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Acronyms

ALDFG – Abandoned, lost or otherwise discarded fishing gear

APEC – Asia-Pacific Economic Cooperation region

ES – Ecosystem services

EU – European Union

FAO – The Food and Agriculture Organization of the United Nations

IAS – Invasive alien species

OSPAR – Oslo/Paris Convention (Protection of the Marine Environment - NE Atlantic)

UNEP – United Nations Environment Programme

USA – United States of America

WP – Work Package

Executive Summary

Measuring the full economic cost of marine litter is complex due to the wide range of economic, social and environmental impacts, the range of sectors impacted by marine litter and the geographic spread of those affected, and the different economic techniques used to do it. However, the scientific community has started to develop economic studies to provide information about the costs of marine litter.

Current scientific evidence of the economic impacts of marine litter in Portugal and Spain is still scarce. Therefore, one of the objectives of the NetTag project is to estimate the economic costs of marine litter to the fisheries sector in NW Portugal and Galicia (NW Spain).

In order to identify the magnitude of the problem, 37 semi-structured interviews and two participatory workshops were conducted with 30 key players in the fishing industry, such as fishers, fishing gears producers, waste and collecting fishing nets for recycling companies, recycling fishing nets company, net monitoring system company, NGO's, governmental authorities and researchers with expertise in marine litter, in NW Portugal and Galicia (NW Spain).

Our results show that Portuguese and Spanish fishers invest on average 49 000 € in buying their fishing gears. Fishing gears must be renewed almost every five years due to partial and complete losses and wear caused by continued use. Damages caused by rocky bottoms, shipwrecks, adverse weather conditions, bad handling and interactions with other fishing activities reduce life span of fishing gears. Frequent partial loses of fishing gears of most vessels in Portugal and Spain implies annual expenses of more than 1 500 € per year in time devoted to recover them and another 6 500 € in repairs, which represents 10% of their annual benefits.

Average direct economic impact of marine litter caught during fishing operations was estimated in 600 €·year^{-1} by vessel, as fishers devote three hours by fishing journey clearing the 13 t of marine litter that every year is entangled in their fishing gears. Most fishers store marine litter onboard and deposit it on the harbours. Harbours in Portugal and Spain are provided with garbage containers for marine litter, and some include specific containers for ALDFG that are cost free for the fishers. The lack of containers for ALDFG in some ports, lack of space onboard and lack of awareness on marine conservation could explain why 15% of the fishers recognized that they routinely throw caught marine litter back to the sea.

Impacts of marine litter on tourism, on human wellbeing and health (e.g., declines in wages), and on cultural heritage (e.g., on lighthouses and buildings related to fishing activities in coastal communities) were also identified by fishers and other marine stakeholders.

1 Introduction

The worldwide production and trading of many goods is increasing. Plastic production has increased exponentially since the early 1950s and reached 322 million tonnes in 2015, this value does not include synthetic fibres which accounted for an additional 61 million tonnes in 2015 (Lusher et al., 2017). According to the United Nations, 80% of all marine litter derives from terrestrial sources, and only 20% is originated in the oceans (UNEP, 2005).

Marine litter produces an extensive variety of negative environmental, economic, safety and health, including impacts on cultural heritage (Iñiguez et al., 2016). The economic impact of marine litter is highly relevant and manifests itself in numerous ways. Low decomposition rate of most marine litter implies that effects in the marine environment and on people last during hundreds of years (OSPAR, 2007; Iñiguez et al., 2016). People living industrialized and urbanized areas with high concentrations of plastic debris are especially vulnerable to negative impacts on ecosystems and derived services, including reductions in health food availability (Boglaienko and Tansel, 2018).

Measuring the full economic cost of marine litter is complex due to the wide range of economic, social and environmental impacts, the range of sectors impacted by marine litter and the geographic spread of those affected, and the different economic techniques used to do it. However, the scientific community started to develop economic studies to provide costs of the marine litter for policy makers (Newman et al., 2015).

As regards economic costs it is important to differentiate between actual economic costs linked to expenditure (e.g., costs of clean-up of beaches; costs associated with damage to or loss of fishing gears or obstruction of motors; eventual costs of hospitalisation from marine debris related with health impacts), economic costs of loss of revenues (e.g., loss of revenue from fish or loss of income from coastal tourism) and assessment of well-being costs in economic terms (e.g., assessing the economic value of loss of cultural values such as recreation or landscape aesthetics).

The environmental impacts to marine ecosystems caused by plastics has been estimated at USD 13 billion per year (including financial losses to fisheries and tourism and time spent on clean-up activities), whilst the total natural capital cost of plastics used in the consumer goods industry (e.g., the financial cost to enterprises if the impacts associated with their current practices were internalised into their internal operations) is estimated at over USD 75 billion per year

(including the cost of environmental impacts such as CO_2 emissions, and loss of resources when plastic waste is not recycled) (UNEP, 2016).

At the shorelines, marine litter causes aesthetic and contamination problems that can result in less tourism and entails cleaning costs to the local authorities. It was estimated that the clean-up costs to remove marine litter from all European coasts would add up to €630 million (Acoleyen et al., 2013). Attempts have been made to develop methodologies for quantifying non-use values, but such studies are often hindered by the lack of relevant and reliable data. It has been estimated that the impacts related to plastic pollution in the ocean costs up to USD 8 billion per year total (including the use and non-use values) (UNEP, 2017). Despite their partial coverage, the studies that are available provide enough information to draw several important conclusions (Newman et al. 2015).

Marine litter has economic and social impacts from the local to the international level. The presence of marine litter has significant documented impacts on the marine environment (e.g., degrading inland, coastal and open-sea ecosystems). Degradation of ecosystems can have a negative effect on the economy (e.g., revenue losses in the fisheries, tourism and shipping sectors) and on society (e.g., affecting the health and well-being of residents and visitors) (UNEP, 2017).

The costs of marine litter for industries such as fisheries have beginning to be quantified and can be considerable. Litter caught in fishing nets is becoming a frequent problem. Furthermore, litter can be responsible for damaging fishing vessels and fishing gears or may contaminate the catch (Thomson et al., 2004; Andrady, 2011). Floating plastic debris can affect the engine cooling systems and become entangled in propellers (McIlgorm et al., 2011). The total economic cost of this impact has been estimated to be nearly €61.7 million in the European Union (EU) alone (Mouat et al., 2010).

The fishing industry suffers the impact of marine litter, but it also contributes to it, over 45% of plastic debris found in the ocean are related to Abandoned, Lost or otherwise Discarded Fishing Gears (ALDFG) (Lebreton et al., 2018). It is difficult to measure the costs ALDFG has on the fishing activity, as it varies from fishery to fishery (NOAA, 2015). Its presence in marine ecosystems can has a significant impact on commercial fishing and shellfish industries, leading to relevant socioecological consequences (Lusher et al., 2017).

Different management measures are needed to address ALDFG. Some studies estimated that over 90% of the species caught with ALDFG are of commercial value, hence, representing a significant loss of revenue for fishers (Al-Masroori et al., 2004). For example, Scheld et al. (2016) estimated that the annual loss due to derelict pots and traps for nine species of crustacea in Chesapeake Bay (USA) amounted to USD 2.5 billion.

Impacts of marine litter can also damage the tourism sector. Recent studies showed the economic costs for the tourism sector. For example, cleaning the beaches of Goeje Island (South Korea) have been estimates to be range between USD 27.7-35.1 million of lost revenue in 2011 as a result of over 500 thousand fewer visitors (Jang et al. 2014). It has been also estimated that the damage of the marine litter to the tourism sector in the Asia-Pacific Economic Cooperation (APEC) region would be at USD 622 million (Mcllgorm, 2009). Van der Meulen et al. (2014) also estimated that annual costs to the tourism sector in the UK could range from USD 2.2 million to almost 823 million in the 2010-2100 period.

In addition, even though there is a growing interest in ecosystem services (thereafter, ES) (Costanza et al., 1997; de Groot et al., 2012) little research has been done to date on the economic cost of marine litter on ES provision. Marine litter can damage ecosystems, their components, functions and associated ecosystem good and services. Ingestion by and entanglement of species (e.g. 'ghost fishing' by discarded nets) are increasingly documented problems in marine research. Furthermore, litter items can be toxic to marine species (e.g. some plastic additives are endocrine disruptors), or they can facilitate the spread of invasive alien species (IAS), with negative impacts on the receiving ecosystems. Impacts of marine litter can also lead to societal costs including reduced potential opportunities for recreational activities, health risks to coastal visitors (e.g., contaminated swimming water, cuts from sharp items) foregone benefits from access to marine and coastal environments (e.g., reduced tension and stress) and potential risks associated with the consumption of contaminated marine seafood products (UNEP, 2017).

Impacts of marine litter on recreational activities have been also recently documented. For example, Legget et al. (2014) showed that marine litter had a significant impact on residents' beach choices to visit the beaches in California (USA). The study indicates that a 50% reduction in marine litter could generate USD 67 million in economic benefits to residents over a 3-month period.

The main aim of NetTag is to reduce and prevent marine litter derived from fisheries, one way to do this is raising awareness amongst fishers to the need to adopt preventive practices to reduce onboard litter, another way is by developing new technologies to track fishing gears to facilitate its location and recovery in case it gets lost.

The main objective of WP7 of the NetTag project is to estimate the economic costs of marine litter to the fisheries sector in NW Portugal and Galicia (NW Spain). The key interest of WP7 is to assess, based on the available scientific knowledge and evidence, the potential impact of marine litter and therefore the economic value they generate every year, as an indicator of the potential economic damage costs of marine litter to the fisheries sector.

Direct economic impacts faced by the fisheries sector arise from the need to repair or replace fishing gears that have been damaged or lost due to encounters with marine litter; repairing vessels with tangled propellers, etc.; loss of earnings from time spent looking for lost gear (not fishing), and loss of earnings due to reduced, damaged or contaminated catches resulting from marine litter in the nets. The sector also experiences indirect economic losses of earnings due to the impact of loss and abandoned fishing gear on fish stocks (e.g., ghost fishing). This project report addresses Task 7.1 of the NetTag project by providing estimates of the total economic costs for fisheries derived from marine litter in NW Portugal and Galicia (NW Spain).

2 Data collection

2.1 The economics costs of marine litter for fisheries: A European review

In order to analyse the state of knowledge about research on the economics costs of marine litter to the fishery sector of NW Portugal and Galicia, the database ISI Web of Knowledge (available at http://apps.webofknowledge.com) was used to select scientific publications that matched the following two search strings in the title or in the theme of the publications: Europe AND marine AND litter* AND econom*" and "Europe OR marine AND econom* AND fishing gear* AND (abandon* OR lost OR discard)".

The searches included all scientific articles published in English until the cut-off date of the end of November 2019. The first search resulted in 38 papers and the second in 25 papers. After deleting duplicated papers and those papers not related to the objective of this report (abstracts were reviewed to confirm the preselection) a total of 27 papers were carefully reviewed.

Another four papers were incorporated from the literature cited in the original papers obtained in the searches.

A database was created with the information gathered from the publications, including details of 1) economic impacts of marine litter caught by the fishing gears, propellers and refrigeration intakes of vessel engines, and 2) of lost fishing gears, including replacement costs and time invested on recovery operations. Available data was normalized by costs in current euros by fishing vessel and year.

Recovery campaigns of lost fishing years were not included in the analysis because they are designed with different objectives instead to develop systematic recoveries (Brown and Macfadyen, 2007), making difficult establishing economic comparations.

The main findings of the publications in each of the two topics are detailed in the results section and they have been put in context in the discussion section.

2.2 Fishers' knowledge and perceptions on the costs of marine litter for fisheries

Semi-structured interviews with fishers were developed to gather their knowledge about 1) problems associated with marine litter: types, quantities, and economic impacts, including time devoted to clean the nets and aggregated derived costs (loss of fishing time, wages, etc.); and 2) ALDFG, including the frequency and reasons for the losses, measures taken to recover lost gears, and aggregated involved costs, i.e., of time devoted to recovery operations (fuel, loss of fishing time, etc.) and of reparation of damaged gears (information on the asked questions and procedure are included in D2.1 and D2.2[1]).

The economic impact of marine litter caught on fishing gears was estimated by the information provided by the fishers, who estimated the time invested by fishing trip and the annual costs by boat. To estimate the economic costs of ALDFG, information of the frequency of losing fishing gears and of costs of the time devoted in each recovery operation was used. The fishers provided information of how often they lose entire (or pieces) of fishing gears: never, occasionally (up to once per year), or frequently (up to twice per year). Subsequently, we multiplied this frequency (0, 1, or 2) by the recovery costs by operation reported by each fisher to estimate their annual recovery cost. Annual repair costs were directly estimated using the information

[1] The participatory workshops held with fishers, described below, were also used to obtain estimates of the impacts of marine litter and ALDFG.

provided by the fishers. Moreover, the fishers estimated the importance that the repairs of their fishing gears have on their annual economic balance.

The survey was developed in the northwest of Portugal and Galicia (NW Spain) from March to September 2019. Figure 2 illustrates the survey areas. Fishers were summoned by representatives of fishers' associations (APMSHM and ARVI, partners of NetTag) in each area and were selected to cover a wide range of fishing grounds (from coastal to international distant waters), fishing gears (from manual shell-fishing to industrial trawlers, type of vessels (from small boats to big industrial freezers) and professions (from deck operators to ship owners).

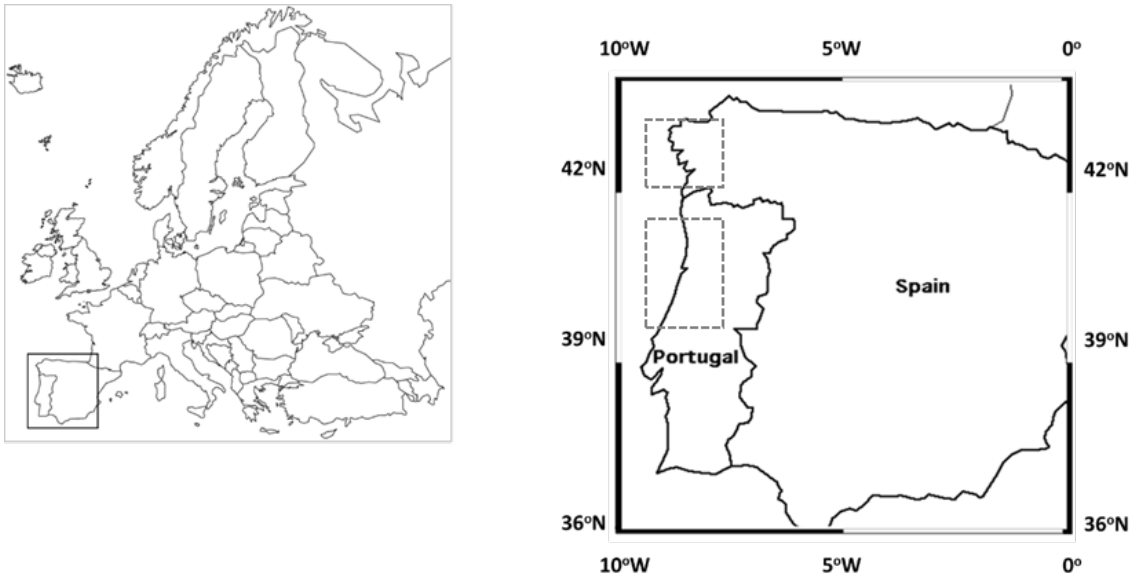

Figure 2. Map of the survey areas.

Semi-structured interviews allowed the researchers to ensure that the participants provided information on key topics, while open-ended questions and probes allowed fishers to expand on the most important items for them (Bryman, 2016).

A total of 37 interviews were performed with fishers, 17 in Portugal and 20 in Spain. However, information was provided for more gear, as some of the fishers provided information on more than one fishing gear[2] (Table 1). Ten different fishing gears were used by the interviewed fishers, the trawlers being the most numerous (13; Table 1). Interviewed fishers showed high fishing experience, with an average of 28.77 ± 7.76 (Standard Deviation) years, with owners, followed by crew members as the main jobs (Table 1).

[2] Some fishers can use different fishing gears (licenses) during the annual fishing cycle.

Table 1. Number of fishers interviewed, fishing gears and jobs onboard by country.

	Country	
Fishing gear	**Spain (N)**	**Portugal (N)**
Dredge	0	2
Drift nets	1	0
Gill nets	3	4
Longline	1	2
Pots	0	3
Purse seine	3	2
Shell fishing	1	0
Trammel nets	2	6
Traps	1	3
Trawl nets	8	5
Profession		
Crew	6	4
Owner	14	10
Skipper	0	3

Source: own elaboration from the results of the interviews.

To complement and discuss the information gathered during the first round of in-depth interviews, two participatory workshops were developed with a group of fishers and other stakeholders different from the participants in the previous interviews. Participants were summoned by representatives of fishers' associations (APMSHM and ARVI, partners of NetTag) in each area following the same criteria used in the previous survey based in interviews. The workshops were held in the facilities of the fishing associations partners in the NetTag Project, Associação PROMAIOR- Maior Segurança Dos Homens Do Mar (APMSHM) in Póvoa do Varzim (Portugal) and Cooperativa de Armadores de Pesca del Puerto de Vigo (ARVI) located in Vigo (Spain).

The overall objective of the consultation was to collect detailed information on the current knowledge about marine litter and its impacts on fishing activities. The consultation also evaluated the current state of knowledge, problems and challenges of the marine litter as well as to gather general lessons learned in EU and non-EU countries where Iberian fishing vessels operate under different regulatory frameworks to deal with marine litter.

The participants' attitudes and perceptions can contribute to: a) provide key information about the local dynamics of marine litter currently unavailable in official data and reports and on the problems and challenges to tackle with the problem, b) recognize the spatial problem of the marine litter, c) indicate how marine litter affect their economy, d) reveal the level of knowledge of fishers about marine litter, d) identify the obstacles (if any) that fishers face in relation to the reduction of marine litter from the sea, and f) identify the best incentives to motivate fishers to land marine litter at harbours.

The workshops lasted for two hours, and attendees shared new data and their opinion on the results of the main economic impacts of marine litter, addressed during the previous interviews (see also D2.1 and D2.2 of the NetTag project), but also provided information on additional impacts of marine litter on key marine ecosystem services, including impacts on tourism, on cultural heritage, and on human wellbeing and health.

The workshop participants answered a questionnaire that included questions related to the specific knowledge and expertise of each participant on marine litter in each country by including the following topics (Annex 1): (a) economic costs of impacts from marine litter on fishing activities, including fishery resources, and (b) impacts of marine litter on marine and coastal ecosystem services, specifically on tourism, cultural heritage and human health. In each case, the attendees quantified impacts by using a semiquantitative scale, from (1 = low, to 3 = high).

A total of 30 stakeholders fishers attended the workshops. Portuguese fishers from different fishing activities were invited to the workshop in Póvoa do Varzim, 17 fishers from different types of fishing attended, including trawling, octopus plastic pots, trammel nets, gill nets, and purse seine fishing (Table 2). From the Portuguese participants 11 were boat owners and two were crew members.

In Vigo, nine skippers of Spanish trawlers, longliners and vessels using drift nets operating in different areas, including Malvinas/Falkland Islands, Namibia, South Africa, North Atlantic and several European international fishing grounds attended the workshop. In addition, four members of ARVI (partners of NetTag) were also involved in the workshop (Table 2).

Table 2. Number of stakeholders that attended the workshops in each country.

Location	Fishers (N)
Póvoa do Varzim, Portugal	17
Vigo, Spain	13
Total	30

Source: own elaboration from the results of the interviews.

In most cases, defining the boundaries of a group of people who are affected by an anthropogenic problem may be critical for the development of their activities (Ostrom, 2007). We sought people whose profession and/or means of livelihood are directly linked to the marine species susceptible to be affected by marine litter. Using non-proportional quota sampling (Tahsakkori and Teddlie, 2003), our sample included those fishers selected by the industrial partners of the NetTag project (APMSHM and ARVI) who play an active role in fisheries for key species affected by the marine litter.

In-person interviews with narrative-based methods and appropriate probes can be well-suited for exploring subjective and experiential topics, arguably helping people reflect on their values more deeply than paper or web-based surveys (Villasante et al., 2016a, 2016b). Considering the limited time to develop this study due to fishers' time constraints, we therefore effectively chose qualitative over quantitative methods, involving a smaller sample in an in-depth exploration in each case study.

When conducting in-depth interviews, the number of new concepts and/or results associated with each additional interview generally tends to diminish after 20 and 30 interviews (Morgan, 2002). Accordingly, in this report we used a small sample size since the goal was to identify the diversity of ways in which the consequences of the marine litter are relevant to fishers. The people interviewed represent a wide range of employment activities in each of the fisheries and live in several coastal zones operating in different fishing grounds. We designed a semi-structured interview to enable interviewees to verbalize how the marine litter is affecting their fishing activities. Fieldwork was conducted between mid-September to mid-November 2019.

3 Results

3.1 The economics costs of marine litter for European fisheries

After reviewing the 31 papers identified in the searches, only three (Brown and Macfadyen, 2007; Macfadyen et al., 2009; Newman et al. 2015) included data on economic impacts of

marine litter and lost fishing gears. Moreover, five different economic references on economic impacts of marine litter were available on these papers and were normalized to costs in current euros (November 2019) by fishing vessel and year. All economic references were obtained for the United Kingdom, mostly in different areas of Scotland.

Based on the review, mean costs by fishing vessel of impacts of marine litter caught by the fishing gears, propellers and refrigeration intakes and of lost fishing gears, including replacement costs and time invested on recovery operations were 37 472 ± 25 203 €·year^{-1}. Mean economic impacts of marine litter (45 744 ± 38 125 €·year^{-1}) were higher than that of lost gears (31 957 ± 20 726 €·year^{-1}).

3.2 Direct economic costs of marine litter for fisheries in Portugal and Spain

The price paid by the shipowners for the fishing gears used by the interviewed fishers ranged from 16 to 1M €, with an average of 49 462 ± 158 810 €. Trawling nets (18 643 ± 19 784 €) and purse seines (376 000 ± 414 283 €) were the most expensive fishing gears. Notably, fishing gears must be renewed quite often, on average every 4.9 ± 4.8 years due to wear caused by continued use and partial damages (see D2.2. for a detailed description of the costs and life span of fishing gears).

More than half of the interviewed fishers (59.1% of total) operate in rocky bottoms, which is the main reason to lose fishing gears when they make contact. Entangling on shipwrecks, adverse weather conditions, bad handling and interactions with other active or lost gears are also important reason to lose fishing gears that could also happen in sandy or mud bottoms, where operate 81.8% and 34.1% of fishers, respectively.

Although most fishers (60.9%) confirmed that they have abandoned complete fishing gears during the years that they have been involved in fishing, this is not common, and partial loses of fishing gears are more frequent (79.4%) than complete loses (20.6%). Most fishers (57.5%) must deal with complete or partial gear loses more than once during their annual fishing cycle, one third of fishers (27.5%) indicated that they lose gears with frequencies lower than once per year, while 15.0% of fishers never lose their fishing gears.

Fishers try to recover their fishing gears when the process is operationally feasible and economically viable. In fact, on average fishers spend 5.9 ± 13.3 h by fishing trip recovering lost fishing gears. Fishers estimated that the mean cost by fishing vessel derived from the time spent in a single recovering operation was 2 936 ± 4 621 €. However, considering the frequency

of the loses reported by the fishers it was estimated that mean annual economic cost of time spent recovering lost fishing nets was 1 584 ± 3 353 € by fishing vessel.

After the fishers recover their lost fishing gears, they repair them, except if they are seriously damaged. In this case, gears are sent for recycling or deposited on the port facilities. The mean annual economic impact by fishing vessel derived from the repair of the recovered fishing gears was 6 627 ± 11 273 €, which according to fishers represents 10.1 ± 10.6% of their annual benefits.

On the other hand, fishers must deal with the economic impacts of marine litter caught in the fishing gears, propellers and refrigeration intakes (Figure 3). On average, fishers reported that their fishing vessels catch 12.7 ± 6.7 t of marine litter by year (see D2.2. for a detailed description of the types of litter). Time invested in removing marine litter from the fishing gears is a relevant economic impact that was reported by 75.0% of the fishers. In fact, fishers spend 3.0 ± 12.0 h by fishing trip cleaning their fishing gears, with a mean direct economic cost of 601 ± 1 113 €·year^{-1} by vessel.

Figure 3. Marine litter recovered by the Galician (Spanish) fishers and authorities at the beach of the Ría de Arousa Bay.

Damages to the catches was also relevant for 58.1% of the fishers, followed by damages to the fishing gears, reported by 40.7% of the fishers. Marine litter occupies part of the space onboard needed to the catches which is also problematic for 20.0% of the fishers. Some of the fishers also explained that marine litter may decrease onboard security because of collisions with floating debris and litter caught on propellers and refrigeration intakes.

Most fishers (85.0%) store marine litter onboard and deposit it on the harbours. Harbours in Portugal and Spain are provided with garbage containers for marine litter, and some of them include specific containers for ALDFG that are cost free for the fishers (e.g., the harbour of A Coruña in Galicia alone collects 25.0 $t \cdot year^{-1}$ of fishing gears (Autoridad Portuaria de A Coruña, 2017). The lack of containers for ALDFG could partially explain why 15% of the fishers recognized that they routinely throw caught marine litter back to the sea.

All the information reported in this section was also confirmed with fishers during the workshops developed in Portugal and Spain.

3.3 Other costs of marine litter in Portugal and Spain

Fishers and other stakeholders that participated in the workshops organized in Portugal and Spain identified and quantified impacts of marine litter on tourism, on cultural heritage, and on human wellbeing and health. Perceived impacts of marine litter on tourism were the most negative. Thus, reductions of tourism-related income and jobs were identified as relevant consequences (2.4 ± 0.8 and 2.4 ± 0.9, respectively, in a semiquantitative scale from 1 = low, to 3 = high), followed by decreases in the number of tourists (2.3 ± 0.9). Pollution to beaches was also considered as another important impact (2.3 ± 0.8).

Negative effects on wellbeing and human health were in general perceived as moderately important. In relation to wellbeing, declines in wages was one of the most negative perceived impacts (1.8 ± 0.9), followed by alterations of social cohesion in local communities (1.7 ± 0.9) and presence of polluted environments (1.7 ± 0.9). Main perceived impacts on human health were toxic intake or exposure (1.8 ± 0.9), including consumption of polluted fish (1.7 ± 0.8).

Finally, the participants in the workshops identified lower impacts on the cultural heritage, e.g., on lighthouses, on recreation and sport, and on old buildings related to fishing activities in coastal communities.

4 Conclusions

Portuguese and Spanish fishers invest a considerable amount of money in their fishing gears, paying 49 462 € on average for a new fishing gear. Due to intensive use and partial damages caused by rocky bottoms, shipwrecks, adverse weather conditions, bad handling and interactions with other fishing activities, average life span of fishing gears is less than five years. Marine litter is also causing damages to fishing gears, decreasing their effective use time and contributing to relevant economic loses to fishers. In the UK it was estimated that economic impacts of marine litter represent almost 40 000 € per year and fishing vessel.

Most Portuguese and Spanish vessels suffer partial losses of fishing gears more than once per year, expending more than 1 500 € per year in time employed to recover them, and more than 6 500 € to have gears repaired, which on average represents 10% of the annual benefit of each vessel. In addition, each Portuguese and Spanish vessel catch ca. 13 t of marine litter every year, investing three hours of each fishing trip cleaning the gears, with a direct economic impact of 600 €·year^{-1} by vessel. Collisions with floating debris, problems derived from litter caught on propellers and refrigeration intakes, damages to the catches and space onboard needed to storage marine litter are also effects of marine litter with relevant economic consequences.

Fishers and other marine stakeholders state that marine litter has also relevant impacts on tourism, on human wellbeing and health, and on a lesser extent on cultural heritage. The presence of marine litter on beaches is expected to cause decreases in the number of visitors, and therefore will reduce tourism-related income and jobs. Polluted environments were also associated with problems to social cohesion in local communities and is believed to have an impact on salaries. People is also concerned about toxic exposure, including the presence of polluted fish on the markets.

Although the system of collection of marine litter and old gears is available in many Portuguese and Spanish ports, up to 15% of fishers recognized that they throw marine litter back to the sea. Lack of space onboard, lack of facilities for ALDFG on some of the ports, along with lack of awareness on marine conservation could explain this behaviour.

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