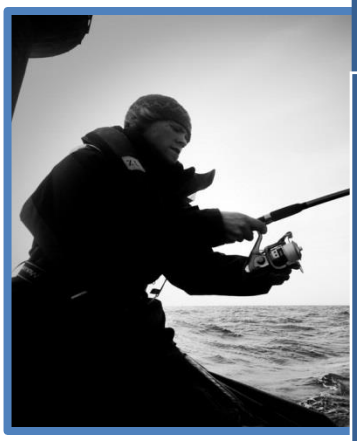
Academic year 2014-2015

Who is the recreational fisherman and what does he catch? An overview of recreational fisheries at sea in Belgium.



Kilian Persoon

ILVO

DIER: Visserij en aquatische productie

VLIZ

Policy Information Division

Promotor:

Dr. Jan Reubens

Co-promotor:

Dr. Sofie Vandendriessche

Supervisors:

Ir. Els Torreele

Dr. Thomas Verleye

Master thesis submitted for the partial fulfillment of the title of

Master of Science in Marine Biodiversity and Conservation

within the International Master of Science in Marine Biodiversity and Conservation EMBC+

'No data can be taken out of this work without prior approval of the thesis promotor / supervisor '

'Photos front page: © Jan Reubens & © Daniel Wintein'

I hereby confirm that I have independently composed this Master thesis and that no other than the indicated aid and sources have been used. This work has not been presented to any other examination board.

Date: 3 August 2015

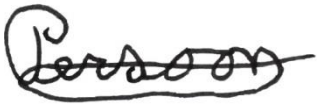
Signature: 

Table of contents

Table of contents 1
1. Abstract 3
2. Executive summary 4
3. Introduction & aim 5
3.1 Recreational Fisheries and fisheries management 5
3.2 A momentum for recreational fisheries 5
3.3 The case study of Belgium 6
3.4 The Neighboring countries 7
3.5 Recreational fisheries and wind farms 8
3.6 Aim 8
4. Material & Methods 9
5. Results 13
5.1 Coverage 13
5.2 Demographic information 13
5.3 Economic value 16
5.4 Temporal variation in fishing activity 20
5.5 Angling at sea 24
5.6 Land based angling 29
5.7 Beach shrimping 33
5.8 Total landings and mortality 34
5.9 Wind farms 34
5.10 Observations at sea 38
6. Discussion 42
6.1 Methodological considerations 42
6.1.1 Survey 42
6.1.2 Intensity measurements at sea 43
6.2 Socio-economic characteristics of Belgian recreational fisheries at sea 44
6.3 Recreational fisheries and wind farms 46

6.4 Policy implications 46
7. Conclusion 48
8. Acknowledgments 49
9. References 50
10. Annex 1 53

1. Abstract

Marine recreational fisheries have become a hot topic in research, their impact is slowly being recognized by the scientific community and policymakers alike. Belgium, with the exception of some sparse research, has been left behind by its neighboring countries when it comes to identifying the recreational fisheries sector and its impacts. Through the means of a survey both in online and paper form, a variety of data was gathered. The survey reached predominantly anglers within the sector, and as such our conclusions are mainly valid for them. From this data, we are able to demonstrate that although recreational fishing is a hobby primarily done by older men, it does appeal to the entire spectrum of society. Also the economic value of the sector proved to be important: several businesses directly depend on it, both at the coast and inland. Furthermore, it is discovered that wind farms enjoy a reserve-like status in Belgium, acting like nursing grounds, owing this to their legal protection. Finally the catches mainly revolve around 7 species, and for some of these, like *G. morhua* and *D. labrax*, they are quite substantial when compared to commercial landings in the ICES IVc region (36,3% and 51,2% respectively).

Recreatieve visserij op zee is een hot topic in onderzoek, de impact ervan wordt geleidelijk aan erkend door zowel onderzoekers als mensen verantwoordelijk voor het beleid. Met uitzondering van een zeldzame studie, is België achtergebleven in vergelijking met de buurlanden. De informatie over de recreatieve visserij sector en zijn diverse impacts is niet aanwezig. Met behulp van een enquête die zowel online als op papier is gecreëerd werd een grote variëteit aan data verzameld. De enquête werd vooral door hengelaars ingevuld, en de conclusies in dit onderzoek zijn dan ook voornamelijk op hen van toepassing. Uit de data kunnen we besluiten dat, recreatief vissen op zee voornamelijk door mannen van middelbare leeftijd wordt beoefend, hoewel het hele spectrum van de bevolking bereikt wordt. De economische waarde van de sector is groot, en meerdere ondernemingen zijn direct afhankelijk van de sector voor hun voortbestaan, zowel aan de kust als in het binnenland. Verder werd ook vastgesteld dat de windmolenparken in het Belgische deel van de Noord Zee, de inofficiële status van no-take zone hebben, waardoor ze hun functie als broedkamers voor verschillende soorten kunnen vervullen, dit dankzij het verbod op enige activiteit in de windmolenparken. Als laatste zien we dat de vangsten voornamelijk zeven terugkerende soorten bevatten, en voor sommige zoals kabeljauw en zeebaars, zijn de vangsten zeer omvangrijk. Zeker in vergelijking met de commerciële vangsten in het ICES IVc gebied (36,3% en 51,2% van de commerciële vangst respectievelijk).

2. Executive summary

Marine recreational fisheries have become a hot topic in research, their impact is being recognized by the scientific community and policymakers alike. Belgium, with the exception of some sparse research, has been left behind by its neighboring countries when it comes to identifying the recreational fisheries sector and its impacts. This thesis aims at countering the lack of information, through the means of a survey both in online and paper form, a variety of data was gathered. The survey reached predominantly anglers within the sector, and as such our conclusions are mainly valid for them. Another type of fishermen that could be reached is the beach shrimper, one type of fishermen that was not reached but is known to be important from previous research, are those that go out with trawling gear on a boat. Additional input came from in situ observations from the research vessel Simon Stevin, which we used to determine the fishing intensity in the Belgian part of the North Sea.

From this data, we are able to demonstrate that although recreational fishing is a hobby primarily done by older men, it does appeal to the entire spectrum of society. We establish that recreational fishing is important for the people involved as it forms the basis of their social network, and is a form of relaxation for most. Also the economic value of the sector proven to be important: several businesses directly depend on it, both at the coast and inland. Resulting in an estimation ranging from € 917.696 to € 1.660.714 a year spent on recreational fisheries, not including boat costs. The recreational fisheries mainly revolve around 7 species, and for some of these, *G. morhua* and *D. labrax*, they are quite substantial when compared to commercial landings in the ICES IVc region (36,3% and 51,2% respectively). There are quota for *G. morhua*, and several measure recently initiated by the European Union to protect *D. labrax*. The catches in recreational fisheries are not included in the TAC system, which poses questions to the sustainability of fishing for certain species. From questions concerning wind farms we learn that there is an interest to go fishing there, however the reserve-like status of them is respected mainly due to a prohibition to fish there, and due to the distance from shore. Lastly it is clear that recreational fishermen consider wind farms beneficial for the fish populations.

3. Introduction & aim

3.1 Recreational Fisheries and fisheries management

Over the last few decades, academic researchers have become increasingly aware that the state of the fish stocks has diminished from alarming to downright catastrophic for various preeminent species. As indicated by 'fishing down the foodweb' (Pauly *et al.* 1998), Pauly's most influential publication, and several other works (Bailey, 2011; Hutchings & Myers, 1994; Mullon, *et al.* 2005; FAO The State of World Fisheries and Aquaculture 2014), the severity of the situation has reached a critical point, demanding actions both to save the sector of fisheries itself and entire marine environment in. This information is put into recommendations by several organizations who have a long tradition in provide advice. Concerning this advice, we distinguish various initiatives, dividable into two categories. First of all we consider the scientific committees who submit recommendations based on academic research, such as ICES and FAO. Secondly, Regional Fisheries Management Organizations (RFMOs), comprised of all flag states finishing in a particular area, are authorized to impose binding regulations as far as quantities, technical measures and inspections go.

Specifically in Europe the Common Fisheries Policy (CFP) has been introduced in the 1970s, and works together with the RFMOs that operate in the European Union's territory. 'The CFP aims to ensure that fishing and aquaculture are environmentally, economically and socially sustainable and that they provide a source of healthy food for EU citizens. Its goal is to foster a dynamic fishing industry and ensure a fair standard of living for fishing communities.' It governs the commercial fisheries and has decent results proving its value thus far, still improving with the discard ban as its most recent addition.

3.2 A momentum for recreational fisheries

Since recreational fisheries have been included in the DCF regulation[1], the number of studies on this subject have increased. Where before the inclusion there was little effort to estimate the catches of recreational fisheries and their potential effects on fish stocks and marine ecosystems (Pawson *et al*., 2008). The impact they have on the different fish stocks has been considered irrelevant for a long time, yet international research on this subject is growing ever since the 21st century (e.g. Cooke & Cowx, 2004; Lewin *et al*., 2006; Cabanellas-Reboredo *et al.,* 2014; Hammen & De Graaf, 2015; Hughes, 2015). The results obtained through those recent studies have proven to be rather surprising. In France for example, research showed that the recreational catches for species such as *Dicentrarchus labrax* and *Pollachius pollachius* are comparable in quantity to those of commercial landings (Herfaut *et al*. 2013). These findings were highly relevant, considering the fact that the catch of *Pollachius pollachius*, amongst other species, is subject to TACs (Total Allowable Catch). Since TACs are being calculated without taking recreational catches into account, this one-dimensional method forgoes the main purpose of the system,

[1] The DCF distinguishes between commercial and recreational fisheries, with recreational fisheries being defined as 'non-commercial fishing activities exploiting living aquatic resources for recreation or sport.'

which is maintaining a sustainable fisheries sector. Therefore more accurate insights in total landings, including those of recreational fisheries, are required.

3.3 The case study of Belgium

There has been little research so far on recreational fisheries in Belgium. Currently accurate data concerning the size of this sector, is lacking.

This lacuna is mainly due to the lack of obligation to register when fishing at sea, which falls under federal jurisdiction, contrary to fishing in waters which falls under the jurisdiction of the Flemish regional government. As a consequence of the absence of an obliged permit, there is no accurate estimation of the number of fishermen, which in turn hampers data gathering and analysis.

In a pilot study in 2006 the ILVO made an estimation of the catches of *Gadus morhua* in recreational fisheries in Belgium. Based upon a results from small survey, supplemented by the number of trips made by charter vessels, researchers estimated recreational landings ranging between 100 and 200 tons a year. This is a significant amount considering the annual landings between 50 and 75 tons for commercial vessels in the period 2003-2005 (Anonymous, 2007). As far as concrete numbers went, the data showed that per fisherman, per trip, about 5 kg of *G. morhua* was caught. The average recreational fisher in Belgium went out on fishing trips approximately 20 days a year and estimations indicate that their category contains roughly 2000 individuals. Since this number is solely based on the number of memberships in fishing associations, this is most likely a severe underestimation.

As part from a larger project observations of recreational fishing vessels, during cruises with a research vessel, where made (Depestele, 2008). From this data it becomes clear that the fishing intensity is largest within the three nautical mile zone, any activity outside this zone was associated with a shipwreck. As these shipwrecks act like artificial reefs (Jensen,2002), this is an ideal location to fish for the different species attracted by it.

Based on a questionnaire, Van Den Steen (2010) determined that the major species in Belgian recreational fisheries constitute *Gadus morhua*, *Dicentrarchus labrax*, *Merlangius merlangus*, and several species of Flatfish such as *Solea solea*, *Limanda limanda*, and *Pleuronectes platessa*. In general, fishers caught up to 5 kg of their different target species per trip. The survey also indicated that there is an equal partitioning between boat anglers and people fishing from the shore (Van Den Steen 2010). However, the survey only yielded 32 responses, so its results are inevitably biased. The survey was spread solely by means of an anglers association, 'Sportvisserij Vlaanderen VZW', thus only including members. Ergo, individuals unassociated with a recognized organization where excluded from data collection.

The obligations of the DCF are annual, and the acquired data is reported through annual publications. The report from 2013-2014 (Zenner *et al.,* in progress) indicates that recreational fishermen are generally both male and retired. Furthermore the results of this report agree with Van Den Steen (2010) in regard to target species. Lastly, results indicate that landings of trips hardly ever exceed 5 kg per targeted species.

In the framework of a recently initiated project, a capacity measurement was carried out in the Belgian harbors at the coast (Verleye, 2015). The researchers recorded the number of recreational fishing boats and the type of gear. In total 631 individual vessels were recorded from which 83,8% were set up for fishing with rod and line exclusively; 3,1% for fishing with mixed gear; and 13,1% for fishing with some kind of towed gear . The high number of vessels was surprising, considering the relatively small stretch of the Belgian coastline.

3.4 The Neighboring countries

Due to the limited information on recreational fisheries in Belgium, this study uses neighboring countries to offer additional information on what can be expected for the Belgian sector of recreational fisheries. From literature, it is clear that there is a different culture over different countries concerning the habits of fishermen. The practice of catch-and-release, for example, is very common in the United Kingdom and the Netherlands. In Portugal and Poland on the other hand, catch and consume it is more common (Ferter *et al.,* 2013). As far as similarities go, we can deduce that the vast majority of fishermen are male and mainly fish for *G. morhua, D. labrax*, and *S. scombrus*; based on the assumption that Belgium and the Netherlands are quite similar in the way recreational fisheries are structured both in demography and target species. The Netherlands however, have a much larger territorial sea, and a longer coastline, measuring 523 km compared to the 67 Belgian kilometers. Consequently, the global sector in the Netherlands is expected to be significantly greater, both demographically (3,2% of the population in NL) (Hammen & De Graaf, 2015) and economically (€127,000,000/year) (Aas*,* 2007).

The situation in France is rather different, as it has a clear difference in participation rate 11,1% from coastal regions and 5,4% from inland regions concerning the participation rate. In France, a regular individual lands approximately 10 kg a year, caught over 13 fishing trips on average. The 10 kg are a relatively low figure, however one must take into account that the calculation includes a fair amount of individuals who only fish once a year. The main target species for French recreational fishermen are *D. labrax*, *S. scombrus*, and *P. pollachius*. France has a lengthy coastline and adjoins different basins, resulting in broad variations in target species, depending on region. At an economic level, recreational fisheries show a national expenditure of 1.256 billion euros, indicating that it is in fact an important industry (Herfaut *et al*., 2013). These finding stress the need to estimate the importance of recreational fishing in Belgium.

The situation in England has been intensively studied in 2012 for the anglers at sea. The rest of the recreational sector was not taken into account. In this study, it was shown that recreational angling attracts 2% of the English adult population. The economic importance of the sector was estimated at £2.1billion in total spending; accounting over 23,600 jobs; resulting in almost £980 million of gross added value for the Region. The species most sought after, include *S. scombrus* and *M. merlangus*. A great proportion of anglers practiced catch-and-release, with releases ranging from 50% to 75%; the main target species being *M. merlangus*, *S. scombrus*, and *D. labrax* (Armstrong *et al.*, 2013)

3.5 Recreational fisheries and wind farms

Over the past years science established that wind farms can function as an artificial reef, and have higher biomass, acting as aggregation and or production sites for different species (Pickering & Whitmarch, 1997; Reubens *et al.*, 2013a; Reubens *et al.*, 2013b;). This presents opportunities for both commercial and recreational fisheries, and at the same time could have a negative effect on fish stocks as aggregated fish are easier to catch (Rose & Kulka, 1999) thereby worsening overfishing on stocks already under pressure.

In Belgium offshore wind farms are always closed off for any activity not related to maintenance or scientific research. This means that not only fishing is prohibited, but sailing through the wind farms is not allowed either. These measures are imposed mainly out of security concerns, yet they have the side effect that a wind farm in the Belgian Part of the North Sea acts as like a MPA. Due to the lack of commercial trawlers, and the higher abundance of species like *G. Morhua* wind farms are an ideal location for recreational angling. During the early years of constructing and operating wind farms, recreational fishermen aggregated in the area. However during later and more intense surveys, a continuously lower amount of recreational vessels was recorded (Vandendriessche *et al.*, 2013). The situation abroad can be very similar to Belgium, in the Netherlands for example no activity is allowed inside the wind farms (Hintzen *et al.*, 2013). In the United Kingdom the situation is much more complex as different regimes can be put forward for individual wind farms.

3.6 Aim

Since well-informed decisions and evaluation of the impacts of fisheries on ecosystems must be based on total removals and total efforts, information on unreported landings and unreported fisheries activities are essential. Given that there is no registration obligation for recreational fisheries in Belgium, this thesis aimed to gather the necessary information by integrating available data sources and by designing and adapting a questionnaire specifically targeting recreational fishermen in Belgium. This information comprised details on the demography of the community of recreational fishermen, on the spatial and temporal distribution of recreational fisheries, target species, catch sizes and compositions, fishing techniques, economic aspects of recreational fisheries, and the motivations and expectations of fishermen, Finally, the thesis aimed to discuss the results of the integration exercise in function of wind farm effects, and in function of the design of a policy that includes recreational fisheries and in which a functioning ecosystem, economical interests, and social cohesion are integrated.

4. Material & Methods

4.1. Survey

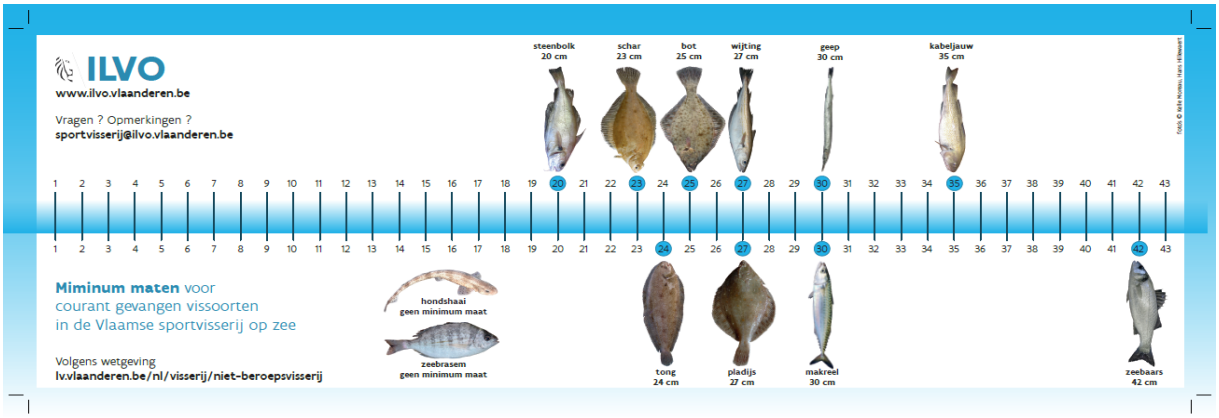
The majority of the data for this thesis was collected through the distribution of a survey among recreational fishermen. The design of this survey is based upon the questions used in previous versions of the DCF surveys. These questions altered based upon recommendations from previous years, and additional questions were included to address the effect of wind farms on the distribution of recreational fisheries. The questions were structured around the technique that is used to fish; rod and line, drag nets, or another type of gear. The full version of the survey is available in annex 1, yet the main subjects are listed below.

- Demographic information
- Motivations
- Expenses made each year
- Vessel ownership
- Method of fishing
- Target species
- Quantity both landed and catch-and-release
- Fishing grounds
- Fishing frequency
- Questions on the wind farms.

An online version of the survey has been developed to increase its coverage. Other advantages of an online version include lower costs, easier processing, quicker responses, and the possibility to make answering certain questions obligatory. The paper version however, is still necessary since not all recreational fishermen are accustomed to working online and have internet-access. The software used to make this survey is the open source program LimeSurvey™ [2]. This program allows the online survey to have the same structure as the paper version. To be able to ensure complete anonymity for the respondents, a separate survey was created to store the contact details. In this manner any link between personnel data and responses is expunged.

To create a participation-incentive among the recreational fishermen, a reward for completing the survey is provided. Based upon a Dutch initiative, a water- and sun-resistant sticker was created by the communication department of the ILVO (Fig. 1). This sticker depicts a scale and an indication of the minimum landing sizes for the most important species caught in the Belgian part of the North Sea. Once a participant fills in the survey, the respondent was directed to a separate page where the postal address could be filled in. This initiative serves two purposes, first of all an incentive to complete the survey and secondly and increase in contact information.

[2] https://www.limesurvey.org; accessed on 26/5/2015



(fig. 1 'Fish sticker' incentive fishermen receive after participating in the survey © ILVO)

To get the survey to the fishermen, different distribution channels were used.

- Distribution to members of 'Sportvisserij Vlaanderen VZW', the most important Belgian organization concerning recreational fisheries.In addition we placed an announcement on the website of 'Sportvisserij Vlaanderen VZW'.[3]
- Thirdly 'Zeevissport VZW', another one of larger organizations in the sector, aided in spreading the word both through their website and their monthly news-letter. They also provided advertising space for posters and flyers regarding the survey, on their stand at the 'Belgian Boat Show'-event in February 2015.
- Apart from the fishing associations, several charter vessels were contacted, of which three agreed to distribute flyers among their clients. The charter vessels were operating from different harbors in Belgium.
- Calls for cooperation in social media, where a link to the survey was provided.

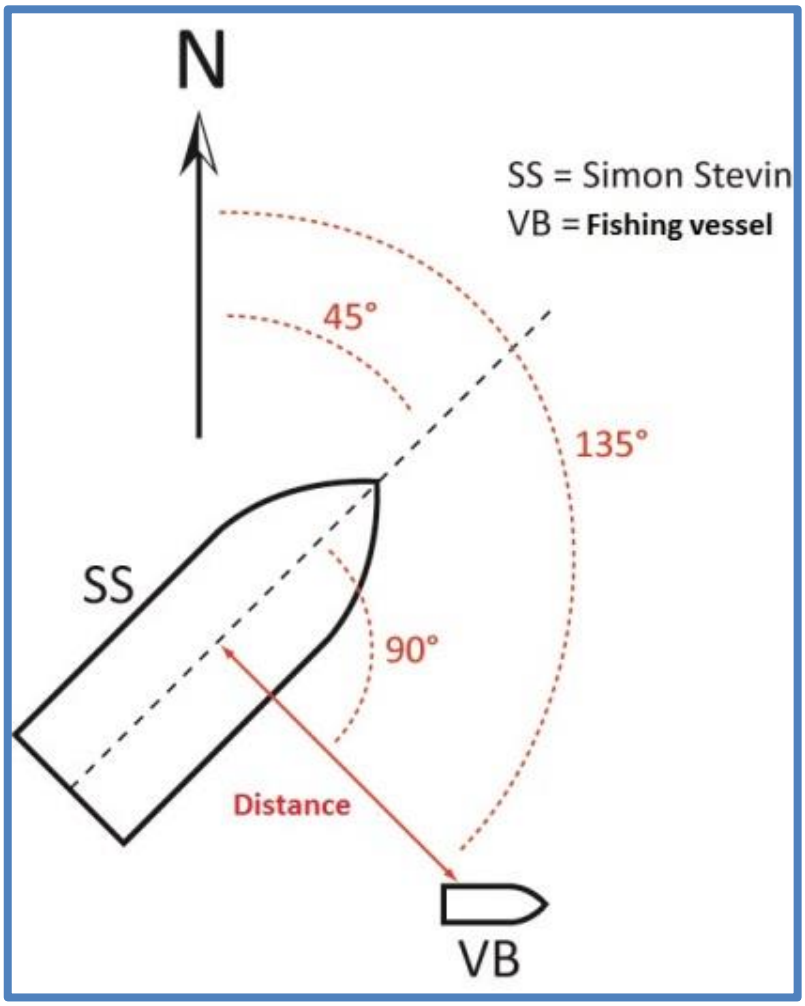
Our main goal concerning the distribution of this survey was to maximize the response-rate, due to the fact that the true size of the recreational fisheries sector remains unknown, hampering the selection of a representative sample. A downside to this approach is that we cannot make adequate calculations regarding the amount of people reached, thus hampering an accurate appraisal of the size of the sector.

4.2. Intensity measurements in situ

To determine the intensity of recreational fishing at different locations in the Belgian Part of the North Sea, on-site surveys on-board the research vessel 'Simon Stevin' took place. Data was gathered from 21 cruises, covering the period 'May 2014 – April 2015' (9 cruises within the timeframe of this thesis). For each observed vessel, the exact geographical location was calculated using the depicted protocol below. Additional information is gathered for each observed vessel, sometimes only visible after analyzing the pictures taken on board. This information includes the name of the ship, the number of people on board, the type of fishing gear and activity were observed. The latter can either be active fishing or steaming.

[3] Idealistically we would published a small article in the bimonthly magazine of the organization, yet due to logistical issues this was not possible this year.

During the cruise, the exact time for each observation was recorded, for the research vessel records its precise location for each given moment[4] This information, in addition to both the angle relative to the course of the research vessel, and the estimated distance from the research vessel to the fishing vessel; allows for the calculation of the position of the fishing vessel (Fig. 2).



(Fig. 2 location determination ©Thomas Verleye)

In order to generate geographical density charts, the following approach was used. First we made a 1x1 km² grid of the BPNS, which we joined with the track data of the 'Simon Stevin'. On the track data, we considered a buffer of 3 km at each side of the ship representing the 'view area'. This enabled us to calculate the number of passages for each individual grid cell. Next the grid layer and the fishing vessel coordinates (observations) were linked, enabling the calculation of the number of fishing vessels within each grid cell. By dividing the number of vessels by the number of passages for each grid cell, the estimated number of vessels likely to be seen when crossing through a particular area, is obtained. This information was then visualized using GIS software. The visualization was performed by Thomas Verleye (VLIZ).

[4] (www.vliz.be/vmdcdata/midas/plan.php?ship=Simon%20Stevin)

4.3. Analysis

For the purpose of the research, MS Access was utilized to store the obtained data. This was achieved by first exporting the raw data from the survey program to MS Excel, after which the data structure was adjusted to ensure that the categories accurately reflected the structure of the survey. In the following step the responses obtained through the paper version of the survey, were transcribed in the Excel files. Lastly, said files were to be uploaded into MS Access, creating the final database. The actual analysis of the results from the survey, was done by using pivot tables in both MS Excel and the Excel PowerPivot add-in.

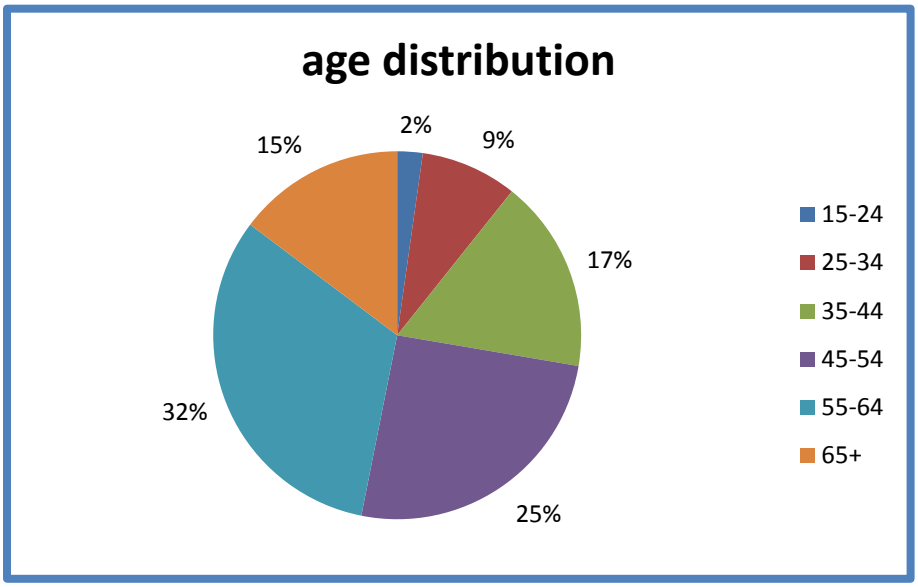
5. Results

5.1 Coverage

The survey ran for a period of nine weeks, from February 9th 2015 until April 15th 2015. In this time frame 408 online responses were received, of which 207 were complete and as such considered viable for analysis. In addition to those, there were 20 responses on paper of which 17 were valid. This resulted in a set of 224 unique responses that made up the dataset used for this research. It is clear that the majority of the respondents is a new group not sampled through the previous DCF-surveys; as 79,02% of the respondents had never filled out a survey concerning their fishing activities before.

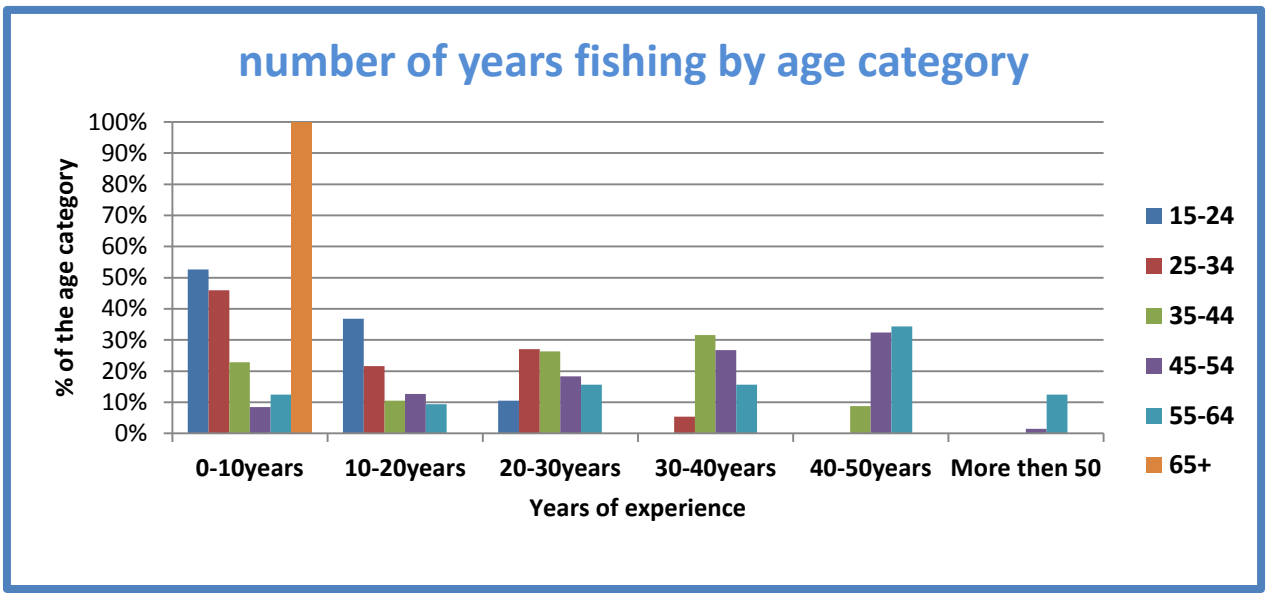
5.2 Demographic information

Recreational fishermen are almost exclusively male, only 3 out of the 224 respondents (1,3%) were female. The age distribution (fig. 3; Question 1) shows that the entire population is encompassed in the survey. The age of the respondents ranged from 15 to 79 years old, while 47% of the respondents has exceeded the age 55.



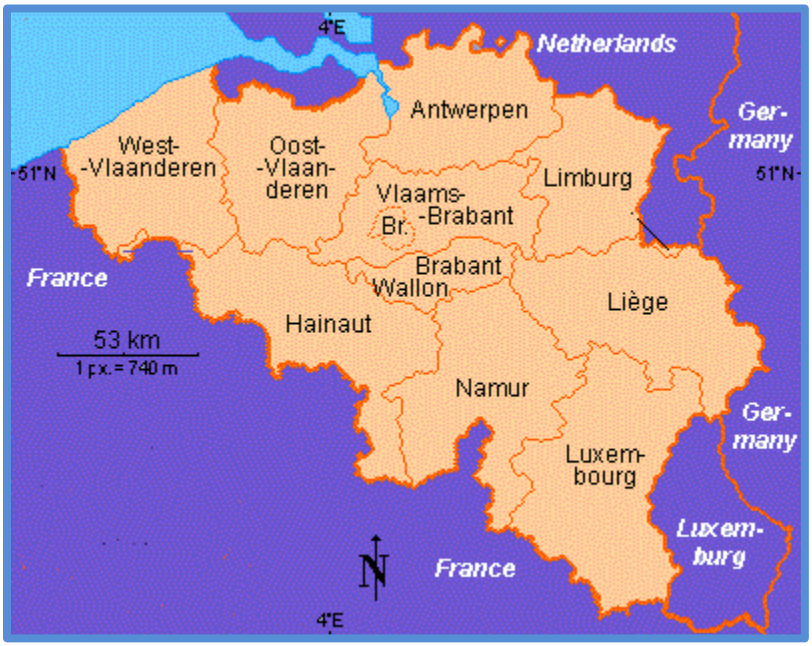
(Fig. 3: age distribution of the respondents)

The experience in fishing expressed in years respondents have been involved in their hobby (Question 1.3), is shown in fig. 4. There appears to be no particular age for individuals to start fishing, the only exception to these finding being the elder proportion in our survey, who took up fishing only recently. The category '45-54' shows that in general this generation took up its hobby earlier in life. Furthermore the hobby seems to lend itself well to young practitioners, as all age categories have a certain number of representatives who started fishing before the age of ten.



(Fig. 4: number of years fishing by age category)

The geographic origin of the fishers (Question 1) is shown in table 1. The data indicates a correlation between the number of fishermen in a specific province, and the provinces distance to the coastline. The correlation is reflected in the low amount of respondents from the south-east of the country. A necessary side note in this regard, is the fact that the survey was only distributed in Dutch, thus resulting in low responses from the francophone provinces (indicated in italics in table 1 and visualized in figure 3).

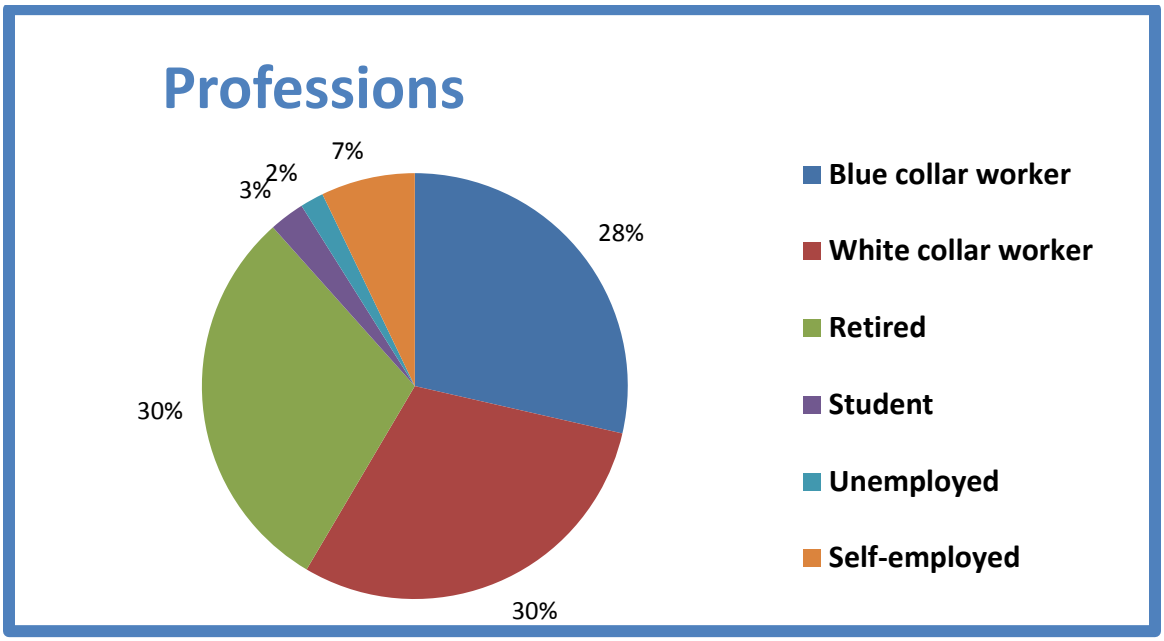


(Fig. 5. Map Belgium and its provinces)

Province	Number of respondents
West-Vlaanderen	91
Oost-Vlaanderen	59
Antwerpen	42
Vlaams-Brabant	20
Limburg	6
Brussel	*1*
Brabant wallon	*0*
Hainaut	*3*
Liège	*1*
Namur	*0*
Luxembourg	*0*
total	**223**

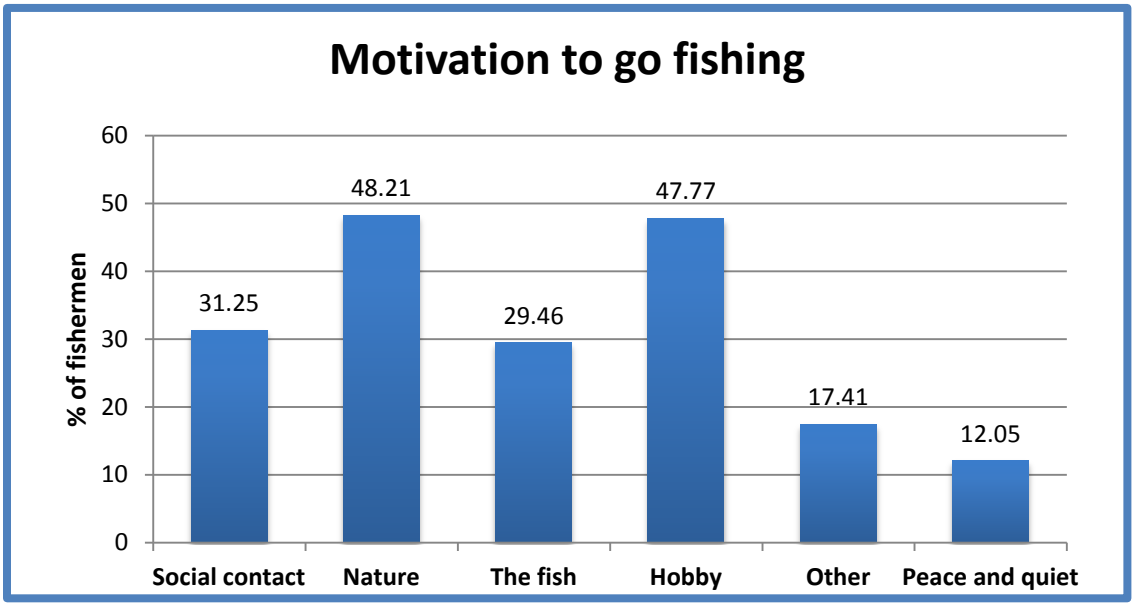
(Table 1: origin of the respondents)

When examining the professions of fishermen, (Fig. 6; Question 1) three major categories come forward: white-collar workers, blue-collar workers and retired people. These categories combined make up for 88% of the fishermen. An additional 7% of the fishermen were self-employed people, leaving students and unemployed people only marginally represented, with respectively 3% and 2% of the respondents.



(Fig. 6 profession of the respondents)

Among the respondents, various motivations for recreational fishing could be distinguished (Question 1.1). As the responses in Fig. 7 indicate, the two primal incentives include being surrounded by nature (48,21%) and having a pass-time in general (47,77%). Other motivations include social contact, a passion for fish and finding some peace and quiet; respectively accounting for 31,25%; 29,46% and 12,05% of the respondents. 17,41% of the respondents recorded various other motives, of which 'getting away from their spouse' was most often mentioned.

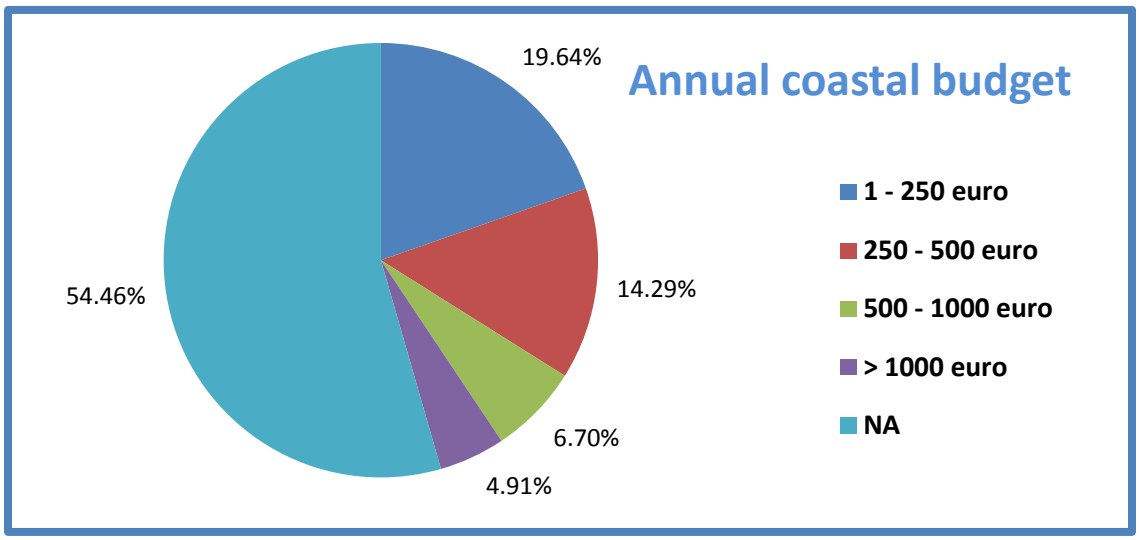


(Fig. 7: the reasons for people to go fishing)

5.3 Economic value

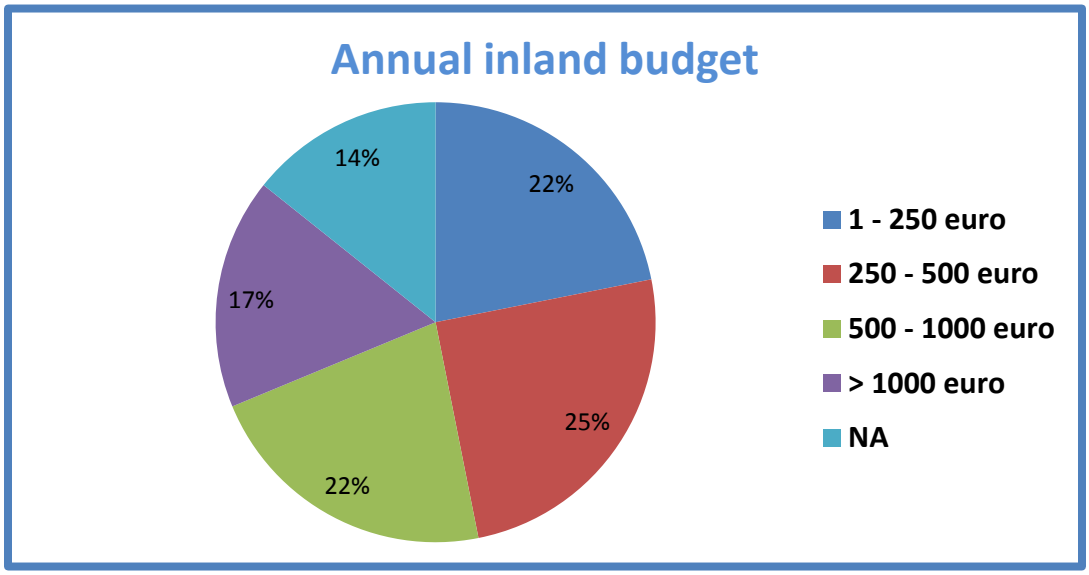
The estimation of the annual budget used by the fishermen on their hobby, gives us an indication of the economic value of the sector. A differentiation between expenses made at the coast and inland was made (Question 1.8). The cost for boats and their fuel (Question 2.3) is considered separately as these steep costs would distort the general image. The graphs(fig. 8 and fig. 9) pool together all expenses related to fishing; ranging from fishing equipment and bait, to the cost of socializing after a fishing trip. It is important to mention that there was no category 'no expenses' provided, rendering it impossible to distinguish this category from the response error.

The question regarding the budget at the coast (Fig. 8) only received a valid response in 46% of the cases, '€ 1 - € 250' and '€ 250 - € 500' being the response categories with the highest frequencies, with respectively 19,64% and 14,29% of all responses.



(Fig. 8: annual budget at the coast)

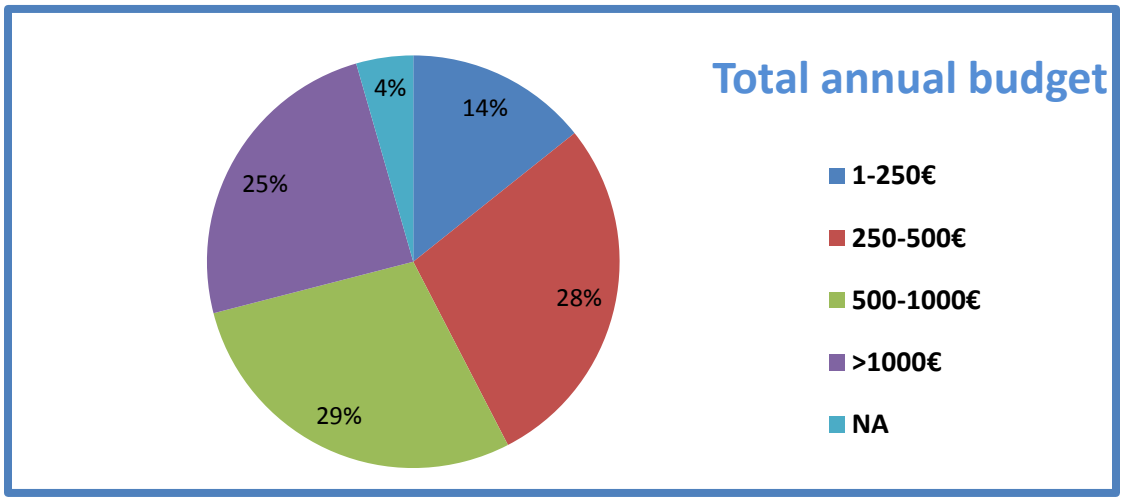
Contrary to the budget results from the coastal region, the results for the inland region are not skewed towards the lower categories. There is an even distribution of the various budget categories (Fig. 9), ranging between 17% and 25% per category. With a percentage of 86% valid responses, the results for the inland yielded a higher response-rate than for coastal region.



(Fig. 9: annual budget inland)

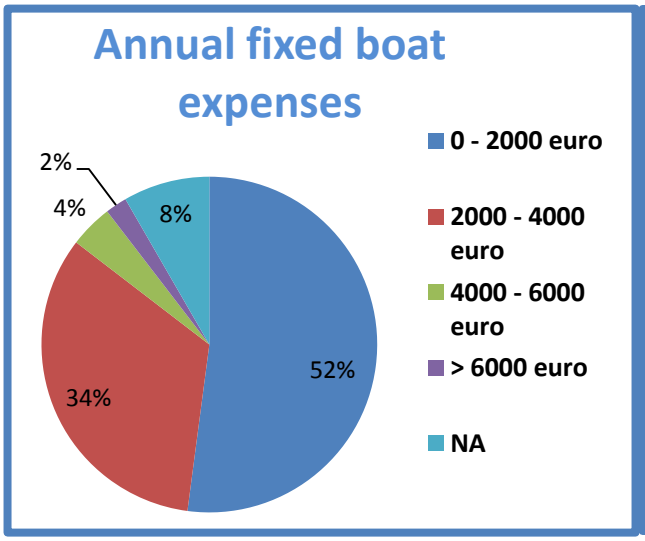
Combining the expenses from both coastal budget and inland budget; we are able to estimate the total amount of money that fishermen spend on their hobby. In Fig. 10 we observe that 29% of the questioned fishermen spend approximately € 500 to € 1000 on their fishing activities. 25% of the respondents recorded expenses above € 1000, while 42% of the respondents indicated an amount under € 500. This question had a response-error of 4%. These numbers amount to an estimation ranging from € 102782 to € 186000 indicate per year for our 224 respondents. Considering the earlier estimation that

Belgium counts over 2000 recreational fishermen, an annual spending ranging from € 917.696 to € 1.660.714 in this sector can be assumed.

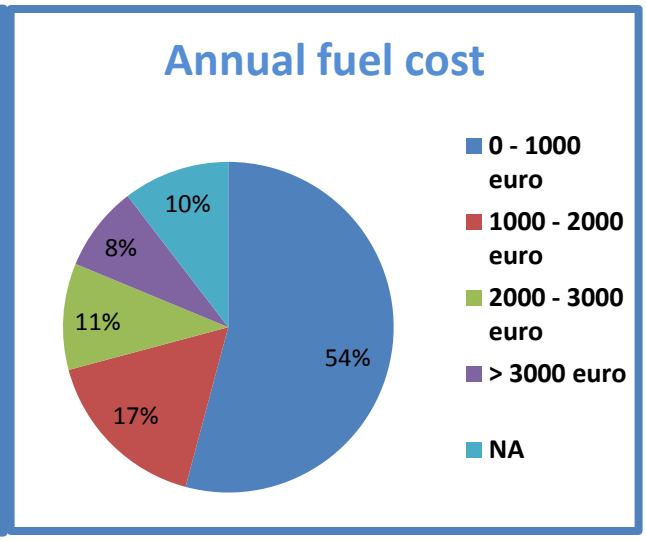


(Fig. 10: total annual budget)

The cost specifically attributed to the purchase and maintenance of vessels was considered separately in this calculation It was chosen to make the distinction between fixed annual costs (Fig. 11) including maintenance, or renting a spot in the harbor; and the annual fuel costs (Fig. 12). The latter are much more variable than the others, which warrants the distinction. In the fixed expenses we note that the majority of boat owners (52%) has spent no more than €2000 a year on their vessel, only a very small group (6%) has exceeded the brink of €4000 a year. For most fishermen, the fuel costs are relatively moderate; only 18% spends over € 2000 per year. While the majority of the respondents (54%) indicated the category '€ 0- € 1000'



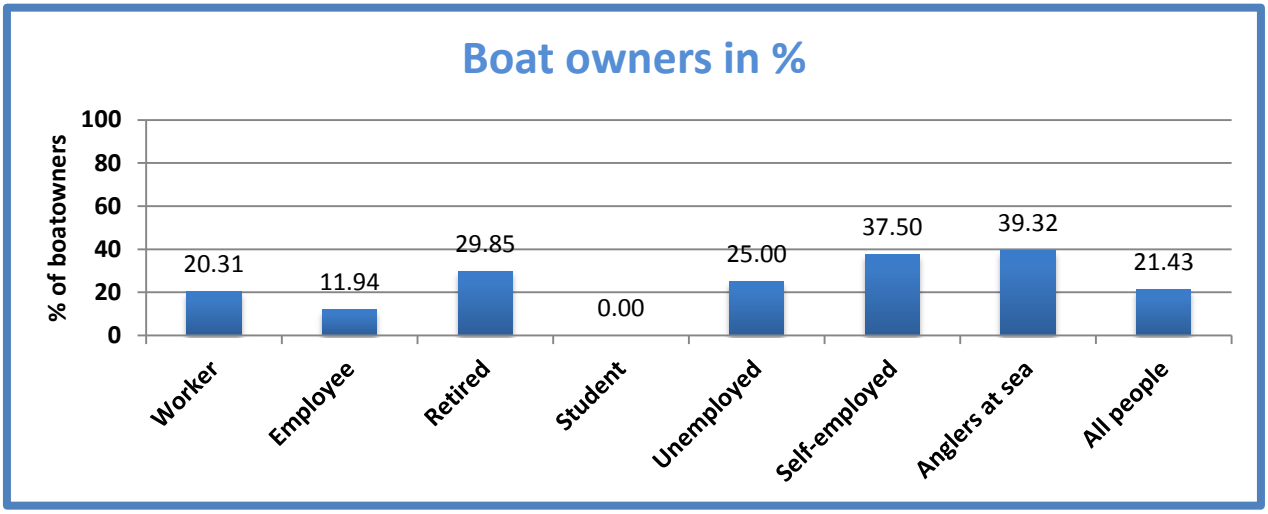
(Fig. 11: annual fixed expenses on a boat)



(Fig. 12: annual fuel cost)

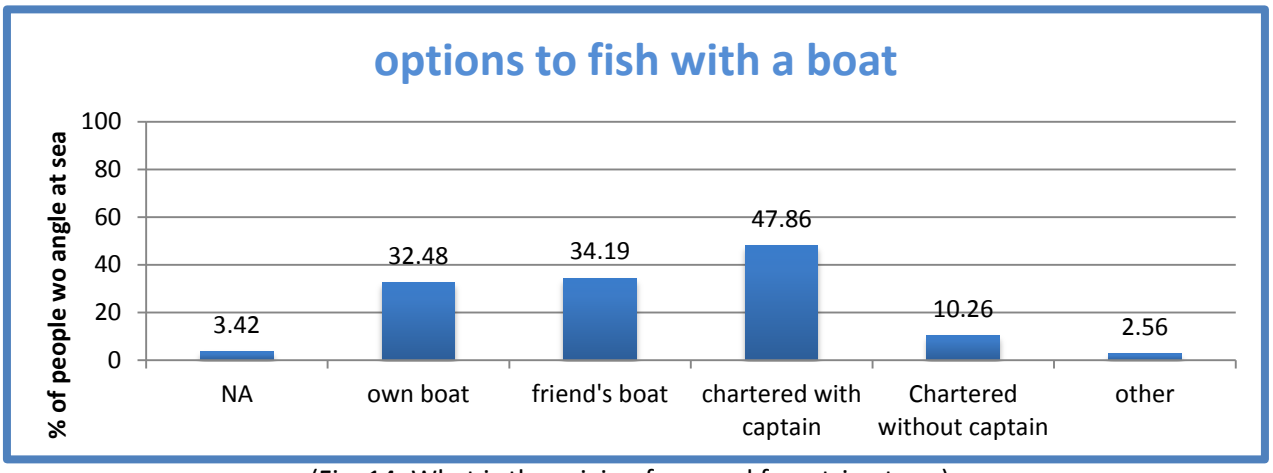
Fig. 13 shows that 21.4% of the respondents own a vessel (Question 2). However, we must highlight the fact that this percentage include fishermen using a technique which does not require a vessel. Inserting

this distinction into the calculation, results show that among the respondents practicing their fishing activities from a vessel; 39,3% is a vessel-owner. When linking the factor 'ownership of a vessel' to various categories of professional occupations, it's notable that with respectively 37,5% and 29, 85%, self-employed individuals and retired respondents were most likely to own a private vessel.



(Fig. 13: % of boat owners for different groups)

Apart from private ownership, anglers who conduct their activities from a vessel, have various options. Fig. 14 shows to what extent all options are used, according to the 2015 survey (Question 3.3). Multiple response-categories were warranted per respondent, considering fishermen do not restrict themselves to one particular way of utilizing a vessel. From the figure we remark that trips with chartered vessels were most popular (47,86%); making use of a friend's boat (34.19%) or utilizing one's private vessel (32.48%) proved to be the two next favored options. The 'other' option always included a request to specify, consistently resulting in the same answer: fishing with a vessel chartered by an angling society.

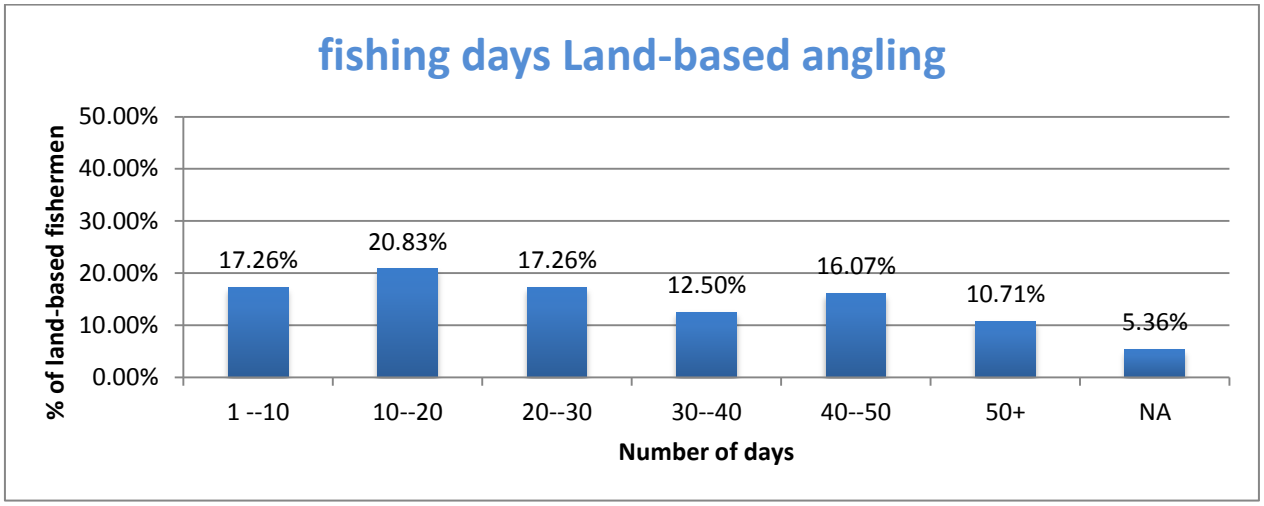


(Fig. 14: What is the origin of a vessel for a trip at sea)

5.4 Temporal variation in fishing activity

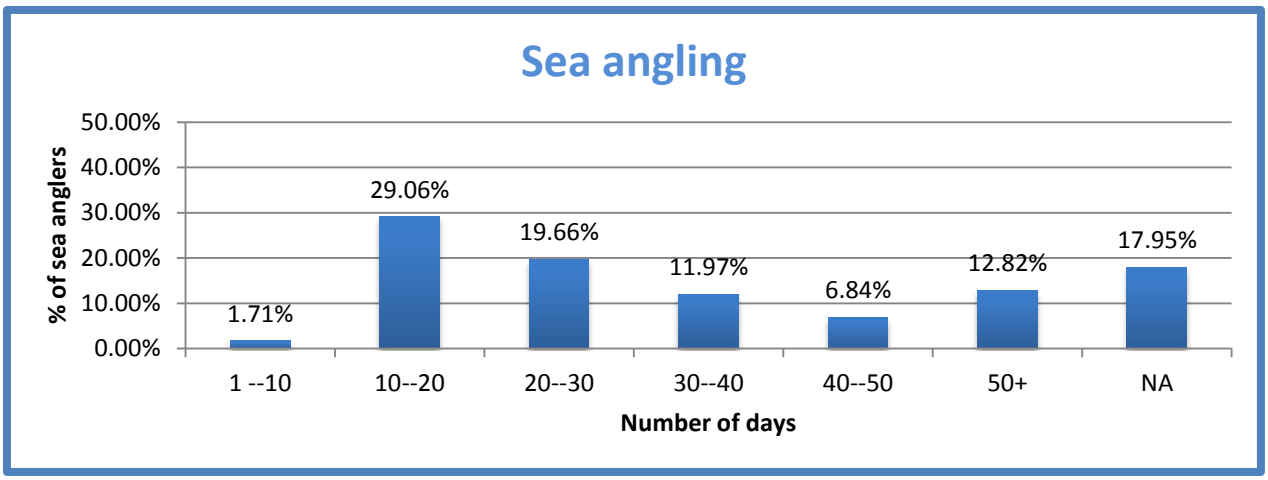
In order to estimate the intensity of recreational fisheries in the BPNS, several indicators were used; these included: number of days one fishes per year (Fig. 15, Fig. 16, Fig. 17), length per trip (Fig. 18), period of the year in which one fishes most often (Fig. 16), and factors determining whether or not to go fishing (Fig. 17).

The number of fishing days per year varied between the three types of fishing we considered. Figure 15 shows that land-based angling knows a relatively even distribution among the different categories in frequency (Question 5.4). To estimate how many days an average land-based angler fishes, we calculated the mean and the median. This resulted in a mean of 31,8 days per year and a median of 25 days. In the separate category '50+ days', the range was rather wide, tilting the general mean towards a higher result. In this specific category, consisting of 18 respondents, the mean was 117,3 days with a maximum of 220 days a year.



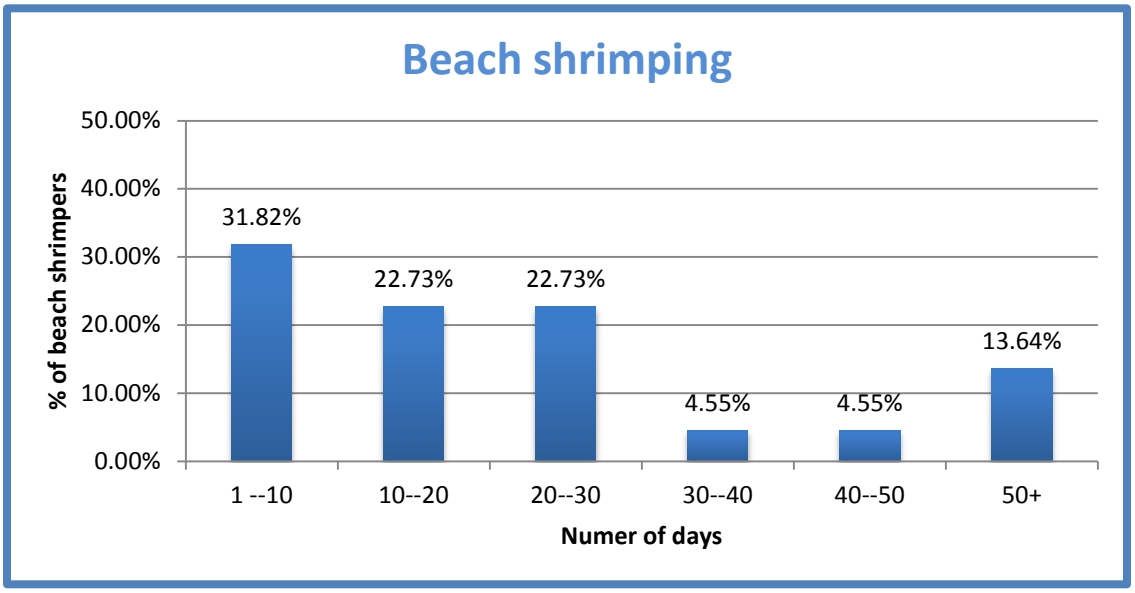
(Fig. 15: number of days fishing for land based anglers)

When regarding the numbers for sea anglers in figure 16 (Question 4.5), we remark that the category practicing their fishing activities '1 to 10 days a year' is marginal (1.71%). In respect to this indicator, we remark that 48,72% of respondents is situated in the interval ranging from 10 to 30 days per year. The mean among the sea-anglers amounts to 32.36 days and the median is set at 25 days. The category of respondents fishing over 50 days a year, consisted of 15 respondents here. The mean in this category was 107,4 days with a maximum of 200 days.



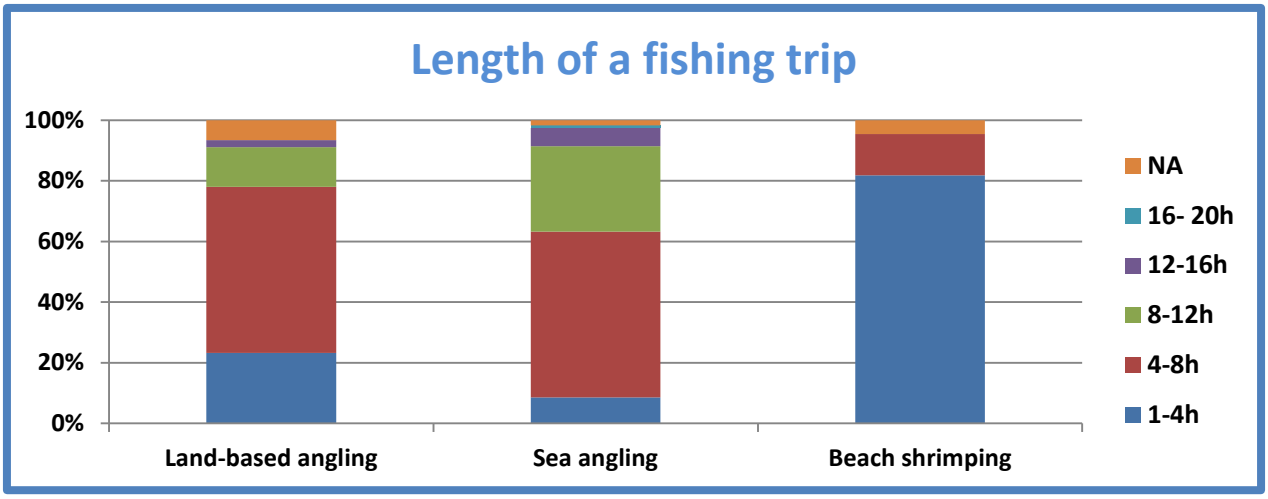
(Fig. 16: number of days fishing for sea anglers)

In regard to beach shrimping (Fig. 17; Question 6.5), a majority (54,55%) does not fish over 20 days a year; and only 22,74% of the respondents in this discipline fished over 30 days. The average number of days per year individuals practiced the method of beach shrimping was 27,98 days, with a median of 15 days. The category practicing over 50 days a year saw a maximum of 150 days a year, with a mean of 115 days.



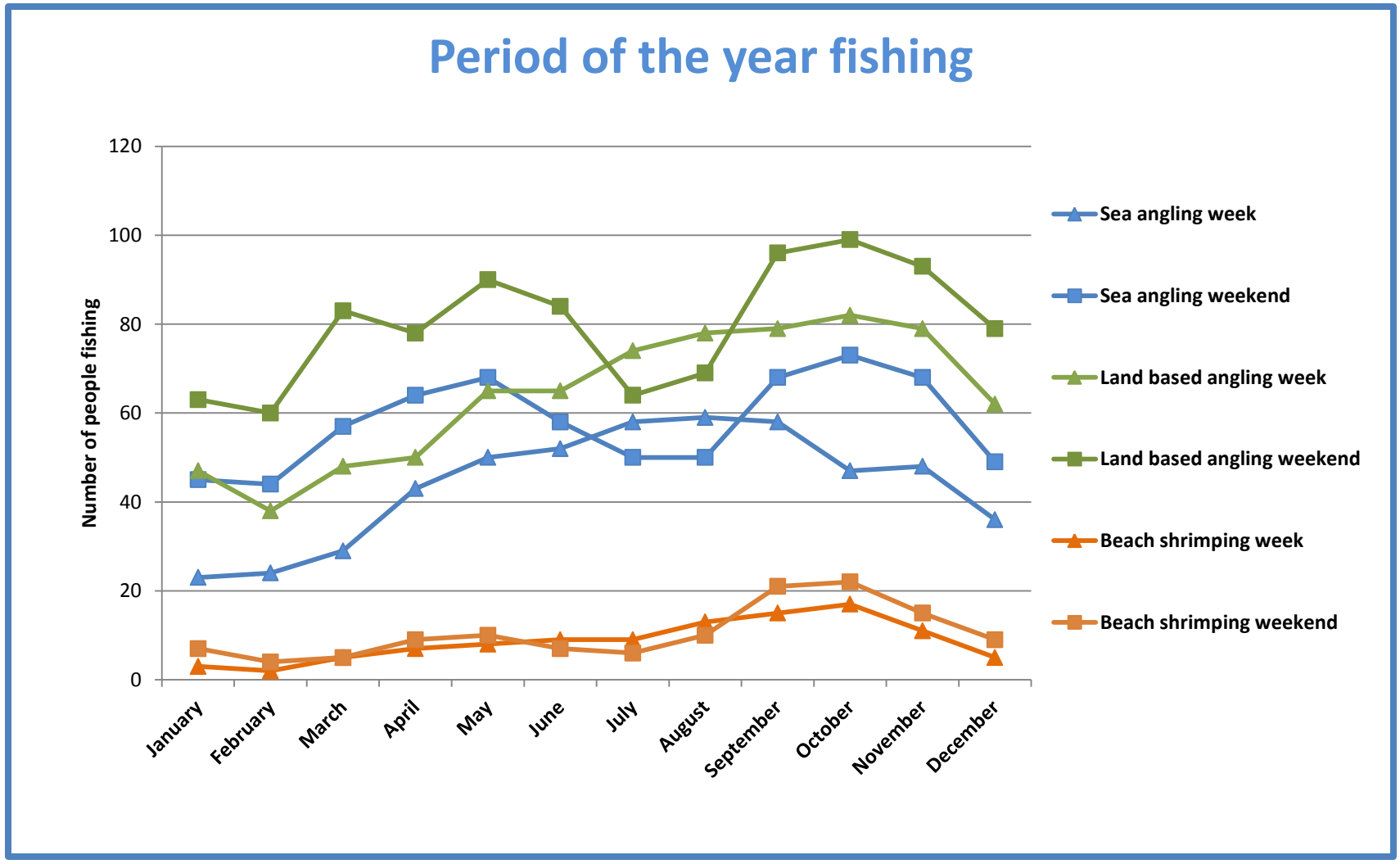
(Fig. 17: number of days fishing for beach shrimpers)

A question on the duration of a trip was posed as well, the obtained results (Question 4.6; 5.6; 6.6) are visualized in Fig. 18. There is a notable difference between the two types of angling and shrimping, over 80% of the shrimping trips lasted under four hours, and no trip exceeded the length of eight hours. Sea angling recorded the greatest proportion of lengthy trips, with under 10% of trips lasting less than four hours. Land-based angling recorded a more diverse distribution. Yet land-based angling and sea angling recorded a comparable proportion of trips lasting four to eight hours, respectively 54,7% and 54,8%.



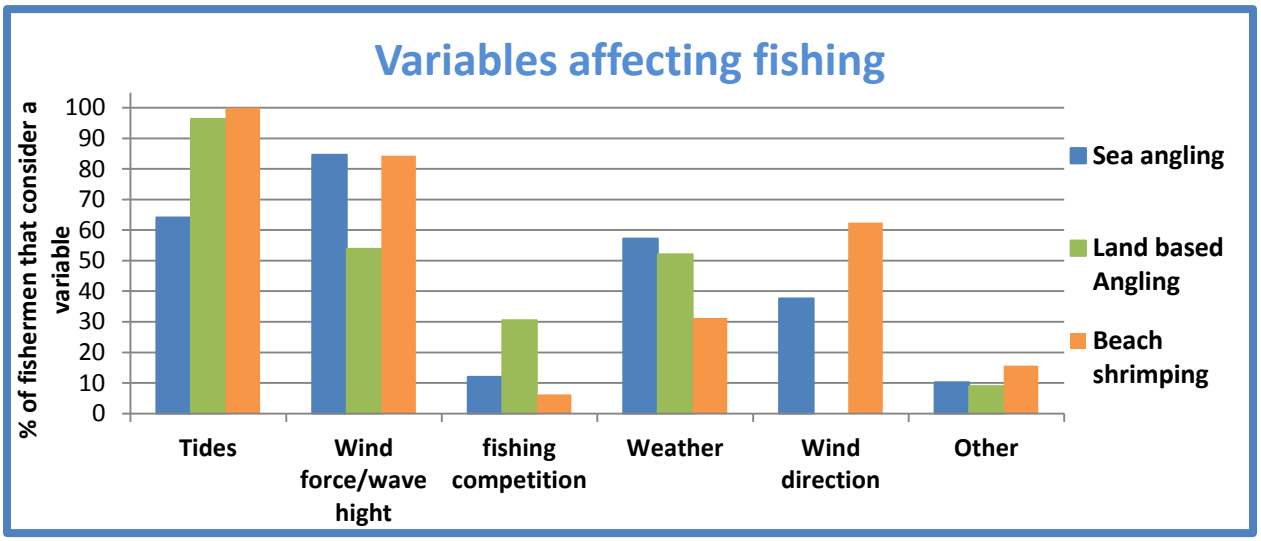
(Fig. 18: duration of a fishing trip for the three types)

To detect seasonality in the fishing intensity we compared the various months of the year. Additionally a distinction between weekdays and weekends was made, to check if a difference among the two could be observed (Question 4.7; 5.7; 6.7). Examining the period of the year, reveals a higher in activity during September and October, and a low during December, January, and February. Fig. 19 shows that for beach shrimping we observe no difference between the weekend and the rest of the week. While for the two types of angling, this is the case.



(Fig. 19: number of people fishing in a period of the year considering type of fishing and weekdays or weekend)

There are several factors, besides available time, determining whether or not to go fishing. The most important of these factors are listed below in figure 20. Displayed in terms of the frequencies with which these factors were mentioned, we observe that the tides are considered of great importance for both shoreline types of fishing (100% and 96,4%), yet sea anglers, consider this being of lesser importance, mentioning it in 64,1% of the cases. Secondary importance is attributed to wind force and wave height which were pooled together, as they are very closely linked. This factor appeared to be mainly important to sea anglers (84,6%) and beach shrimpers (84,4%); and of relative importance for land-based anglers (53,9%). Thirdly, also fishing competitions count as a factor, drawing out mainly land-based anglers (30,5%). In regard to the other disciplines though, this factor is considered to be of lesser to no importance. Furthermore the general weather conditions are considered a factor to all, most frequently mentioned by sea anglers (57,3%). Wind direction specifically has also been indicated as influential by beach shrimpers (62,5%) and sea anglers (37,6%). Land-based anglers did not consider this a factor (0,0%). Lastly there were several other, less mentioned concerns, such as the position of the moon or seasonality.



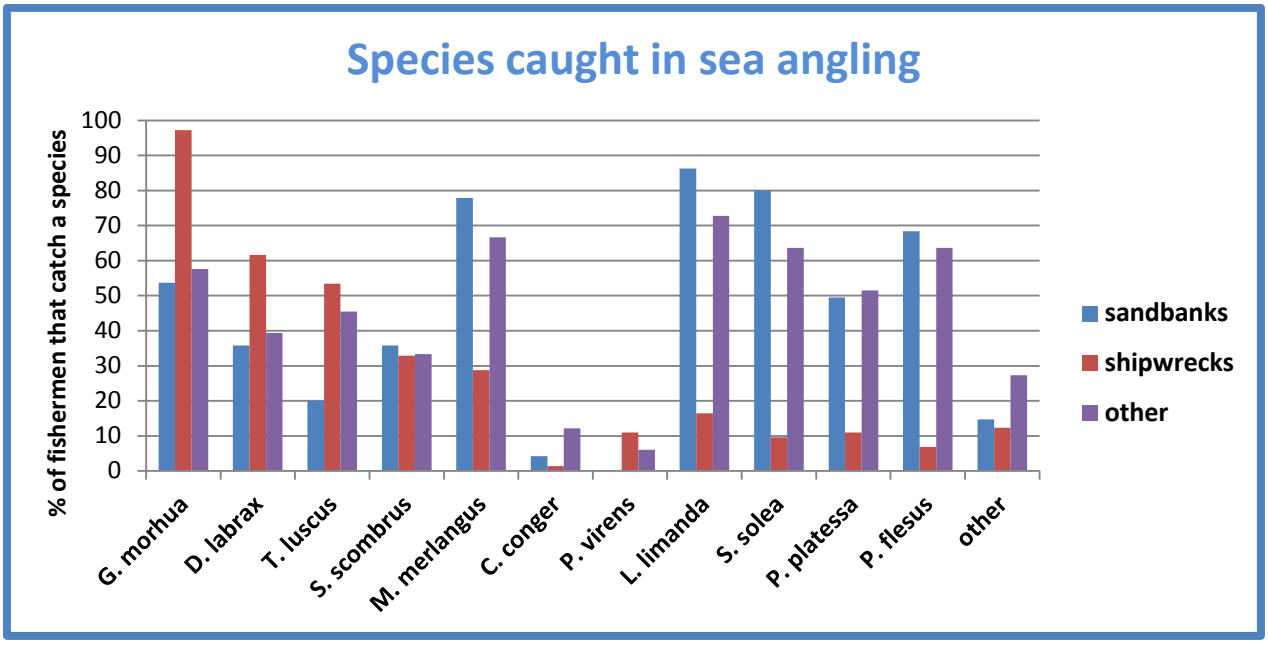
(Fig. 20: different variables affecting the decision to fish by type of fishing)

5.5 Angling at sea

In this section we focus on the sea angling proportion of recreational fisheries. Within the sea angling group we distinguished four different places to go fishing: sandbanks, shipwrecks, the wind farm area, and others. The results showed that only two respondents opted for fishing in the wind farm area. Given the fact accurate conclusions cannot be based upon two single respondents, we chose to exclude the wind farm area in further analysis. The category 'other places' is mainly comprised of shipping lanes and dredging dumping sites. Surprisingly, 'De Paardenmarkt', an ammunition dumpsite from World War I, was also mentioned, despite the fact that this area is restricted due to safety measures as are the wind farms.

All species caught by sea anglers are listed in table 2. The *Micropogonias undulatus* is remarkable among these as it is an invasive species for the European continent. In regard to the used habitats and the

species composition in sea angling, the most important species caught by recreational fishermen are shown in Fig. 21. In this figure, the distinction between shipwrecks, sandbanks and alternative habitats was made. Respondents fishing in the sandbank habitat consider Flatfish (*Limanda limanda*, *Solea solea*, *Pleuronectes platessa*, and *Platichthys flesus*) the main target species, with respectively 86,3%; 80%; 49,5% and 68,4% of the respondents targeting them. Round fish, on the other hand, appear to be of lesser importance, yet not insignificant either, in this habitat, with the exception of *Merlangius merlangus* (77,9%). In the category 'other habitats' a similar trend manifests itself. In contrast to the latter habitats, results prove to differ radically when it comes to the shipwreck habitat. In this category relatively low numbers are reported in regard to Flatfish. Round fish in turn, make up the main target species in this habitat, with *Gadus morhua*, *Dicentrarchus labrax*, and *Trisopterus luscus* respectively targeted by 97,2%, 61,6%, and 53,4% of the respondents. *M. merlangus* (32,9%) and *S. scombrus* (28,8%) make up a smaller proportion of the catch. Finally two species, *C. conger* and *P. virens*, can be considered marginal as barely 10% of the fishermen mentioned them as a part of their catch in either habitat.

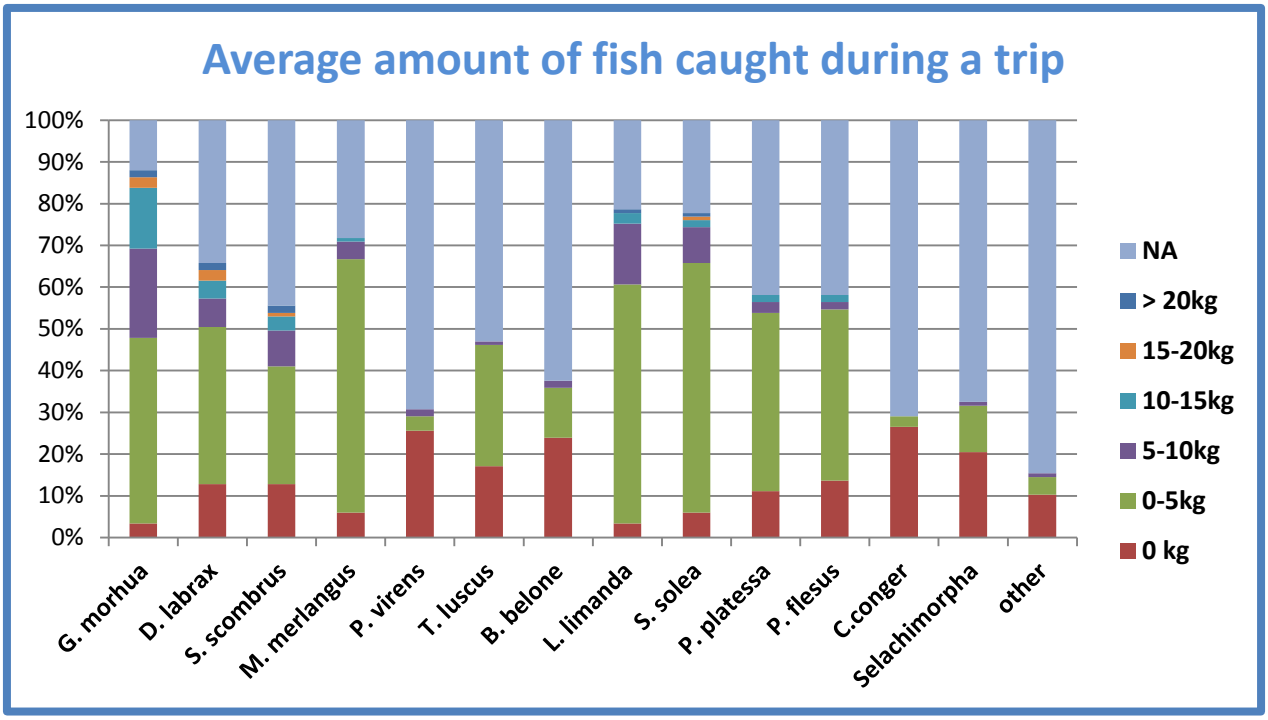


(Fig. 21: importance of species for sea angling at different locations)

common name	Scientific name	common name	Scientific name
cod	*Gadus morhua*	**dab**	*Limanda limanda*
sea bass	*Dicentrarchus labrax*	**common sole**	*Solea solea*
pouting	*Trisopterus luscus*	**plaice**	*Pleuronectes platessa*
mackerel	*Scomber scombrus*	**flounder**	*Platichthys flesus*
whiting	*Merlangius merlangus*	**European conger**	*Conger conger*
saithe	*Pollachius virens*	**grey gurnard**	*Eutrigla gurnardus*
garfish	*Belone belone*	**ray**	*Batoidea*
Ballan wrasse	*Labrus bergylta*	**lesser weever**	*Echiichthys vipera*
horse mackerel	*Trachurus trachurus*	**lumpfish**	*Cyclopterus lumpus*
gilt-head bream	*Sparus aurata*	**Sea lamprey**	*Petromyzon marinus*
squid	*Cephalopoda*	**Atlantic croaker**	*Micropogonias undulatus*
herring	*Clupea harengus*	**chub**	*Squalius cephalus*
tub gurnard	*Chelidonichthys lucerna*		

(Table 2: list of species caught in sea angling, common and scientific names)

Fishermen are known to target particular species. To determine the relative importance of these individual species, a question regarding quantity per species was included in this survey (Question 4.2). The question distinguished fish that was caught and released from fish that was landed. When focusing on landed fish (Fig. 22), we remark that the vast majority of the respondents caught 0 kg to 5 kg of each given species. The only exception to this observation is *G. morhua*, where results showed how 47% of sea anglers regularly caught over 5 kg. This information can be used to estimate the total amount of landed fish by the recreational sea anglers. In table 3 the estimation of the total landings by the respondents of our survey per year is presented. In respect to *G. morhua*, for instance its estimated that the landed quantity of the 117 included respondents ranges from 10,8 ton to 22,1 ton per year. These numbers were obtained by multiplying the edges of each weight interval with the absolute number of fishermen who indicated said interval. For the '>20 kg' category we choose 30 kg as the upper cutoff level. In the next step, these figures were multiplied with the median number of fishing days a year (25) this results in an estimation of the annual landings of these 117 fishermen. Lastly we observe that there is a low response rate , especially in the case of *P. virens* (81%), *C. conger* (83%) and *Selachimorpha* (79%).



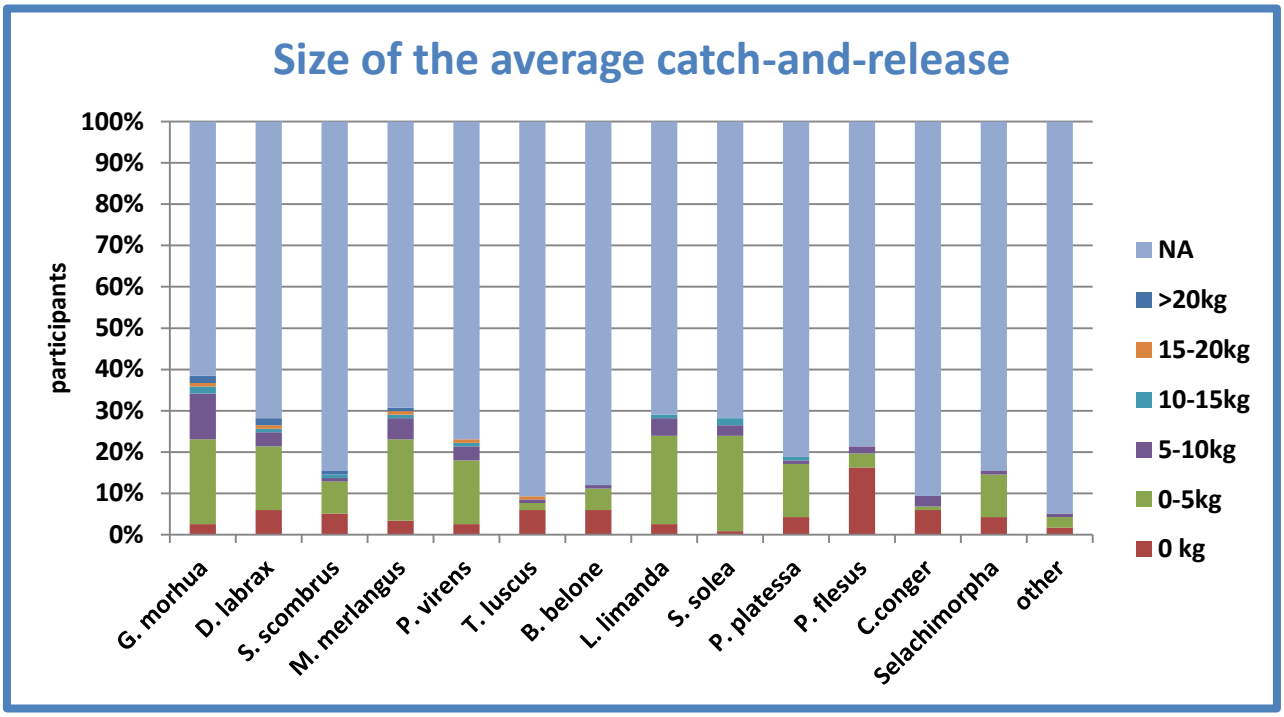
(Fig. 22: average kg's of a species a fisherman catches and lands on a sea angling trip)

	kg landed annually (survey participants)	
Species	Lower estimation	Upper estimation
Gadus morhua	10800	22125
Dicentrarchus labrax	5475	12375
Scomber scombrus	4450	10125
Merlangius merlangus	2650	10500
Pollachius virens	350	1000
Trisopterus luscus	975	4500
Belone belone	600	2250
Limanda limanda	5050	14500
Solea solea	4375	13250
Pleuronectes platessa	2125	7750
Platichthys flesus	1950	7250
Conger conger	75	375
Selachimorpha	450	1875

(Table 3: kg of fish landed by the respondents of the survey during sea angling)

Figure 23 visualizes the second part of question 4.2 , the size of the catch-and-release proportion of the catch during a fishing trip. A first remark is the low response rate on this question: the highest response is 38.5% of the group of sea anglers. When the question was answered however, the results show that the most important species caught-and-released are: *G. morhua*, *S. solea*, *L. limanda*, and *M. merlangus*. Similar to the landed part of the catch, the quantity of the released catch was between 0 and 5 kg.

Using the same type of calculations as for the landed part of the catch, we estimated the quantity of the released part of the catch. The results are summarized in table 4.The quantities are smaller while still in the same order of magnitude. *G. morhua* was most important followed by *M. merlangus* and *D. labrax*. All species have a larger landed than released fraction, *P. virens* and *C. conger* being the only two exceptions.



(Fig. 23: average kg's of a species that a fisherman catches and releases while sea angling per trip)

	kg caught-and-released annually	
Species	Lower estimation	Upper estimation
Gadus morhua	4100	9000
Dicentrarchus labrax	2575	5625
Scomber scombrus	1100	2500
Merlangius merlangus	2450	6000
Pollachius virens	1575	4125
Trisopterus luscus	550	1000
Belone belone	275	1000
Limanda limanda	1500	4750
Solea solea	1550	4875
Pleuronectes platessa	750	2500
Platichthys flesus	350	1000
Conger conger	400	875
Selachimorpha	425	1750

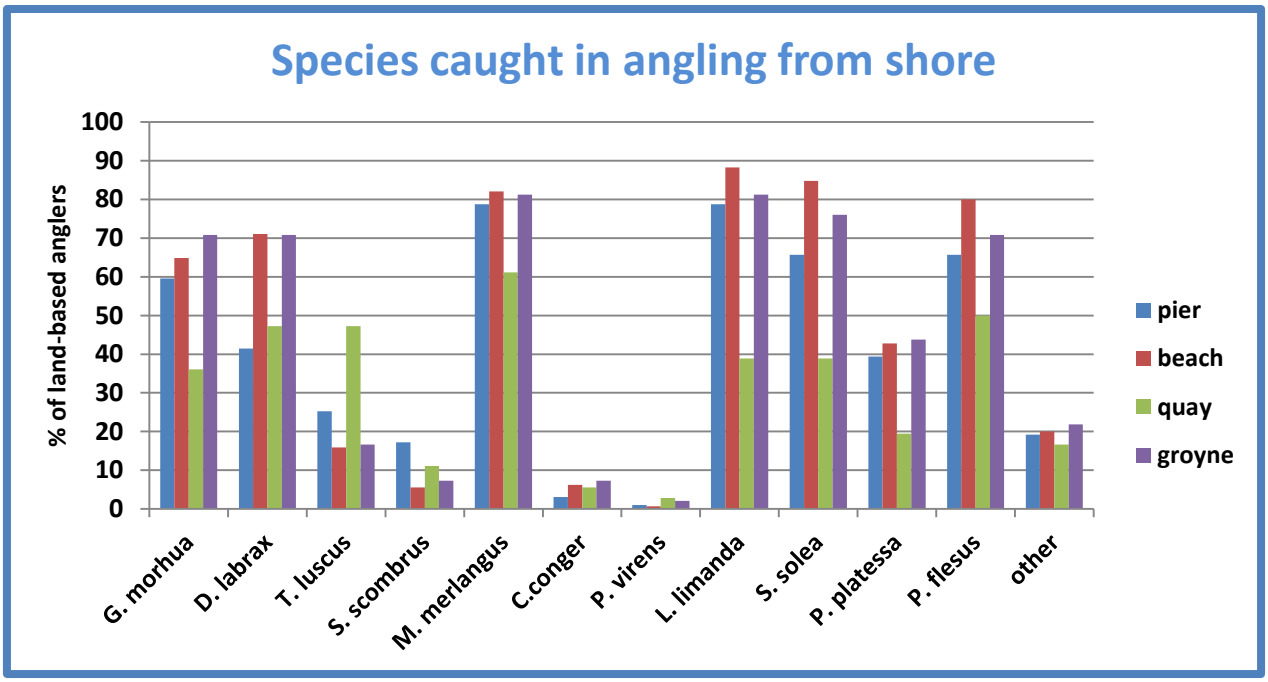
(Table 4: kg of fish caught and released by the respondents of the survey during sea angling)

An estimation of total mortality caused by recreational fisheries could only made for *G. morhua*. This is due to the lack of information in respect of the post-release mortality regarding other species. Concerning *G. morhua*, we assumed a post-release mortality of 11.2% (Weltersbach and Strehlow 2013). This amounted to a total biomass ranging from 459,2 kg to 1008 kg of *G. morhua*, that has to be added to the landed fraction, resulting in a figure in the range of 11.2 ton and 23.1 ton of *G. morhua* biomass that is taken out of the system annually, only taking into account the 117 sea anglers in our study.

5.6 Land based angling

To construct an image of land-based angling, we replicated the same steps as for sea angling. When angling from land there are four possible types of habitats: a pier, the beach, a quay from a harbor, or a groyne on the beach. Of these four the beach was clearly the most heavily used, followed by piers and groynes, the quays were used by the smallest group of fishermen.

When comparing the four types of habitats (Fig. 24; Question 5.1), the main target species showed a distinction between quays on one hand, and the beach, pier and groyne on the other hand. The main species in the quays habitat are *M. merlangus* (61,1%), *P. flesus* (50%), *D. labrax* (47,2%), and *T. luscus* (47,2%). The other three habitats, pier, beach, groyne have the same target species, with some variation in the different percentages. The most important species for these were *M. merlangus* (78,8%; 82,1%; 81,3%), *L. limanda* (78,8%; 88,3%; 81,3%), *S. solea* (65,6%; 84,8%; 76%), and *P. flesus* (65,6%; 80%; 70,8%). Three different species, *S. scombrus*, *C. conger,* and *P. virens* can be considered as marginal in the land-based fishing sector, almost never achieving a value higher than 15%. The 'other' species mentioned are four species listed in table 5,together with all species caught while angling from shore.

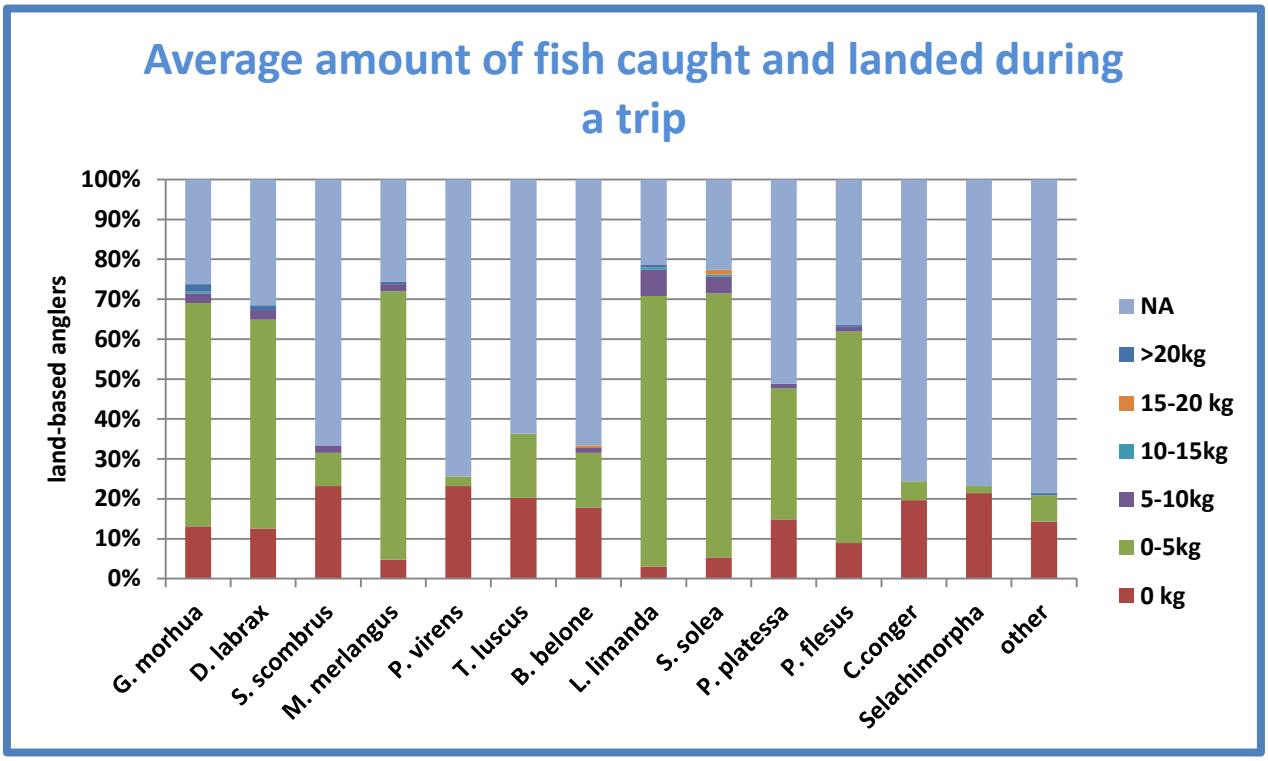


(Fig. 24: importance of species for land based-angling at different locations)

common name	Scientific name	common name	Scientific name
cod	*Gadus morhua*	sole	*Solea solea*
sea bass	*Dicentrarchus labrax*	plaice	*Pleuronectes platessa*
pouting	*Trisopterus luscus*	flounder	*Platichthys flesus*
mackerel	*Scomber scombrus*	lesser weever	*Echiichthys vipera*
whiting	*Merlangius merlangus*	tub gurnard	*Chelidonichthys lucerna*
conger	*Conger conger*	Atlantic croaker	*Micropogonias undulatus*
saithe	*Pollachius virens*	chub	*Squalius cephalus*
dab	*Limanda limanda*		

(Table 5: Species caught in land-based angling)

The amount a respondent caught and landed is visualized in Fig. 25 (Question 5.2), we note that almost every fishermen caught between 0 kg and 5 kg if he/she fished for a certain species during a trip. *L. limanda* is the only species that has a notable proportion of catches larger than 5 kg. A large proportion of 'No answer' exists for several species: *Selachimorpha*, *C. conger*, *P. virens*. The total estimated amount of fish caught and landed annually for the participants of the survey is shown in table 6. It shows that *L. limanda* was the most important followed by *S. solea, M. merlangus* and *G.morhua*.



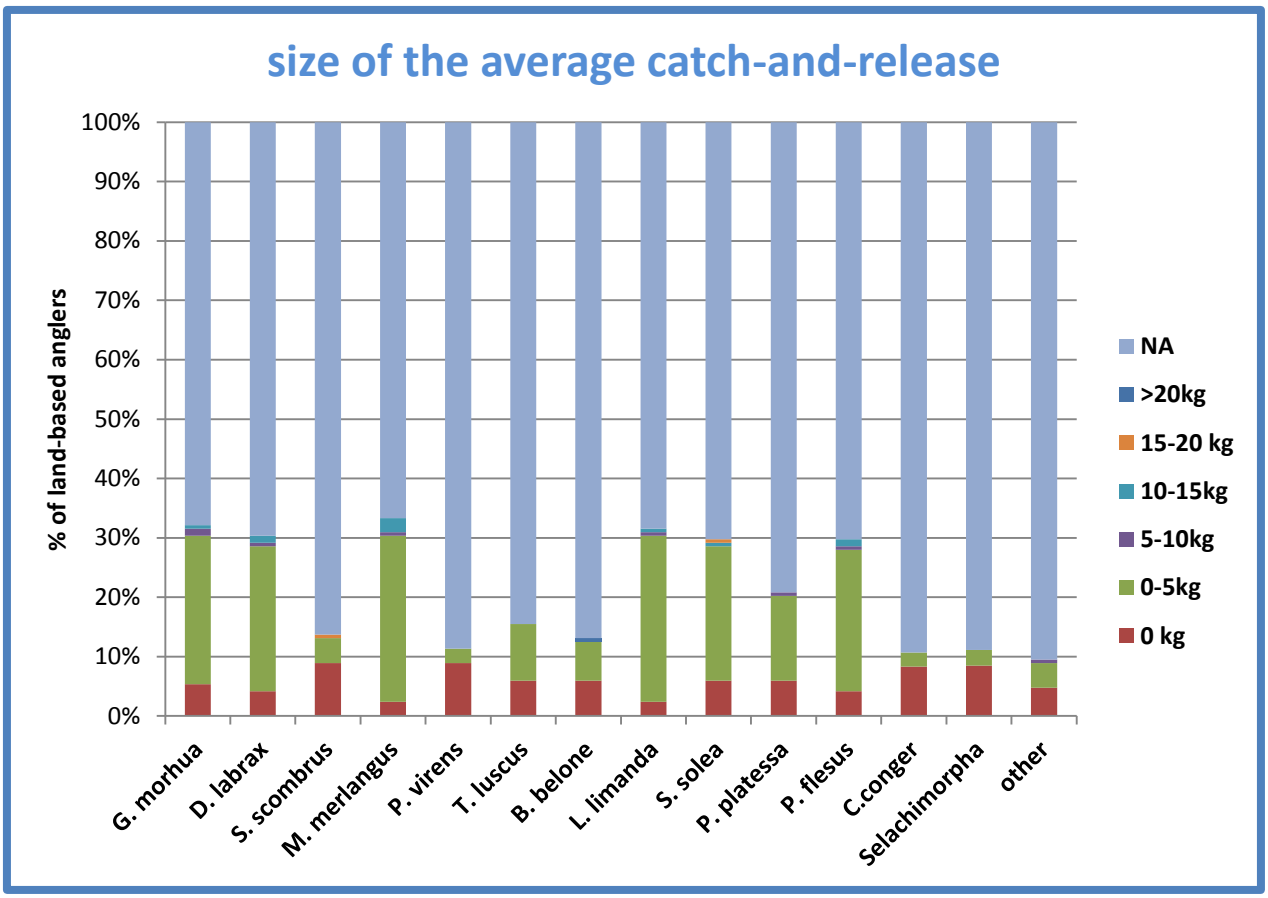
(Fig. 25: average kg's of a species a fisherman catches and lands on a land based trip)

	kg landed annually (survey participants)	
Species	Lower estimation	Upper estimation
Gadus morhua	4600	15375
Dicentrarchus labrax	3700	13500
Scomber scombrus	725	2500
Merlangius merlangus	3700	15625
Pollachius virens	100	500
Trisopterus luscus	675	3375
Belone belone	1200	3875
Limanda limanda	4975	18125
Solea solea	4650	17000
Pleuronectes platessa	1625	7375
Platichthys flesus	2975	12375
Conger conger	200	1000
Selachimorpha	75	375

(Table 6: kg of fish landed by the respondents of the survey while land based angling)

The amount of catch-and-release can be found in Fig. 26 (Question 5.2), the substantial amount of 'no answer' is obvious. Looking at the answers that were given, we observe that, with the exception of whiting, almost no fisherman releases more than 5kg of a species on an average trip. The total amount of catch-and-release annually by the respondents of this survey is shown in table7. It shows that *M. merlangus* was the species most commonly caught and released again, followed by a group of *L. limanda*, *S. solea*, *D. labrax* and *G. morhua* who all had about the same values.

The estimation of total mortality caused by land based angling is done only for *G. morhua* in the same way as for sea angling. For *G.morhua* we assume a post release mortality of 11,2%. This amounts to a ranging from 173,6 kg to 686 kg of *G. morhua* that has to be added to the landed fraction, resulting in a figure between 4.7 tonnes and 16,0 tonnes of *G. morhua* biomass taken out of the system due to the 169 land-based anglers in our survey annually.



(Fig. 26: average kg's of a species that a fisherman catches and releases while land based angling per trip)

	kg landed annually (survey participants)	
Species	Lower estimation	Upper estimation
Gadus morhua	1550	6125
Dicentrarchus labrax	1650	6125
Scomber scombrus	550	1375
Merlangius merlangus	2300	7625
Pollachius virens	100	500
Trisopterus luscus	400	2000
Belone belone	775	2125
Limanda limanda	1550	6500
Solea solea	1575	5625
Pleuronectes platessa	725	3250
Platichthys flesus	1625	6000
Conger conger	100	500
Selachimorpha	125	625

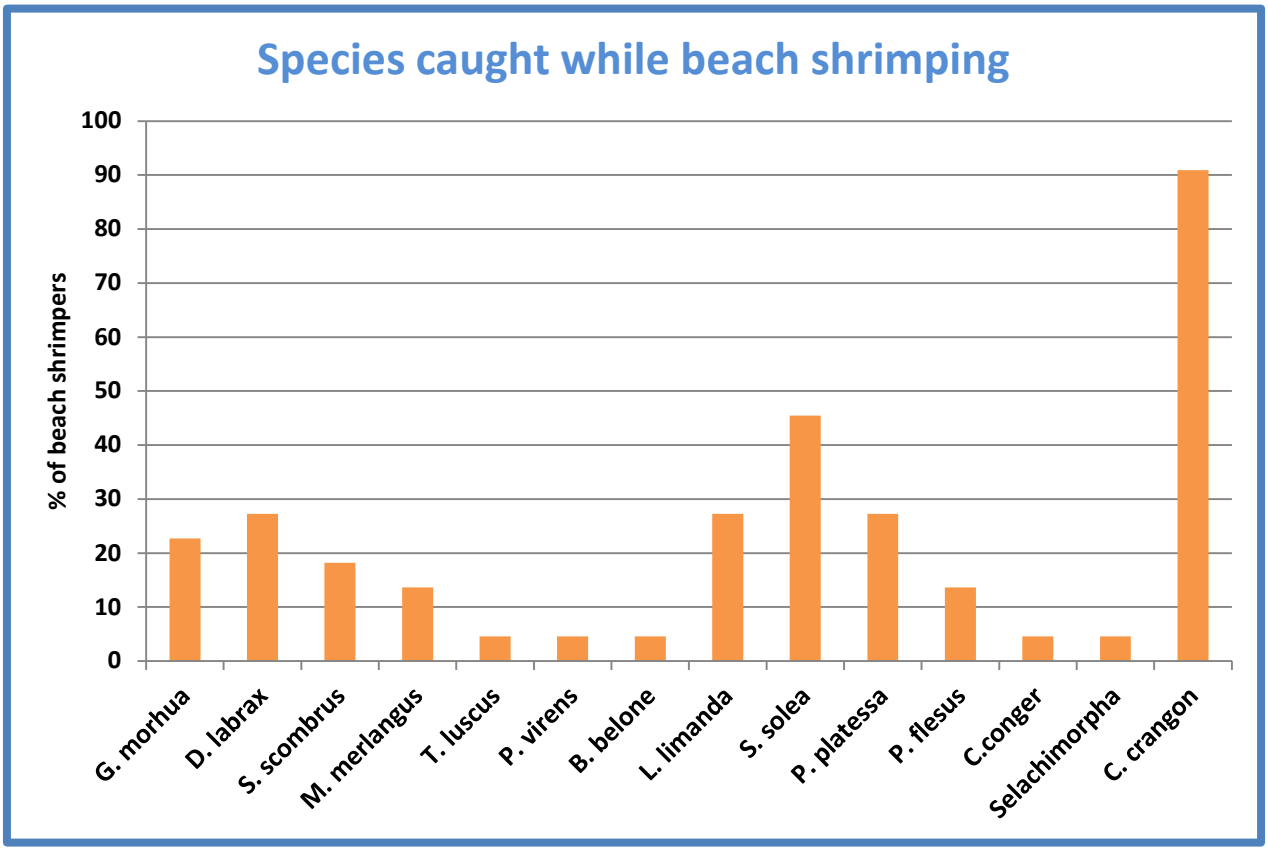
(Table 7: kg of fish released by the respondents of the survey while land based angling)

5.7 Beach shrimping

The final type of recreational fishing is beach shrimping. Visualized in Fig. 27 is the importance of different species for this fisheries (Question 6.1). It shows the importance of *Crangon crangon* with 90.9% of the fishermen mentioning this species, when asked for their target species, 95.5% of beach shrimpers indicated *C. crangon*. Next to it the main species were *S. solea* (45.5%), *L. limanda*, *P. platessa*, and *D. labrax* (27.3% for all three species).

The amount of fish landed is listed in table 8 (Question 6.2), this shows that the catch of *C. crangon* was an order of magnitude larger than all the other species. Other relevant species were the four species of flatfish, *G. morhua*, *D. labrax, S. scombrus*, and *M. merlangus*. All the other species were caught an order of magnitude lower. When asked to the size of a catch all species were caught between 0 and 5kg during one trip. The only exception was *C. crangon* of which 75% of the fishermen indicated between 0 and 5kg, and 25% indicated between 5 and 10kg.

The part of the question on the amount of release (Question 6.2) was not answered sufficiently to be able to make adequate conclusions, and as such is not considered for the analysis.



(Fig. 27: importance of species in beach shrimping)

species	lower estimation	upper estimation	species	lower estimation	upper estimation
Gadus morhua	75	375	*Limanda limanda*	90	450
Dicentrarchus labrax	90	450	*Solea solea*	150	750
Scomber scombrus	60	300	*Pleuronectes platessa*	90	450
Merlangius merlangus	45	225	*Platichthys flesus*	45	225
Trisopterus luscus	15	75	*Conger conger*	15	75
Pollachius virens	15	75	*Selachimorpha*	15	75
Belone belone	15	75	*Crangon crangon*	300	1500

(Table 8: kg of fish landed by the respondents of the survey while beach shrimping)

5.8 Total landings and mortality

When we assume a population of 2000 fishermen, we can calculate an estimation for the landings by recreational fishermen in Belgium. The numbers are listed in table 9.It becomes clear that that the important species are *G. morhua, L. limanda,* and *S. solea*, as these are the only ones with an upper estimation over 300 tonnes. It is important to remark the large variation between the upper and lower estimations, as for some species, *G. morhua* and *L. limanda,* this is more than 220 tonnes.

	kg landed annually	
Species	Lower estimation	Upper estimation
Gadus morhua	154000	375000
Dicentrarchus labrax	91750	258750
Scomber scombrus	51750	126250
Merlangius merlangus	63500	261250
Pollachius virens	4500	15000
Trisopterus luscus	16500	78750
Belone belone	18000	61250
Limanda limanda	100250	326250
Solea solea	90250	302500
Pleuronectes platessa	37500	151250
Platichthys flesus	49250	196250
Conger conger	2750	13750
Selachimorpha	5250	22500

(Table 9: estimation of total annual landings by recreational fishermen in Belgium)

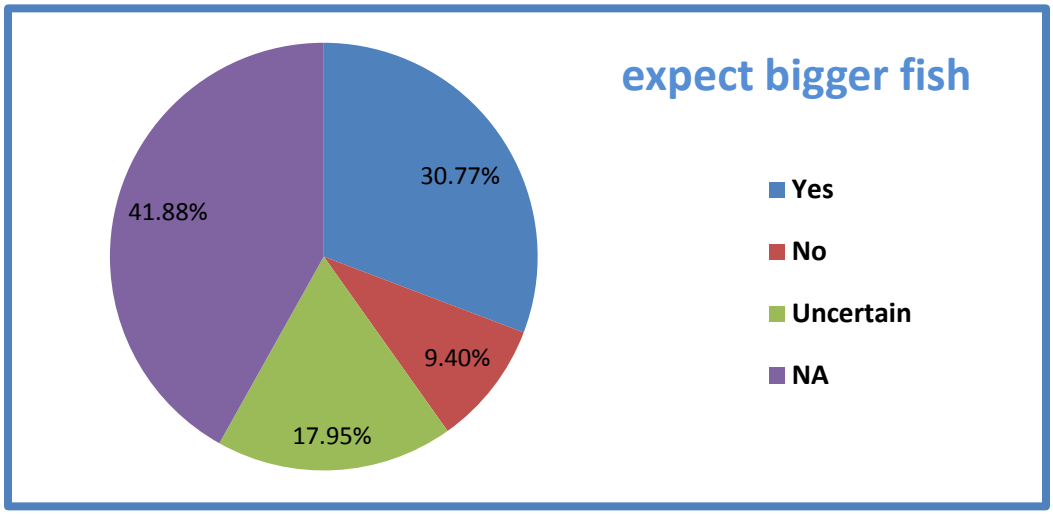
5.9 Wind farms

The wind farms are an potential interesting fishing area for recreational fishermen, as commercial fishing is not allowed, and the wind farms act like reefs with an associated higher biomass. We asked if there are respondents fishing in the vicinity of the wind farms (Question 7.2), to investigate if respondents respect the reserve-status of the area, their answer is show in table 10.

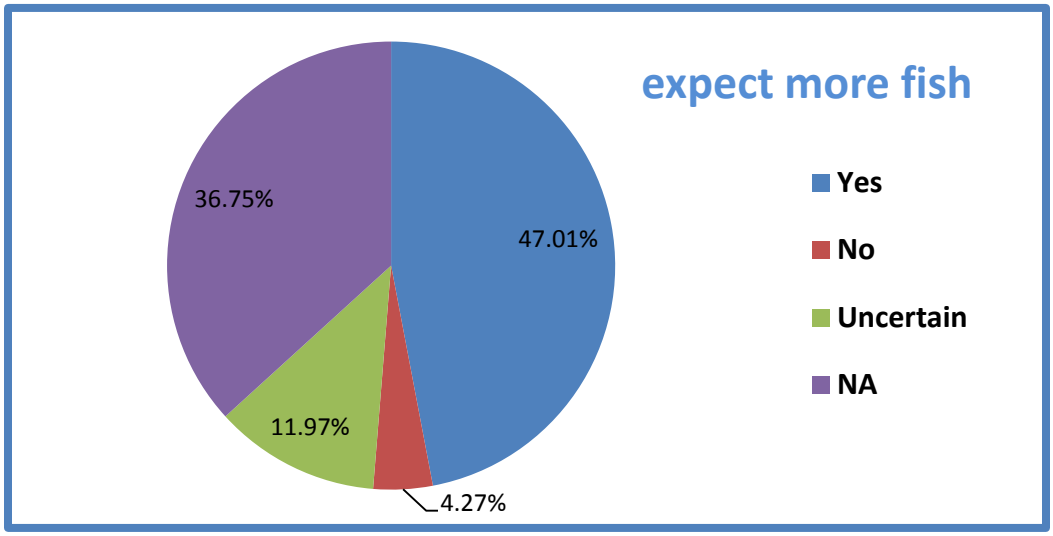
answer	% of fishermen
Yes	4.46%
No	41.96%
NA	53.57%
total	**100.00%**

(Table 10: % of people fishing near the wind farms)

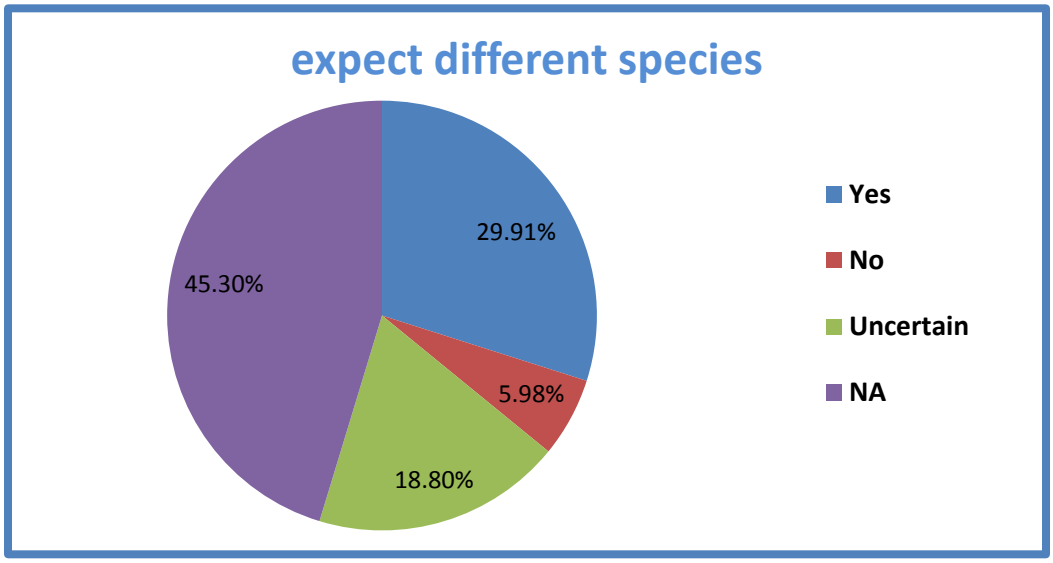
The views that our respondents have of the wind farms were investigated through question 7.2. Their answers are visualized in Fig. 28, Fig. 29, and Fig. 30. This question was left unanswered by about 40% of the respondents. Bigger individual fish are thought to be a consequence of the wind farms by 30,77% of the respondents. More fish biomass is considered to occur in this habitat by 47,01% of the fishermen in our survey. Different species is indicated by 29,91% of the respondents to occur. Remarkably the answers on all these questions suggest that of those respondents answering most expect something different in the wind farms.



(Fig. 28: Do fishermen expect bigger fish in wind farms)



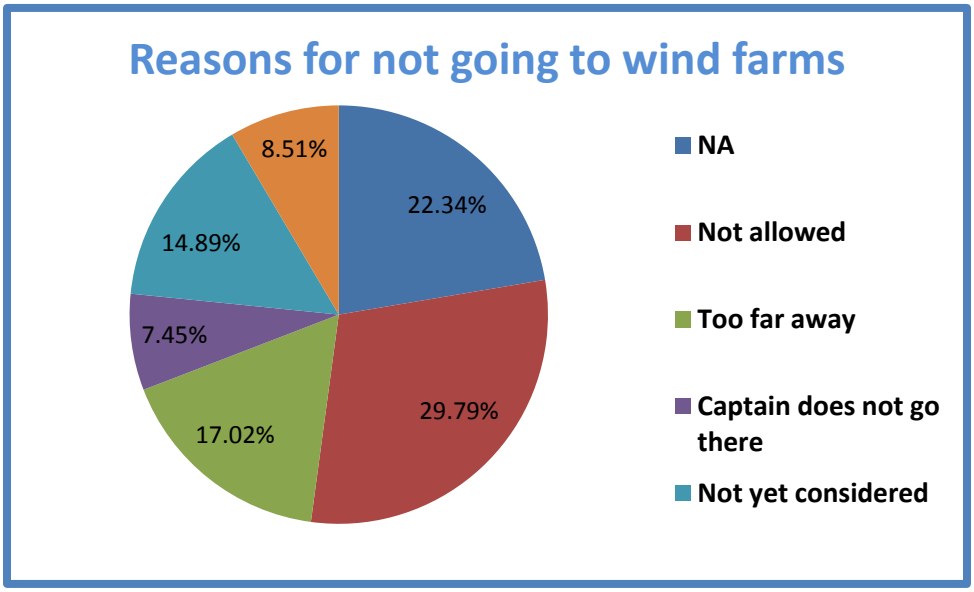
(Fig. 29: Do fishermen expect more fish in wind farms)



(Fig. 30: Do fishermen expect different species in wind farms)

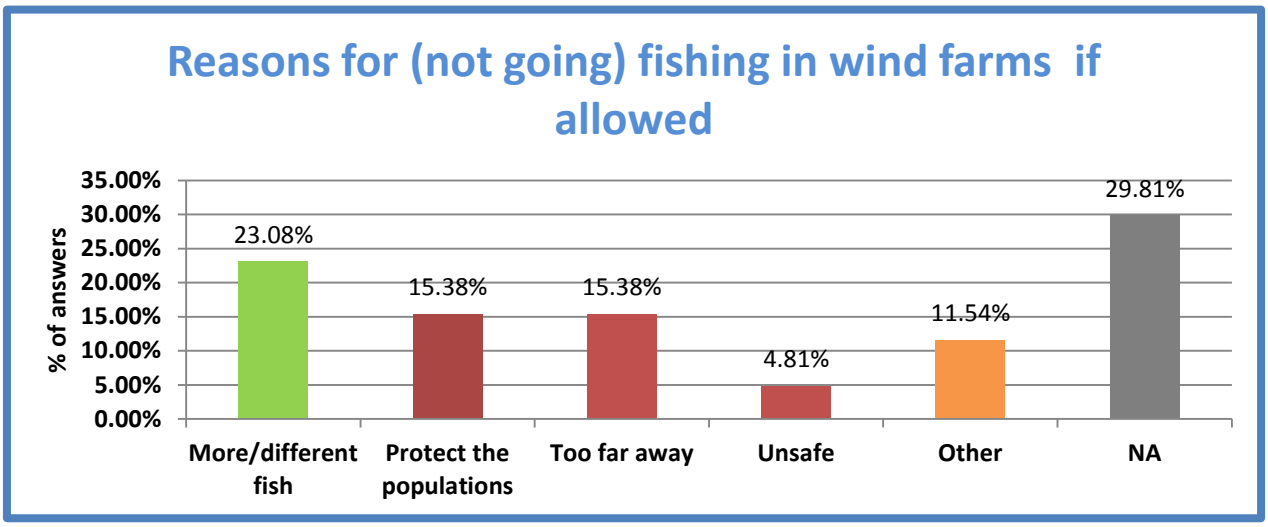
When asked if the fishermen would want to go fishing if in the wind farms (Question 7.3), the responses were distributed in the following way: 39,32% said yes; 31,62% said no; and 29,06% did not answer the question.

Additional information could be found in the additional open questions the respondents provided on the wind farms. Firstly when asked why respondents chose to fish in wind farms or why they do not. The individuals who go there, all give the same answer 'there is still enough fish in these wind farms'. The larger group of fishermen who do not fish in the wind farms had more diverse answers, these are summarized in Fig. 31. We see that the main reasons for not going to the wind farms are legal (29,79%) and distance (17,02%) related, accounting for almost 50% of the responses.



(Fig. 31: reasons for not going to the wind farms)

Next we posed the hypothetical question (Question 7.3): "Would you go fishing in wind farms if it was allowed?" On that question 40.38% of the respondents answered 'Yes', 34.62% said 'No' and 25% gave no answer. When asked for the reason of their answer (Fig. 32), there is one main reason for the eagerness to fish in the wind farms, which is the expected higher biomass and/or different species that would be caught (23,08%). The reasons given by respondents when they would not be interested to go to wind farms, were mainly to protect the fish stocks (15,38%) as the fishermen consider wind farms as breeding grounds that replenish the stocks, and the distance from the coast (15,38%). Safety (4,81%) is an issue that a small group considered. Several other reasons were given such as: 'The challenge of fishing there'; 'The peace and quiet of the wind farms'; or 'To check if it is true what scientists say about these wind farms.'



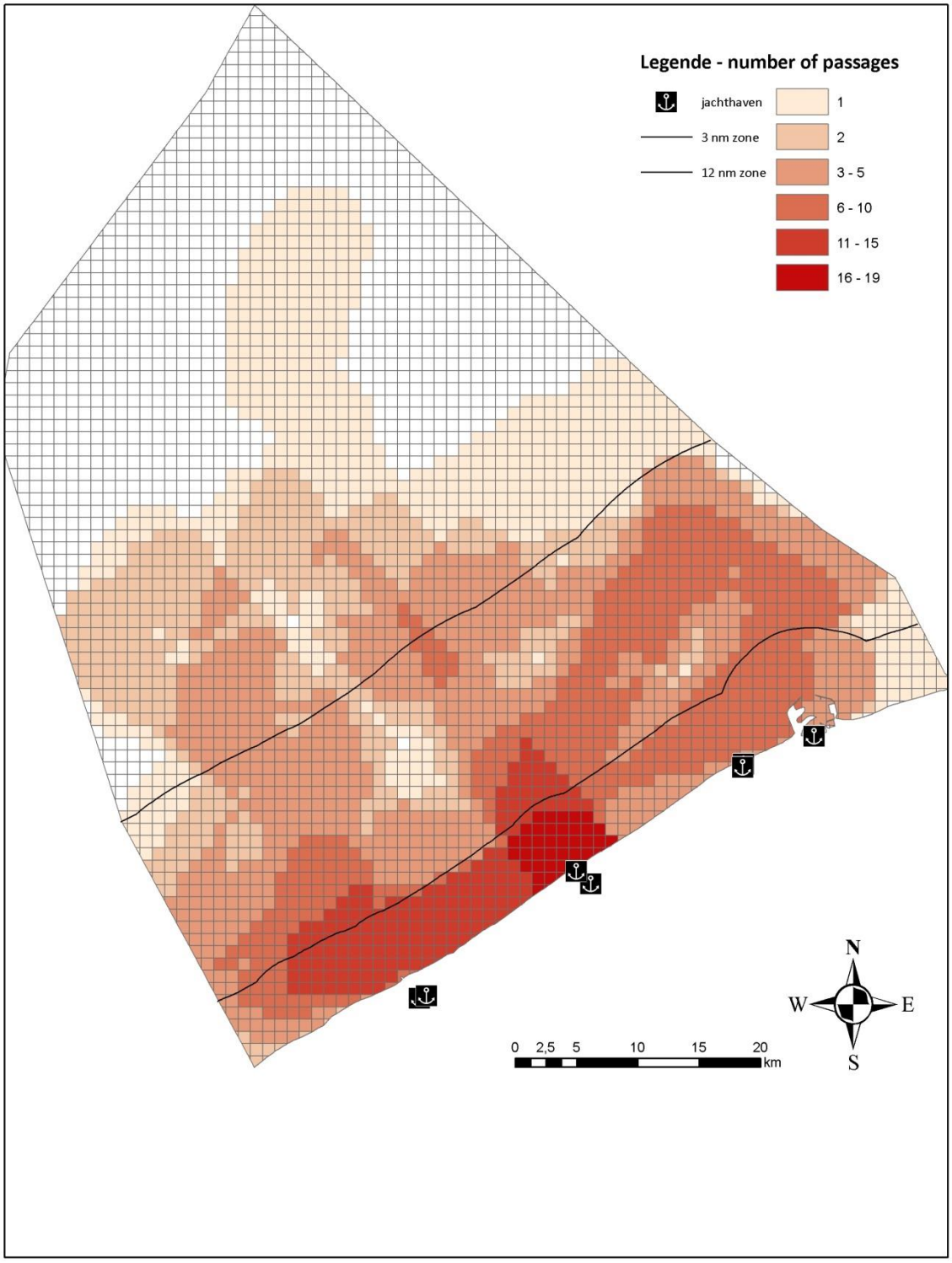
(Fig. 32: reasons to go/ not go fishing in wind farms, green=reason to go, red=reason not to go, orange=mixed reasons)

5.10 Observations at sea

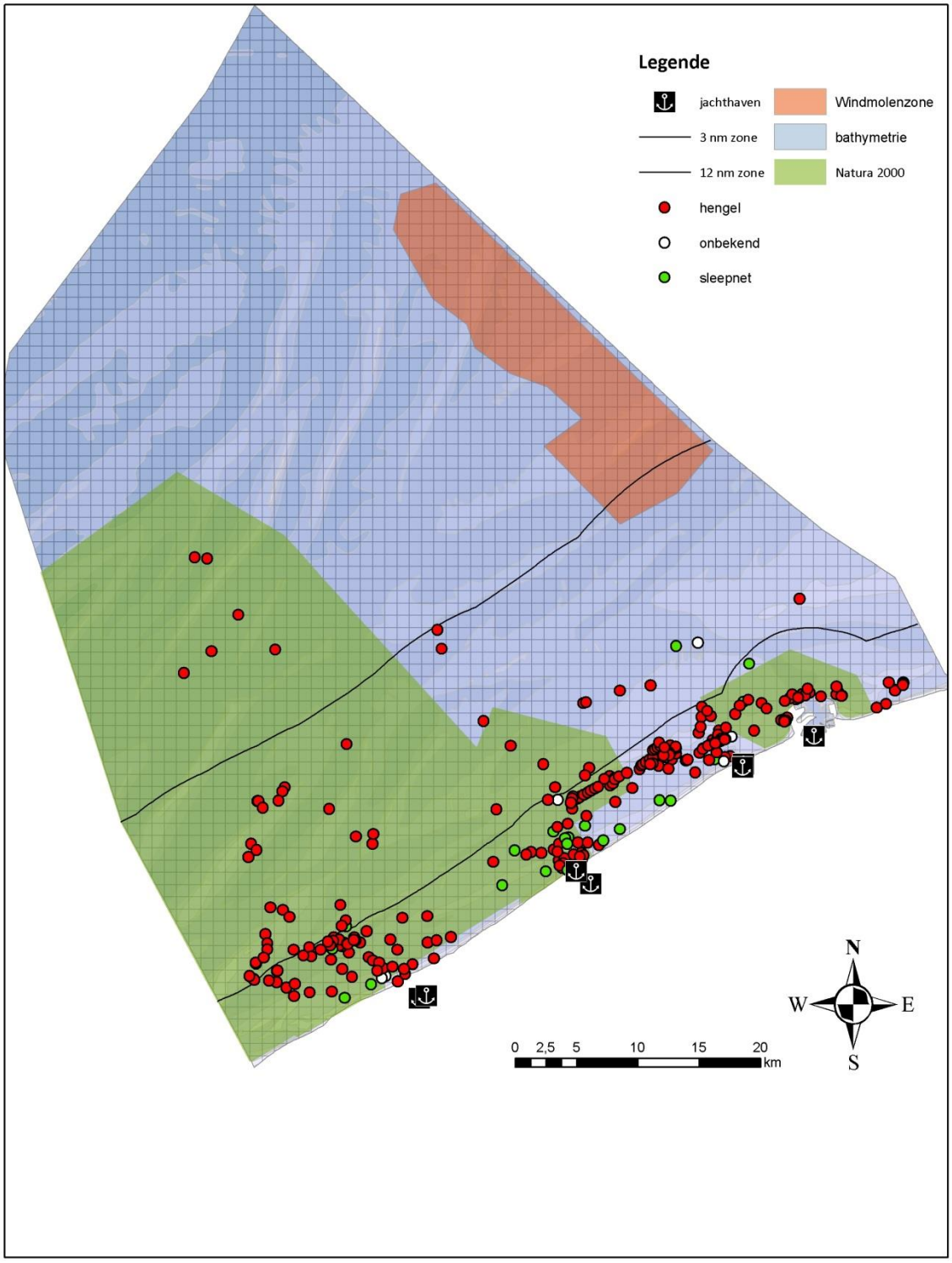
The combination of all the data gathered during the cruises on board the research vessel Simon Stevin resulted in three maps: In the first map (Fig. 33) we see the intensity of sampling projected onto the BPNS. The darker the color the higher the number of passages with the ship. It becomes clear that the 3 nautical mile zone is heavily sampled, and the 12 nautical mile zone has fairly good coverage as well. Beyond that line the sampling has been more scarce.

The second map shows us the individual observations of recreational fishing vessels (Fig. 34). We observe that the majority of the observations has happened in the 3 nautical mile zone, observations beyond this zone were almost exclusively in the Natura 2000 area of the BPNS. We also note the overwhelming abundance of angling vessels compared to the trawling vessels.

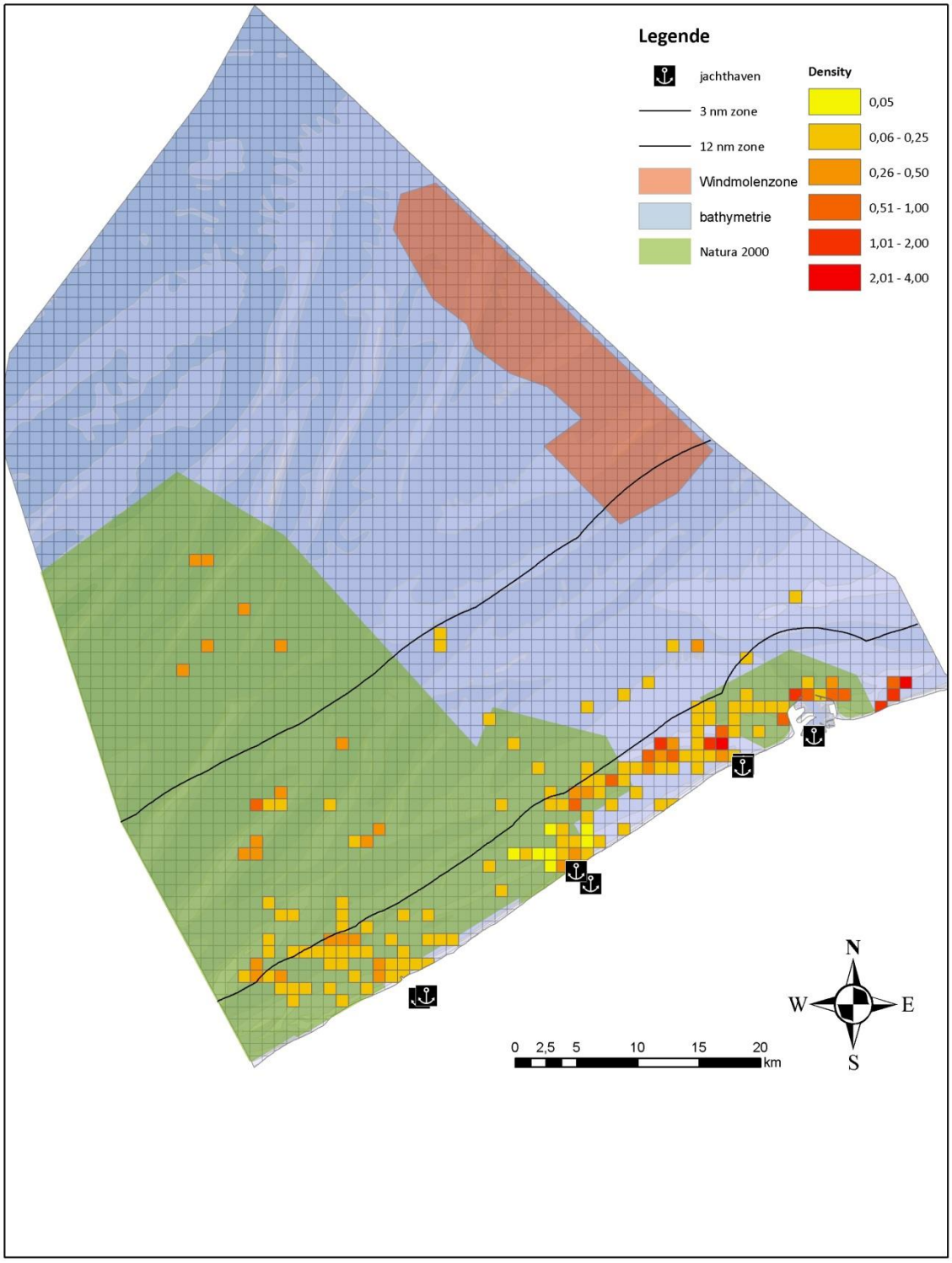
The final map (Fig. 35) gives us the density of recreational vessel at a certain location, taking into account the number of passages. This gives us an idea of the intensity of recreational fishing in the BPNS.



(Fig. 33: map of BPNS with intensity of sampling © Thomas Verleye)



(Fig. 34: Individual observations of recreational fishing vessels in the BPNS, © Thomas Verleye)



(Fig. 35: Density of recreational fishing vessels in the BPNS, © Thomas Verleye)

6. Discussion

6.1 Methodological considerations

6.1.1 Survey

When doing this type of research, a good practice is to reflect on the way the different aspects of it were conducted. This is not only important to assess the reliability of the results, it can also be an aid for future research. The first to point out is the effectiveness of the online version of our survey. A much larger group of fishermen was reached than in previous studies (Zenner *et al.*, in progress; Van Den Steen, 2010), and allowed for an easy processing of the results. However, when looking at the design of the survey, there are some points that should be taken into account. An internet-based survey has become the standard practice to collect data in a cost-efficient way. Next to cost reduction, other strengths include faster data collection time, less response bias, and the technical capabilities of the software, for example making certain questions compulsory (Weber & Bradley, 2006).

While analyzing the data, both the strengths and weaknesses of the different styles of questions came up. Firstly, there were several mistakes that can be attributed to insufficient testing, such as the lack of a zero answer to some questions, yet if more time can be invested into perfecting the survey, these issues will be resolved. Next and more problematic, was the problem with the questions regarding size of the catch (Question 4.2, 5.2, 6.2). The question, as it was posed in the survey, assumed that during every trip a recreational fisherman catches all the indicated species in the same amounts. This is especially important as firstly fishermen target specific species when they go on a trip and not all possible species, and secondly the catches during a trip are extremely variable. To be able to estimate the catches, it would be useful to make a distinction based upon the intended target species of a trip. For example, when fishing specifically for *D. labrax* near a shipwreck, as opposed to fishing in the sandbank habitat for flatfish. This approach would enable to make a more accurate estimation of catches in comparison to the overestimation of the current method. Finally the debate between open-ended and close-ended questions should be considered. The advantages and disadvantages of both types are described in literature (Reja *et al.,* 2003), and the questions achieved their goal in most cases. However, some thought should be given to those questions (Question 1.1, 4.3, 5.3, 6.3) where the two types have been mixed. In these questions examples of possible answers were provided, yet the question itself was open-ended. In the response this became apparent due to the lack of other answers than those set as an example. This should be avoided in the future as it combines the disadvantages of both types of questions.

When preforming a survey-based study, the main concern is to achieve a representative sample of the total population that is investigated. In this study it was impossible to determine the composition of representative sample as there was no prior information on the configuration of the sector. It is certain that our sample does not represent the entire recreational fisheries sector as we have almost no responses (3) from boat owners who use towed gear, while a part of the recreational fleet is known to

be equipped with this type of gear (VLIZ, 2015). Special effort to include this group in future research is essential to get a complete view of the sector.

Furthermore the method of promoting the survey is a factor that should be considered as well. As the main promotion was done through fishing associations, the respondents are more likely to be a member of said associations, leading to an overrepresentation of this category. Because of this the results of the survey are more likely to produce higher averages, as people involved with fishing associations are probably spending more time and money on their pastime. While individuals who fish only once or twice a year consider their contribution insignificant and as such are less likely to fill in a survey.

From our results we could conclude that the different age categories increase in relative importance with age. Yet the oldest category of respondents, older than 65, does not seem to follow this trend. This might be caused by an actual lower number of people involved in recreational fishing, for example caused by the inability to fish due to old age. However, it is also true that this category of people is harder to reach through online surveys in general (Weber & Bradley, 2006). We did present people with the possibility to fill in the survey on paper, yet the promotion of the survey was mainly done through online-means. As suggested by Weber and Bradley it might be beneficial to try to oversample this group in the future, to achieve a representative image of the general population of recreational fishermen.

The creation of an incentive to participate, under the form of the 'vis sticker', has proven is worth as several respondents specifically inquired for it. It is also a recommended method to increase the response rate in literature as well (Lyons *et al.,* 2005). To ensure equally high response rate a follow-up incentive should be considered, if the survey is to be repeated.

A final and important remark is the language of the survey. As Belgium has three official languages, assessing the recreational fisheries sector through a survey requires a multi-lingual set of questions. For this survey only a Dutch version was created, which as such limits our conclusions to the region of Flanders. Therefore future research requires a survey which can be spread throughout the country.

6.1.2 Intensity measurements at sea

The results provided by the different cruises proved good quality data on the intensity of fishing in different areas of the Belgian part of the North Sea. The main issue with this data however, is that is not an accurate image of the intensity of fishing. As during a cruise only a certain transect of the BPNS is covered, no statement can be made about those areas not covered. So we only have an indication, not an actual number, of the number of vessels at sea. To be able to create an actual intensity map a different approach should be used. The method used in New-Zealand (Hartill *et al.*, 2013) with the use of aerial surveys and webcams at the four different harbors, as suggested by Verleye and collegues (VLIZ, 2015) would provide an ideal method. Especially the webcams are low-cost compared to staff members observing the harbor for an entire day.

6.2 Socio-economic characteristics of Belgian recreational fisheries at sea

The combination of the different questions of the survey, allows to create an image of the average recreational fishermen in Belgium. We can also compare the results both with the existing research in Belgium, and with the information available on neighboring countries. Firstly the sex of our respondents is predominantly male (98,7%), and this corresponds with previous research in Belgium as Zenner and colleagues found 92,5% of their respondents to male (Zenner *et al.*, in progress). This is very similar to the results abroad, in France 82% of the fishermen is male (Herfaut *et al.*, 2013), in the Netherlands 81,7% is male (Van der Hammen & de Graaf, 2013), and in England 98% is male (Armstrong *et al*., 2013).

Secondly when considering the age distribution the same similarities arise. In the work of Zenner and colleagues we observe a very similar distribution, even though different age-classes were used the category '55-65 years old' (33,75%) is almost identical in size to our results in the '54-64 years old' category (32%) (Zenner *et al.*, in progress). In England we can observe a similar trend with the majority of the respondents aged between 45 and 64 years old (59,8%), the category older than 65 is much smaller at 11,7% similar to the trend in this study (Armstrong *et al*., 2013). Comparing with the Netherlands shows a very high participation rate among minors, yet beside this difference the same pattern of higher numbers of fishermen in the categories between 40 and 65 years old (Van der Hammen & de Graaf, 2013). In France the largest category of people involved is between 35 and 49 years old, which is a departure from the trend the other countries follow, however due to the use of different age-classes the percentages are not completely comparable (Herfaut *et al.*, 2013).

The next factor we consider is the employment status of the fishermen. In our study we found 58% of the respondents to be employed, and 30% to be retired. This differs from previous work where 44% was employed and 43% was retired (Zenner *et al.*, in progress). When looking abroad, the English figures indicate 54% employed and 20% retired (Armstrong *et al*., 2013), the French figures are in between these figures with 56% employed and 26% retired (Herfaut *et al.*, 2013). These figures seem to be all in the same order of magnitude indicating further the similarities between the different populations of recreational fishermen.

Another factor is the origin of the respondents, for those countries we have information, France and England, we observe the same trend, the closer to the coastline the more recreational fishermen live there (Armstrong *et al*., 2013; Herfaut *et al.*, 2013). The exact same trend can be observed in our results, with more fishermen living in the western provinces than in the eastern. Proving the point that proximity to the sea incites people to take up recreational fishing.

In this survey the different reasons the respondents cite as the incentives to go fishing. These could be compared to the Sea Angling 2012 report (Armstrong *et al*., 2013), where the motivations of fishermen were questioned. These lead to very similar results, the nature experience and hobby/relaxation were the main answers as well. The different terms used are somewhat different, yet they have, in general, the same meaning as the answers given by our respondents.

A following item that can be compared is the economic significance of the recreational fisheries sector. Due to different ways of calculating the figures, comparing them can be hard. However, a general trend comparison is possible. The situation in England (Armstrong *et al*., 2013) allows us to compare specific aspects of costs related to fishing. The level of detail achieved in this report far exceeds our results, yet the average expenditure in England was estimated at £1394 a year (equivalent to €1977). This figure is much lower than the one calculated for Belgium (ranging from €500 to €1000). The results for France are in between these two estimations, with an overall expenditure of €1267 each year (Herfaut *et al.*, 2013). Considering the fact that people might underestimate the costs associated with their fishing activities. Yet also acknowledging that due to its small size a fishermen has almost no accommodation expenses, it can be assumed that the actual number for the Belgian fisheries sector is higher than the one we estimated, probably closer to the French figure. Especially since expenses related to privately owned vessels are not included in the estimation, and these are known to increase the average substantially.

Not a socio-economic factor, yet important to get an idea of the average fishermen, is the proportion of catch-and-release of the total catch. We know from literature that these figures can differ significantly in countries. In the Netherlands about 70% of the catch is released again (Van der Hammen & de Graaf, 2013), while in England it is 48% (Armstrong *et al*., 2013). Depending on the species we observe a catch-and-release rate of about 30%, lower than in the others. This was expected as from informal conversations with fishermen it became clear that the culture in Belgium concerning catch-and-release, is more focused on consuming the catch, and as such much of it is actually landed.

As a final factor we consider the number of fishing days, as a measure of the intensity of fishing the average respondent has. For Belgium we see higher numbers than in the neighboring countries, depending on the type of fishing the mean varies from 28 to 32 days, and the median from 25 to 15 days. These high numbers can probably be explained by an underrepresentation of fishermen going out only a few times a year, as addressed in the previous section. Therefore the actual mean is probably quite close to the numbers we obtained, yet the median should be lower. Resembling more the results seen in England with a mean of 28 days and a median of 14 days (Armstrong *et al*., 2013).

When combining all this information, the conclusion can be made that a recreational fishermen has a specific profile throughout a large part of Western Europe. Despite the small differences in the respective countries, we can say that the average fishermen is a male between 45 and 60 years old, who is either employed or retired, and lives close to the coast. The motivation to pursue this hobby is both to relax and to experience nature, and individuals spend between €1000 and €2000 a year depending on their income. The intensity is diverse with both occasional and semi-professional fishermen. The main difference we can see is in the practice of catch-and-release, where Belgium resembles more the southern approach of consuming a catch, than releasing it like in more northern countries. To test if this assumption of a general type of recreational fisherman is correct, it would be interesting to compare results with other countries such as Germany, Ireland or Spain. As learning who the average fishermen is, can provide fisheries managers tools to approach these people and get them to cooperate with scienctists.

6.3 Recreational fisheries and wind farms

The relationship between wind farms and recreational fishermen can be considered almost non-existent, if only taking into account the amount of fishermen actually going there. Whether it is due to the legal prohibition, the distance from the coast, or another reason, recreational fisheries are almost non-existing in the vicinity of wind farms. This can be considered as good news, because this suggests that the reserve status of wind farms is respected by recreational fishermen. As commercial vessels equipped with VMS show to respect the reserve status quite well, this leads to the conclusion that an actual no-take area in the Belgian part of the North Sea exists.

Looking at people who go fishing at a particular site is not the only way to determine the relationship between them. Among fishermen there is an enthusiasm to fish in the wind farms, mainly caused by the view individuals have on the effect of wind farms on fish stocks. These views are similar with the results scientists find in the field, that a wind farm increases diversity and fish abundance (Stenberg *et al.*, 2015). Almost 40% of the respondents indicate that they would go fishing to a wind farm if it was allowed. This is a clear sign that the legislation is a main factor in creating and maintaining the nursing grounds in the area. For species like *G. Morhua* this is especially important, as this species is recovering, however its population still needs some form of protection to achieve sustainable levels in the North Sea[5]. For this reason it is important that the wind farms remain closed to all types of fishing, as is suggested by researchers (Reubens *et al.*, 2013a).

6.4 Policy implications

As proven in this paper recreational fisheries as a sector to important to ignore when defining a policy to achieve a sustainable exploitation of the resources provided by the sea. In designing a policy the aspects need to be taken into account. First the social importance of recreational fisheries in providing individuals a social reference group, secondly the economic relevance as several jobs are directly dependent on the sector, the legal importance as under European obligations several species have a quota, and finally the ecological aspect as for some species the additional recreational landings might mean an even higher overexploitation.

The fishermen themselves feel threatened by a growing number of regulations, such as the recent ban on trammel nets and the increase of the minimum landing size for *D. labrax.* They have realized that they need to cooperate with researchers to safeguard their hobby, and as such are more willing than ever to help scientists. This opportunity should be used to create a group of fishermen keeping a logbook, in an effort to gain a more accurate view on the total landings by them. This logbook method proved to be a valuable tool in research worldwide (Parnell *et al.*, 2010; Shertzer & Williams, 2008; Van der Hammen & de Graaf, 2013), and the people involved can serve as a gateway to the entire recreational fisheries community for researchers.

[5] http://www.ilvo.vlaanderen.be/language/nl-BE/NL/Pers-en-media/Alle-media/articleType/ArticleView/articleId/2216/Populatie-kabeljauw-herstelt-zich-in-de-Noordzee#.Vb5kSvlRYXg

The main concern when it comes to policy however, can be found in the determination of several quota and other protective measures for important species. *G. morhua* is the most important species in the Belgian recreational fisheries, and is subjected to quota. To get an idea of the scope of the recreational catches one can compare it with the data from ICES in sector IVc [6], this area is larger than the Belgian part of the North Sea yet to have some idea of the size the comparison holds. In 2013, 1033 tonnes of *G. morhua* was landed from the IVc area. Our estimation ranging from 154 tonnes to 375 tonnes represents 14,9% to 36,3% of that catch, even though our estimation is, as stated above, likely an overestimation the figures are very large. These high landings indicate that the stock of *G. morhua* is more productive than assumed, because even with the high landings the stocks are improving. For *D. labrax* the situation is even more remarkable, as the estimation ranging from 91,8 tonnes to 258,8 tonnes represents 18,1% to 51,2% of the 505 tonnes of this species caught in area IVc. For *D. labrax* the European commission has launched several measures this year to protect the failing stocks[7]. Other important species in this study can be compared to the ICES data as well. *L. limanda* ranges from 4,6% to 15,2%, *S. solea* from 0,9% to 2,9%, and *M. merlangus* from 6% to 25,9%, which are all relatively high numbers.

As the fisheries policy in the European Union is regulated by the CFP, many decisions concerning the catches have to be decided at this level. Unfortunately some of the measures in place at the moment are not effective, the bag limit of three fish per day per angler is an incentive to upgrading, and is hardly respected. As one fishermen puts it: 'Why would I stop fishing when I have a good day with a lot of fish, and when there is hardly any enforcement of the regulations?' Which words the main issue for any measure in recreational fisheries, the lack of enforcement of the different regulations.

[6] Official Nominal Catches 2006-2013. Version 12-02-2015. Accessed 31-07-2015 via http://ices.dk/marine-data/dataset-collections/Pages/Fish-catch-and-stock-assessment.aspx

[7] http://ec.europa.eu/newsroom/mare/itemdetail.cfm?item_id=20186 Accessed on 2/08/2015

7. Conclusion

The results presented here provide us with an image of the recreational fisheries sector. The average fishermen is male, middle-aged, employed,; he lives relatively close to the coast, undertakes 25 fishing trips a year, and annually spends an amount ranging from €500 to €1000, even though this is likely an underestimation. Recreational fishing in Belgium is mainly angling, with a small group trawling for shrimp on the beach. The main species are flatfish, *G. morhua,* and *D. labrax*, which are caught in relatively small amounts per trip, ranging from 0 to 10kg.

Sea angling happens predominantly in the three nautical mile zone, which is in sandbank habitat where the main target species are flatfish. Fishing further at sea usually coincides with a shipwreck and is than focused on roundfish attracted to them. The potentially abundant fishing grounds of the wind farms are not visited thereby respecting the reserve status of this area. If the legal prohibition to fish here would disappear however, this would rapidly change. Angling form shore is characterized by smaller catches per trip, and a more even proportion of flatfish and roundfish. As the most abundant type of location the actual beach is the most popular among fishermen.

The practice of catch-and-release, although not as common as in some neighboring countries, is about 30%. This means that post-release mortality is a serious factor, however due to an absence of knowledge in the scientific community this is not easily incorporated. The overall catches in recreational fisheries are surprisingly large when compared to landings by commercial fisheries, with some catches representing 16% or even up to 51% of the commercial catch in ICES area IVc. Including this data into the fishing mortality rates is crucial in the development of a sustainable fishing sector. Up to this day the enforcement of different regulations and high quality catch statistics for recreational fisheries in Belgium is lacking.

8. Acknowledgments

I would like to take the opportunity to thank all the people involved in my thesis. The crew of the RV Simon Stevin for the entertaining conversation during the cruises. All the people involved with the LIVIS project, for giving me the opportunity to work in such an interesting project, especially Frankwin for the input during our meetings. Of course my promotors Jan and Sofie for their patience, and sometimes hard yet necessary words. To my two supervisors, Thomas and Els for their fast answers to emails, and helpful conversations. Els I would like to thank you extra, as you had not anticipated being my supervisor, yet you did everything you could to create some time for my in your busy schedule. My thesis would not have reached its current level without your support. A final thanks goes to Charlotte Van Dijck, you are the best friend I could wish for my dear, and I solemnly promise never to make you read the word 'recreational' ever again.

9. References

Anonymous; ILVO-Fisheries, Resultaten van een pilootstudie over de recreatieve visserij op kabeljauw in de Belgische wateren = Results of a pilot study on the recreational cod fisheries in the waters under Belgian jurisdiction. Ministry of the Flemish Community: Oostende. 8 pp; 2007

Armstrong, M. A. BrownJ. HargreavesK. HyderS. Pilgrim-MorrisonM. MundayS. ProctorA. RobertsK. Williamson; "Sea Angling 2012 – a survey of recreational sea angling activity and economic value in England" Defra; 2013

Bailey, K.M. An Empty Donut Hole: the Great Collapse of a North American Fishery. Ecology and Society. 16:16; 2011

Cabanellas-Reboredo, M.; Alos, J.; March, D.; Palmer, M.; Jorda, G. Where and when will they go fishing? Understanding fishing site and time choice in a recreational squid fishery. Ices Journal of Marine Science. 71:1760-1773; 2014

Cooke, S.J.; Cowx, I.G. The role of recreational fishing in global fish crises. Bioscience. 54:857-859; 2004

de Graaf, M., Simal, F.; 'Quick scan' to assess the prevalence of dermal parasites among coral reef fishes of Bonaire. IMARES Report C055/15, pp. 13; 2015

Depestele, J.; Courtens, W.; Degraer, S.; Derous, S.; Haelters, J.; Hostens, K.; Moulaert, I.; Polet, H.;Rabaut, M.; Stienen, E.; Vincx, M.; 2008; WAKO: Evaluatie van de milieu-impact van WArrelneten boomKOrvisserij op het Belgisch deel van de Noordzee: Eindrapport. ILVO-Visserij: Oostende, België. 185pp. (+Annexes).

Ferter, K.; Weltersbach, M.S.; Strehlow, H.V.; Vlstad, J.H.; Alos, J.; Arlinghaus, R.; Armstrong, M.; Dorow, M.; de Graaf, M.; van der Hammen, T.; Hyder, K.; Levrel, H.; Paulrud, A.; Radtke, K.; Rocklin, D.; Sparrevohn, C.R.; Veiga, P. Unexpectedly high catch-and-release rates in European marine recreational fisheries: implications for science and management. Ices Journal of Marine Science. 70:1319-1329; 2013

Hartill, B., Bian, R., Rush, N., Armiger, H. Aerial-access recreational harvest estimates for snapper, kahawai, red gurnard, tarakihi and trevally in FMA 1 in 2011–12.; 2013

Herfaut, J.; Levrel, H.; Thebaud, O.; Veron, G. The nationwide assessment of marine recreational fishing: A French example. Ocean & Coastal Management. 78:121-131; 2013

Hintzen, N.; Hamon, K.; van der Hammen, T.; Poos, J.; de Graaf, M.; Buisman, E.; Machiels, M.; 2013; Effecten voor de visserij bij de aanleg van windmolenparken binnen de 12 mijlszone; IMARES, Rapport C175/13

Hughes, R.M. Recreational fisheries in the USA: economics, management strategies, and ecological threats. Fisheries Science. 81:1-9; 2015

Hutchings, J.A.; Myers, R.A. WHAT CAN BE LEARNED FROM THE COLLAPSE OF A RENEWABLE RESOURCE - ATLANTIC COD, GADUS-MORHUA, OF NEWFOUNDLAND AND LABRADOR. Canadian Journal of Fisheries and Aquatic Sciences. 51:2126-2146; 1994

Jensen, A. Artificial reefs of Europe: perspective and future. Ices Journal of Marine Science. 59:S3-S13; 2002

Lewin, W.C.; Arlinghaus, R.; Mehner, T. Documented and potential biological impacts of recreational fishing: Insights for management and conservation. Reviews in Fisheries Science. 14:305-367; 2006

Lyons, Angela C., et al. "Conducting research online: Challenges facing researchers in family and consumer sciences." Family and Consumer Sciences Research Journal 33.4: 341-356.; 2005

Mackinson, S.; Wilson, D.C.; Galiay, P.; Deas, B. Engaging stakeholders in fisheries and marine research. Marine Policy. 35:18-24; 2011

Mullon, C.; Freon, P.; Cury, P. The dynamics of collapse in world fisheries. Fish and Fisheries. 6:111-120; 2005

Parnell, P.E.; Dayton, P.K.; Fisher, R.A.; Loarie, C.C.; Darrow, R.D. Spatial patterns of fishing effort off San Diego: implications for zonal management and ecosystem function. Ecological Applications. 20:2203-2222; 2010

Pauly, D.; Christensen, V.; Dalsgaard, J.; Froese, R.; Torres, F. Fishing down marine food webs. Science. 279:860-863; 1998

Pawson, M.G.; Glenn, H.; Padda, G. The definition of marine recreational fishing in Europe. Marine Policy. 32:339-350; 2008

Reja, U., Manfreda, K. L., Hlebec, V., & Vehovar, V. Open-ended vs. close-ended questions in web questionnaires. Developments in applied statistics, 19, 159-177.;2003

Reubens, J.T.; Braeckman, U.; Vanaverbeke, J.; Van Colen, C.; Degraer, S.; Vincx, M. Aggregation at windmill artificial reefs: CPUE of Atlantic cod (Gadus morhua) and pouting (Trisopterus luscus) at different habitats in the Belgian part of the North Sea. Fisheries Research. 139:28-34; 2013a

Reubens, J.T.; Vandendriessche, S.; Zenner, A.N.; Degraer, S.; Vincx, M. Offshore wind farms as productive sites or ecological traps for gadoid fishes? - Impact on growth, condition index and diet composition. Marine Environmental Research. 90:66-74; 2013b

Rose, G.A.; Kulka, D.W. Hyperaggregation of fish and fisheries: how catch-per-unit-effort increased as the northern cod (Gadus morhua) declined. Canadian Journal of Fisheries and Aquatic Sciences. 56:118-127; 1999

Shertzer, K.W.; Williams, E.H. Fish assemblages and indicator species: reef fishes off the southeastern United States. Fishery Bulletin. 106:257-269; 2008

Stenberg, C.; Stottrup, J.G.; van Deurs, M.; Berg, C.W.; Dinesen, G.E.; Mosegaard, H.; Grome, T.M.; Leonhard, S.B. Long-term effects of an offshore wind farm in the North Sea on fish communities. Marine Ecology Progress Series. 528:257-265; 2015

Vandendriessche, S.; Hostens, K.; Courtens, W.; Stienen, E.; Fisheries activities change in the vicinity of offshore wind farms p81-85; chapter in: Degraer, S., Brabant, R., Rumes, B., (Eds.) (2013). Environmental impacts of offshore wind farms in the Belgian part of the North Sea: Learning from the past to optimise future monitoring programmes. Royal Belgian Institute of Natural Sciences, Operational Directorate Natural Environment, Marine Ecology and Management Section. 23

Verleye, T.; VLIZ; Beleidsinformerende Nota: De recreatieve zeevisserij in België: Monitoring van de capaciteit, intensiteit en densiteit op zee (eerste resultaten). VLIZ Beleidsinformerende nota's BIN 2015_001. Oostende. 20 pp.; 2015

Weber, J. and Bradley, K.D.;, “Strengths and weaknesses of conducting web-based surveys: a review of the literature”, Mid-Western Educational Research Association Annual Meeting, Columbus, OH; 2006

Young, J.C.; Jordan, A.; Searle, K.R.; Butler, A.; Chapman, D.S.; Simmons, P.; Watt, A.D. Does stakeholder involvement really benefit biodiversity conservation? Biological Conservation. 158:359-370; 2013 Bailey, K.M. An Empty Donut Hole: the Great Collapse of a North American Fishery. Ecology and Society. 16:16; 2011

10.Annex 1

Enquête recreatieve zeevisserij

1. Algemene gegevens

Geboortejaar: .....

Postcode: .....

Beroep:

- ☐ Bediende
- ☐ Arbeider
- ☐ Student
- ☐ Werkloos
- ☐ Zelfstandig
- ☐ Gepensioneerd

Geslacht: M / V

1.1. Waarom gaat u vissen? (sociaal contact, de vis,…) .....

1.2. Bent u ooit **professioneel** visser geweest? ..... Ja / Nee

1.3. **Hoe lang** doet u al aan strand en/of zeevissen? .....

1.4. Doet u aan **wedstrijdzeevissen**? ..... Ja / Nee

1.5. Doet u aan zeevissen **buiten wedstrijden**? ..... Ja / Nee

1.6. Vist u soms in het **buitenland**?..... Ja / Nee

1.7. Bent u in het **buitenland al bevraagd** over uw recreatief zeevissen? ..... Ja / Nee

1.8. Welk **budget** spendeert u gemiddeld aan het zeevissen per jaar?

Bvb. Vistuig, aas, horeca, kledij, veiligheid… (indien u een eigen boot heeft, boot gerelateerde kosten niet meerekenen)

Aan de **kust**	In het **binnenland**
☐ 1-250 euro	☐ 1-250 euro

☐ 250-500 euro	☐ 250-500 euro
☐ 500-1000 euro	☐ 500-1000 euro
☐ Meer dan 1000 euro	☐ Meer dan 1000 euro

Hebt u een eigen boot?	Indien ja, ga naar deel 2. Indien nee, ga naar deel 3.

2. Eigen boot

2.1. Beschrijving vaartuig:

Is uw boot gemotoriseerd ..... Ja / Nee .....

Type (vb: zeilboot, zeekajak, …) : .....

Merk : .....

Haven / of trailer : .....

Afmetingen : .....

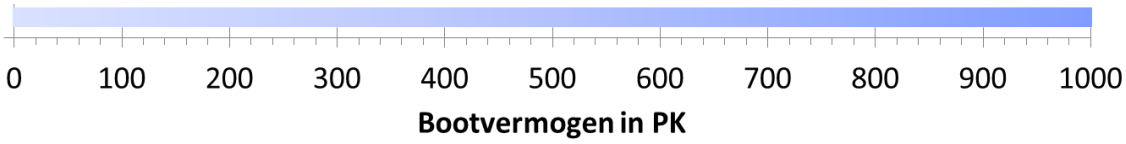
Max aantal passagiers : .....

Gebruik visvinder : ..... Ja / Nee .....

Gebruikt vistuig : ☐ Hengel ☐ Sleeptuig ☐ Passief tuig

Aantal hengelkokers : .....

Duid het motorvermogen (in PK) aan :



Bootvermogen in PK

2.2. Neemt u visvrienden mee aan boord? ..... Ja / Nee

Indien ja, hoeveel gemiddeld per trip?

☐ 0 ☐ 1-2 ☐ 2-4 ☐ meer dan 4

2.3. Hoeveel spendeert u gemiddeld per jaar aan

Vaste kosten (onderhoud, ligplaats, trailer, …)	Brandstof
☐ 0 - 2000 euro	☐ 0 - 1000 euro
☐ 2000 - 4000 euro	☐ 1000 - 2000 euro
☐ 4000 - 6000 euro	☐ 2000 - 3000 euro
☐ Meer dan 6000 euro	☐ Meer dan 3000 euro
Indien meer hoeveel ongeveer?	Indien meer hoeveel ongeveer?
.....	.....

3. Hengelen

Hengelt u?	Indien nee, ga naar deel 6 (p11). Indien ja, vul onderstaande vragen in.

3.1. Koopt u uw aas of verzamelt/maakt u het zelf?

☐ kopen ☐ zelf verzamelen / maken

3.2. Welk type aas gebruikt u?

☐ Kunstaas ☐ Haring

☐ Pieren (zeepier, zagers, …) ☐ Krabben

☐ Sprot ☐ Schelpen

☐ Spiering ☐ Mosselen

☐ Andere: .....

Indien u gaat zeehengelen met de boot van een vriend of een gehuurde boot:

3.3. Gaat u mee met een vriend die een boot heeft en/of gaat u mee met een gehuurde boot met bemanning?

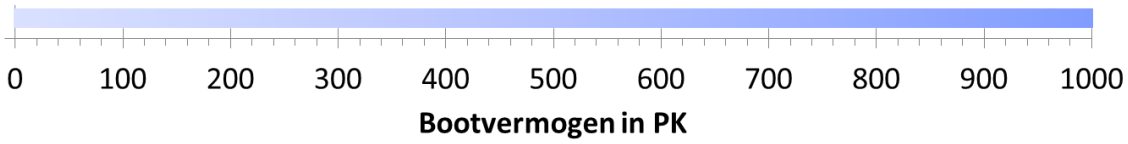
☐ Vriend

☐ Gehuurde boot: ☐ met kapitein ☐ zonder kapitein

3.4. Wat is de vertrekhaven van de boot? .....

3.5. Hoeveel vissers zijn er gemiddeld mee aan boord? .....

3.6. Wat is het vermogen van de boot/boten? Duid aan:



3.7. Wordt er een visvinder gebruikt?..... Ja / Nee / Ik weet het niet

Hengelt u	op zee	Vul deel 4 in (p4)
	op strand / pier / staketsel / …,	Vul deel 5 in (p8)

4. Zeehengelen

4.1. Op welke locaties vist u op welke soorten en wat zijn de voor- en nadelen van deze locaties

OP ZEE	Hoe vaak	Voordeel	Nadeel	Soorten	Andere soorten:	Opmerkingen
Zandbanken	° Nooit ° Soms ° Vaak ° Altijd	° Veel vis ° Weinig concurrentie ° Weinig controle ° Dichtbij	° Weinig vis ° Te ver ° Veel controle ° Moeilijk vissen ° Veiligheid	° Kabeljauw / Gul ° Zeebaars ° Steenbolk ° Makreel ° Wijting ° Kongeraal ° Koolvis ° Schar ° Tong ° Schol ° Bot	° ° ° °	
Wrakken	° Nooit ° Soms ° Vaak ° Altijd	° Veel vis ° Weinig concurrentie ° Weinig controle ° Dichtbij	° Weinig vis ° Te ver ° Veel controle ° Moeilijk vissen ° Veiligheid	° Kabeljauw / Gul ° Zeebaars ° Steenbolk ° Makreel ° Wijting ° Kongeraal ° Koolvis ° Schar ° Tong ° Schol ° Bot	° ° ° °	
Windmolen-gebied	° Nooit ° Soms ° Vaak ° Altijd	° Veel vis ° Weinig concurrentie ° Weinig controle ° Dichtbij	° Weinig vis ° Te ver ° Veel controle ° Moeilijk vissen ° Veiligheid	° Kabeljauw / Gul ° Zeebaars ° Steenbolk ° Makreel ° Wijting ° Kongeraal ° Koolvis ° Schar ° Tong ° Schol ° Bot	° ° ° °	
Ander:	° Nooit ° Soms ° Vaak ° Altijd	° Veel vis ° Weinig concurrentie ° Weinig controle ° Dichtbij	° Weinig vis ° Te ver ° Veel controle ° Moeilijk vissen ° Veiligheid	° Kabeljauw / Gul ° Zeebaars ° Steenbolk ° Makreel ° Wijting ° Kongeraal ° Koolvis ° Schar ° Tong ° Schol ° Bot	° ° ° °	

4.2. Hoeveel kilo vis vangt u gemiddeld per vistrip, inclusief wedstrijdresultaten? (Met zeepaling bedoelen we hier Kongeraal)

	Hoeveelheid (kg)												Hoeveel % overleeft teruggooi volgens u?					Aantal	
	Meegenomen						Teruggooi												
Soort	0	0 - 5	5 - 10	10 - 15	15 - 20	> 20	0	0 - 5	5 - 10	10 - 15	15 - 20	> 20	0	25	50	75	100	Hengels	Haken per hengel
Kabeljauw / Gul	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Zeebaars	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Makreel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Wijting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Steenbolk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Koolvis	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Geep	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Schar	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Tong	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Schol	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Kongeraal (Zeepaling)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Haaien (ook hondshaai)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Andere vissoorten	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....

4.3. Hebt u ooit controle gehad terwijl u aan het vissen was of bij aan wal komen?
Indien ja, heeft dit gevolgen gehad voor u? (bv.: boete, inbeslagname….)

.....

.....

4.4. Wat bepaalt of u gaat vissen?

☐ Getijden ☐ Windkracht / golfhoogte ☐ Wedstrijd ☐ Weer

☐ Windrichting ☐ Andere:.....

4.5. Hoeveel **dagen** per jaar gaat u vissen?

☐ 1 - 10 ☐ 10 - 20 ☐ 20 - 30 ☐ 30 - 40 ☐ 40 - 50

☐ Indien meer dan 50, hoeveel: .....

4.6. Hoelang duurt zo'n vistrip gemiddeld?

In **uren**: ☐ 1 - 4 ☐ 4 - 8 ☐ 8 - 12 ☐ 12 - 16 ☐ 16 - 20

4.7. Wanneer gaat u het vaakst vissen?

	Jan	Feb	Maart	April	Mei	Juni	Juli	Aug	Sep	Okt	Nov	Dec
In de week	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
In het weekend	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

4.8. Wat doet u met de vangst?

☐ Terugzetten ☐ Opeten ☐ Weggeven aan vrienden & familie

☐ Andere: .....

Indien u de keuze zou hebben om uw vangst te verkopen, zou u dit doen: ..... Ja / Nee

5. Hengelen op land

5.1. Op welke locaties vist u op welke soorten en wat zijn de voor- en nadelen van deze locaties

OP LAND	Hoe vaak	Voordeel	Nadeel	Soorten	Andere soorten:	Opmerkingen
Pier of Staketsel	° Nooit ° Soms ° Vaak ° Altijd	° Veel vis ° Weinig concurrentie ° Weinig controle ° Dichtbij	° Weinig vis ° Veel concurentie ° Veel controle ° Moeilijk vissen ° Veiligheid	° Kabeljauw / Gul ° Zeebaars ° Steenbolk ° Makreel ° Wijting ° Kongeraal ° Koolvis ° Schar ° Tong ° Schol ° Bot	° ° ° °	
Strand	° Nooit ° Soms ° Vaak ° Altijd	° Veel vis ° Weinig concurrentie ° Weinig controle ° Dichtbij	° Weinig vis ° Veel concurentie ° Veel controle ° Moeilijk vissen ° Veiligheid	° Kabeljauw / Gul ° Zeebaars ° Steenbolk ° Makreel ° Wijting ° Kongeraal ° Koolvis ° Schar ° Tong ° Schol ° Bot	° ° ° °	
Kaaimuur	° Nooit ° Soms ° Vaak ° Altijd	° Veel vis ° Weinig concurrentie ° Weinig controle ° Dichtbij	° Weinig vis ° Veel concurentie ° Veel controle ° Moeilijk vissen ° Veiligheid	° Kabeljauw / Gul ° Zeebaars ° Steenbolk ° Makreel ° Wijting ° Kongeraal ° Koolvis ° Schar ° Tong ° Schol ° Bot	° ° ° °	
Golfbreker	° Nooit ° Soms ° Vaak ° Altijd	° Veel vis ° Weinig concurrentie ° Weinig controle ° Dichtbij	° Weinig vis ° Veel concurentie ° Veel controle ° Moeilijk vissen ° Veiligheid	° Kabeljauw / Gul ° Zeebaars ° Steenbolk ° Makreel ° Wijting ° Kongeraal ° Koolvis ° Schar ° Tong ° Schol ° Bot	° ° ° °	

5.2. Hoeveel kilo vis vangt u gemiddeld per vistrip, inclusief wedstrijdresultaten? (Met zeepaling bedoelen we hier Kongeraal)

	Hoeveelheid (kg)												**Hoeveel % overleeft teruggooi volgens u?**					**Aantal**	
	Meegenomen						**Teruggooi**											Hengels	Haken per hengel
Soort	0	0 - 5	5 - 10	10 - 15	15 - 20	> 20	0	0 - 5	5 - 10	10 - 15	15 - 20	> 20	0	25	50	75	100		
Kabeljauw / Gul	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Zeebaars	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Makreel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Wijting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Steenbolk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Koolvis	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Geep	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Schar	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Tong	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Schol	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Kongeraal (Zeepaling)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Haaien (ook hondshaai)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
Andere vissoorten	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....
....	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	....	....

5.3. Hebt u ooit controle gehad tijdens of na het vissen?

Indien ja, heeft dit gevolgen gehad voor u? (bv.: boete, inbeslagname….)

.....

.....

5.4. Wat bepaalt of u gaat vissen?

□ Getijden □ Windkracht / golfhoogte □ Wedstrijd □ Weer

□ Windrichting □ Andere:.....

5.4. Hoeveel dagen per jaar gaat u vissen?

□ 1 - 10 □ 10 - 20 □ 20 - 30 □ 30 - 40 □ 40 - 50

□ Indien meer dan 50, hoeveel dan: ……

5.5. Hoelang duurt zo'n vistrip gemiddeld?

In **uren**: □ 1 - 4 □ 4 - 8 □ 8 - 12 □ 12 - 16 □ 16 - 20

5.6. Wanneer gaat u het vaakst vissen?

	Jan	Feb	Maart	April	Mei	Juni	Juli	Aug	Sep	Okt	Nov	Dec
In de week	□	□	□	□	□	□	□	□	□	□	□	□
In het weekend	□	□	□	□	□	□	□	□	□	□	□	□

5.7. Wat doet u met de vangst?

□ Terugzetten □ Opeten □ Weggeven aan vrienden & familie

□ Andere: .....

Indien u de keuze zou hebben om uw vangst te verkopen, zou u dit doen: ..... Ja / Nee

6. Andere vismethodes

6.1. Op welke locaties vist u, met welke methode?

Type visserij	Vismethode	Doelsoort	Locatie		Specifieke vragen				
Zeevisserij met sleepnet	° Boomkor ° Borden		° Zandbanken ° Andere: ° ……		° Sleepduur ° Maaswijdte ° Lengte boomkor	° …….. ° …….. ° …….	° Breedte bovenpees ° Grootte borden	° …….. ° …….	° Sorteerzeef ° Kookketel ° Zeeflap
Strandvisserij met sleepnet	° Boomkor ° Borden ° Steeknet (duwen)		° Pier / Staketsel ° Strand	° Kaaimuur ° Golfbreker	° Sleepduur ° Maaswijdte ° Lengte boomkor	° …….. ° …….. ° …….	° Breedte bovenpees ° Grootte borden	° …….. ° …….	° Sorteerzeef ° Kookketel ° Zeeflap
Passieve visserij	° Warrelnetten ° Geankerde kieuwnetten ° Drijfnetten ° Staand want ° Longline ° Potten ° Andere:……		° Zandbanken ° Wrakken ° Windmolengebied ° Pier / Staketsel ° Strand ° Kaaimuur ° Golfbreker	° Andere: ° …….. ° …….. ° …….. ° …….. ° …….. ° ……..	° Tijd dat het tuig uit staat ° Maaswijdte ° Afmetingen net	° …….. ° …….. ° …….	° Aantal netten ° Aantal potten ° Aantal lijnen ° Aantal haken	° …….. ° …….. ° …….. ° …….	
Vissen tijdens duiken	° Speer-vissen ° Andere		° Zandbanken ° Windmolengebied	° Wrakken					
Kruisnet-visserij			° Pier / Staketsel ° Strand	° Kaaimuur ° Golfbreker					
Mossels en schelpen verzamelen			° Pier / Staketsel ° Strand	° Kaaimuur ° Golfbreker					

6.2. Hoeveel kilo vis vangt u gemiddeld per vistrip, inclusief teruggooi? (Met zeepaling bedoelen we hier kongeraal)

	Hoeveelheid (kg)												Hoeveel % overleeft teruggooi volgens u?				
	Meegenomen						Teruggooi										
Soort	0	0 - 5	5 - 10	10 - 15	15 - 20	> 20	0	0 - 5	5 - 10	10 - 15	15 - 20	> 20	0	25	50	75	100
Kabeljauw / Gul	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Zeebaars	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Makreel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wijting	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Steenbolk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Koolvis	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Geep	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Schar	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tong	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Schol	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kongeraal (=Zeepaling)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Haaien (ook hondshaai)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Garnaal	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Mosselen	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Krabben	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Kreeften	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Andere	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Andere	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Andere	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

6.3. Hebt u ooit controle gehad tijdens of na het vissen?

Indien ja, heeft dit gevolgen gehad voor u? (bv.: boete, in beslagname….)

.....

.....

6.4. Wat bepaalt of u gaat vissen?

□ Getijden □ Windkracht / golfhoogte □ Wedstrijd □ Weer

□ Windrichting □ Andere:.....

6.2. Hoeveel dagen per jaar gaat u vissen?

□ 1 - 10 □ 10 - 20 □ 20 - 30 □ 30 - 40 □ 40 - 50

□ Indien meer dan 50, hoeveel dan: ……

6.3. Hoelang duurt zo'n vistrip gemiddeld?

In **uren**: □ 1 - 4 □ 4 - 8 □ 8 - 12 □ 12 - 16 □ 17 - 20

6.4. Wanneer gaat u het vaakst vissen?

	Jan	Feb	Maart	April	Mei	Juni	Juli	Aug	Sep	Okt	Nov	Dec
In de week	□	□	□	□	□	□	□	□	□	□	□	□
In het weekend	□	□	□	□	□	□	□	□	□	□	□	□

6.5. Wat doet u met de vangst?

□ Terugzetten □ Opeten □ Weggeven aan vrienden & familie

□ Andere: .....

Indien u de keuze zou hebben om uw vangst te verkopen, zou u dit doen: ..... Ja / Nee

7. Windmolens

Dit jaar wordt er een in het kader van een thesis gekeken naar de windmolen parken op zee en hun effect op de visserij. Gelieve deze vragen dan ook zeker in te vullen.

7.1. Gaat u in de buurt van de windmolenparken vissen? ..... ja / nee

Waarom wel/niet?

.....

.....

.....

7.2. Ziet u een effect van de windmolens op het vissen in de omgeving ervan? Indien u er niet gaat vissen, wat verwacht u?

Grotere vissen ..... Ja / Nee

Meer vis ..... Ja / Nee

Andere soorten..... Ja / Nee

7.3. Stel dat u mag vissen in de windmolenparken zelf, zou u dat doen? Waarom?

ja / nee

.....

.....

.....

7.4. Heeft u nog andere opmerkingen of bedenkingen bij de windmolenparken?

.....

.....

.....

.....

8. Overstap naar commerciële visserij

8.1. Bent u geïnteresseerd om van uw hobby uw beroep te maken, en dus een commerciële visser te worden? .....Ja / nee

8.2. Duid aan wat u vindt van volgende stellingen.

	Helemaal oneens	Oneens	Noch eens noch oneens	Eens	Helemaal eens
Ik ben op de hoogte van de stappen die ik moet nemen	☐	☐	☐	☐	☐
Ik weet welke de voorwaarden zijn.	☐	☐	☐	☐	☐
Ik weet tot wie ik me dien te wenden om deze stap te zetten.	☐	☐	☐	☐	☐

8.3. wat verhindert u om deze stap te zetten?

.....

.....

.....

.....

.....

.....

Indien u meer wil weten over de mogelijkheden om een commerciële visser te worden kunt u uw email adres achterlaten aan het einde van deze enquête.

9. Afsluiting

9.1. Hoe is deze enquête bij u geraakt?

□ Belgian Boat Show

□ De VVHV website

□ Een andere website: ……

□ Een brief toegestuurd gekregen

□ Andere: ……

9.2. Hebt u al eerder de enquête van het ILVO over recreatieve visserij ingevuld? . Ja /Nee

9.3. Wenst u op de hoogte gehouden te worden van de resultaten van deze enquête? ……

Ja / Nee

Laat dan hier uw email adres achter: ……

9.4. Bent u geïnteresseerd om deel te nemen aan ander onderzoek over de recreatieve visserij en mogen wij u daarvoor contacteren?…… Ja / Nee

9.5. Wij lezen graag uw opmerkingen:

……

……

……

……

.....

.....

.....

.....

.....