port. The accumulation of marine litter on the seabed of Tokyo Bay was investigated by sampling of the marine litter items brought ashore by the fisherman. In addition, the survey was also made to examine the effectiveness of cleaning the seabeds with this method. Litter was sampled from the whole catch by the small trawl almost once a week. Samplings were made during a total of 330 days and in total 2,187 tows were made (an 86.9 km² large towing area). The sampled litter was classified into plastic, metal, glass, fishing gear, and others. Numbers and weights of the items in each category were measured. A total of 26,940 litter items (1,682 kg) were collected during the six years. Cans, plastic shopping bags, plastic food containers, beverage bottles and cans, and clothes constituted most of the litter collected. Plastics was the dominant item material and accounted for 51.2 per cent of the litter collected, with a total of 2,109 litter items. The proportion of fishing gear, e.g., fishing trap, nets and ropes, was 3.6 per cent. Litter was widely distributed over trawl-fishing grounds in the area, with an average of 310 litter items per km², declining from 403 per km² in 1996 to 184 per km² in 2000.

¹⁰ Litter on the Sea Floor Along European Coasts. Article by F. Galgani et al, published in 2000 in *Marine Pollution Bulletin*.

4.6 SNS Fishing-for-litter project

The "Save the North Sea" Fishing-for-litter initiative has been implemented, co-ordinated and managed by KIMO International, one of the partners in the SNS project. The principle of the initiative was to mirror the operational methods of the Den Helder pilot scheme and to expand the initiative to other harbours in The Netherlands, Denmark, Sweden and the United Kingdom with a target of 60 vessels, five harbours and 1,000 tonnes over the period of three years (2002–2004). **The final results of the project were published in 2005. Figures, where they are available for 2003 and 2004 for all the participating harbours involved, are included in Table 1 and Table 2 below.**

Table 1.

Harbour	Tonnages 2003												Total
	January	February	March	April	May	June	July	August	September	October	November	December	
Vlissingen (5)	0,76	0,50	0,80	0,68	0,76	0,00	0,44	0,44	0,44	0,44	0,32	0,32	5,90
Stellendam (5)	1,20	3,76	1,96	4,16	4,42	2,60	2,60	1,34	1,52	1,24	1,24	1,24	27,28
Breskens (3)	1,00	1,00	1,10	1,20	1,10	1,30	1,20	0,90	0,80	0,70	0,80	0,90	12,00
Den Helder (10)	3,82	5,06	2,00	2,09	0,00	4,47	8,24	7,86	6,50	2,05	2,90	3,76	48,75
Shetland (10)								0,72	0,86	0,18	1,94	1,94	5,64
Hivde Sande (10)										10,69	13,25	9,29	33,23
Smogen													0,00
Peterhead													0,00
Grimsby													0,00
Total	6,78	10,32	5,86	8,13	6,28	8,37	12,48	11,26	10,12	15,30	20,45	17,45	132,80

Table 2.

Harbour	Tonnages 2004												Total
	January	February	March	April	May	June	July	August	September	October	November	December	
Vlissingen (5)	0,95	0,95	0,95				0,30						3,15
Stellendam (5)	3,82	5,14		2,18	2,84	2,54	5,28						21,80
Breskens (3)													0,00
Den Helder (10)	10,97	5,48	11,05	7,36	6,50	0,00	3,76	7,46	4,94	8,34	5,18	5,76	76,80
Shetland (10)	0,00	0,78	0,00	0,72	0,10	0,12	0,58	0,96	1,28	0,00	0,76	0,86	6,16
Hivde Sande (10)	13,22	7,30	14,50	14,93	7,35	10,03	16,20	16,80	12,80	10,70	6,30	7,00	137,13
Smogen (2)													0,00
Peterhead (9)					0,83	0,83	0,40	0,40	0,40	0,40	0,50	0,50	4,26
Grimsby													0,00
Total	28,96	19,65	26,50	25,19	17,62	13,52	26,52	25,62	19,42	19,44	12,74	14,12	249,30

Tables 1 and 2: Interim figures for 2003 and 2004 for all the participating harbours involved in the SNS Fishing-for-litter initiative.

The Netherlands: The participation of thirteen additional fishing vessels in Breskens, Stelladam and Vlissingen, as a continuation of the Dutch pilot project in Den Helder, was launched in December 2002, extending it to fishermen in Southern Netherlands in association with the relevant harbour authorities, fishermen's associations and KIMO Netherlands.

Denmark: A scheme was launched in Denmark in October 2003, involving 10 vessels in the harbour of Hvide Sande on the west coast, in partnership with the harbour authorities, Danish Fishermen's Association and KIMO Denmark.

United Kingdom (Scotland): The initiative was launched in the Shetland Islands in June 2003, involving 10 vessels and two harbours (Lerwick and Scalloway), in association with Shetland Fishermen's Association, Lerwick Port Authority, Shetland Islands Council and Shetland Amenity Trust. The harbour of Peterhead was added in April 2004, in association with Peterhead Port Authority and KIMO UK, involving nine white fish vessels.

Sweden: Two vessels landing their catches in the Smögen fishing harbour on the Swedish west coast have been participating, in partnership with the municipality of Sotenäs.

In total, it is estimated that 54 vessels collected a total of over 400 tonnes of litter over the three-year period, which represents a phased implementation from 10 vessels in Den Helder (March 2002-December 2003) and a gradual role out across the nine harbours up to the end of 2004. The average per boat over the project duration was 4 tonnes per year, however this varies dramatically from harbour to harbour and country and the type of fishing activity utilised.

Based on the average amount of time spent cleaning nets per week (2 hours), the average hourly rate for a fisherman (£67), the average time spent at sea (3 weeks per month) and the average number of tonnes of litter collected by a boat in the scheme per year (4 tonnes). This is expected to cost fishermen £1,306.50 per tonne and only applies to fishermen's time, and does not include costs associated with lost catches, damage to gear or disposal costs.

If this is applied to the estimated 400 tonnes that were collected by the end of 2004, the cost of marine litter to the vessels involved in the pilot project in lost time could have been £522,600 (€773,448).¹¹ If this figure were applied to all vessels in the OSPAR region, it would demonstrate the significant economic cost to the industry, not withstanding the environmental and ecologic burdens caused by marine litter.

It is even more significant that this waste is not usually generated by the individual vessels concerned, but from other sources. It could be argued that the industry is being penalised by the current charging regimes which apply in different countries, whether that is through harbours dues and/or disposal costs and landfill taxes, where these apply for waste that has no connection with the vessels concerned. This provides a disincentive to collect and return such waste to shore thus further contributing to the problem.

The SNS Fishing-for-litter initiative has been backed by significant cooperation from the fishing industry, harbour authorities and local authorities and, in some cases, national governments. As a result, significant efforts have been made to identify sources of funding to continue these measures.

5. Current Fishing-for-litter Initiatives

The Netherlands: The Den Helder project operated in 2005 as funding was identified from The Netherlands to continue up to and including the year 2007. Further funding has been secured to continue on a short-term basis in other harbours in The Netherlands, in Stellendam with 3 fishing vessels, in IJmuiden with 5 fishing vessels, 7 vessels in Colijnsplaat and in Breskens with 2 fishing

¹¹ 2 hours per week x £67 (€99.16) per hour = £134 (€198.32) per week. 3 weeks per month = 39 weeks a year. 39 weeks per year x £134 (€198.32) per week = £5,226 (€7,734.48) per year. This sum per year / 4 tonnes per year = £1,306.50 (€1,933.62) per tonne, and that sum per tonne x 400 tonnes = £522,600 (€773,448).

vessels. In 2006 more than 121.000 kg of waste was collected in these 4 harbours from the North Sea.

Denmark: The scheme in Denmark, involving 10 vessels in the harbour of Hvide Sande, has been adopted by the harbour authority.

United Kingdom (Scotland): The initiative involving 10 vessels and two harbours continued until March 2005 with the support of the Shetland Fishermen's Association, Lerwick Port Authority, Shetland Islands Council, and Shetland Amenity Trust & KIMO UK. The scheme in Peterhead continued until March 2005, in association with Peterhead Port Authority and Aberdeenshire Council and KIMO UK. Since the completion of the SNS the North Sea project in 2004 funding has been obtained for a three-year project commencing in April 2005 to expand the FFL scheme in Scotland to 10 harbours with participation from 100 fishing vessels to reach an objective to collect 500 tonnes. The project has attracted the participation of 12 harbours including three harbours from the SNS project (Lerwick, Scalloway, and Peterhead) and Aberdeen City, Fraserburgh, Stornoway, Malliaig, Kinlochervie, Tarbert, Ullapool, Eyemouth, and Cullivoe (Shetland). Plans are under way to launch two more harbours on the west coast of Scotland in 2007. *United Kingdom (England):* Applications for funding have been submitted to various agencies to develop a three year project involving four harbours and 60 vessels in the South West of England.

Sweden: The scheme in Smögen ceased with the end of the SNS project. Possibilities to expand the activities to other fishing harbours are presently being looked into by KIMO Sweden.

Norway: In Norway an ad hoc committee was examining at cleaning up waste in the marine environment.

France: Information was received through the Steering Group of the OSPAR Pilot Project on Monitoring Marine Beach Litter at the 9th meeting in Dieppe, France, 1–2 October, 2005 regarding activities by local communities in the Pyrénées-Atlantiques region. The communes group Kosta Garbia collects waste at sea during the summer, at distances between 300 metres and 3 nautical miles from the coast. From the coast out to 300 metres, five communes collect floating waste. The amount of marine litter collected at sea (0–300 metres from the coast) was 50.1 m³. Such litter is collected by means of small boats or jet skis. A fisherman has been engaged by the communes group Kosta Garbia to collect floating marine litter by surface trawling the sea between 300 m and 3 nautical miles from the coast. After aerial surveillance over the area, in cooperation with the fisherman, one can detect presence of marine litter, particularly as strings between two waterfronts. However, sometimes this litter sinks below the surface before the fisherman gets there. The amount of litter thus trawled and collected during 90 days in 2004 was 8 tonnes of plastic and 6 tonnes of wood. Further activities occur involving fishermen in the Aquitaine region: The objective of the programme is to engage fishermen to bring back waste ashore, i.e., is to collect waste at sea (remedial measures) and to make sure that waste is not thrown overboard (preventive measures). The programme started in 2002 with the company Bertin Technologies, and has been implemented since 2004 by Institut des Milieux Aquatiques. About 200 vessels in four fishing harbours – Arcachon, Capbreton, Saint-Jean-de-Luz, and Hendaye – participate, which means that some 1,800 fishermen are engaged. Receiving skips or containers are available in the ports for the waste collected by fishermen. For this programme, a Special Programme Officer has to be in the ports every day to give plastic bags to crew members, to raise awareness among professional fishermen, to set up contacts with contractors who pick up the skips, and for ongoing contacts with professional organizations and port authorities. In 2004, 89 tonnes (1007 m³) of waste were collected, in 2005 (January–August), the amount was 75 tonnes (854 m³).

6. Discussion

Experiences from the activities implemented so far point at a number of issues that need to be considered when discussing an expansion or initiation of Fishing-for-litter initiatives in additional countries or harbours in the OSPAR region. Formal/legal/administrative issues, as well as practical questions, need to be investigated and discussed. Such issues include, e.g., what is required from the participating countries and local communities, relevance in relation to existing legislation on

reception facilities, time aspects (the need for a long-term commitment), coordination responsibilities (central/local), equipment on board vessels, options for delivery and reception ashore, and capacity and schemes for waste handling/management/disposal in local communities. Of course, economic issues – fee systems, economic compensation for additional costs incurred – also have to be investigated and discussed.

Furthermore, the implementation of legislation on mandatory reporting to the authorities of loss of nets at sea (preferably with as exact notes on positioning as possible) not only in Norway but throughout the OSPAR area has been suggested.

The Dutch Vuilvisproject Den Helder clearly highlights a number of important aspects:

- Motivated fishermen, and fishermen's organisations;
- No extra cost to the fishermen, i.e., no fee for delivery of the waste collected at sea;
- Interested local communities/harbour operators;
- The existence of an already effectively functioning system for reception and management of waste that could handle the extra quantities of waste delivered;
- A system set up to keep track of the extra waste delivered – e.g., through separate big bags;
- A central authority to coordinate the project;
- Funding secured over a longer period of time to pay for the extra equipment needed onboard the vessels, as well for additional costs associated with the delivery and treatment of the waste.

The following principles are applicable:

- There should be no extra cost to the fishing boats/fishermen, no extra charges for delivering the waste ashore. The fishermen's contribution is the time spent, on a voluntary basis, to clear the fishing gear and collect the litter in big bags to be brought ashore.
- There should be no extra cost to the local communities or the harbour operators receiving the waste collected in the fishing gear for handling and final disposal of the waste;
- The extra costs must be covered from external funding sources.

The SNS Fishing-for-litter initiative has demonstrated on a limited scale that the objectives and aims of the scheme can gain the support of the fishing industry, port authorities and local authorities. Furthermore, it can contribute to changing practices and culture within the fishing sector, provide a mechanism to remove marine litter from the sea and seabed, and raise awareness among the fishing industry, other sectors and the general public.

It could be argued that if similar schemes were to be implemented throughout the OSPAR region, significant amounts of marine litter could be removed from the sea thus reducing both environmental impacts and economic costs to the fishing industry and other sectors. If the participation of more than 50 vessels could be encouraged, and a target of 500 vessels could be achieved, a total annual collection rate of 2,000 tonnes could be expected. This would represent 10 per cent of the estimated 20,000 tonnes annually dumped in the North Sea. It could, therefore, be argued that if similar schemes were to be implemented across the OSPAR region, the Fishing-for-litter initiative could act as a significant OSPAR programme and measure to reduce marine litter. However, in order to keep up with the present likely rate of accumulation of litter on the sea beds in the region, Fishing-for-litter activities would probably have to be complemented with large-scale, regular and targeted clean-up operations operated and funded by, e.g., governments and government agencies.