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Non-market valuation of inshore fishing
Is inshore fishing a factor of attractiveness for coastal tourism?

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Action 3.3 - GIFS Project

2014

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PRESENTATION OF THE STUDY

This study is part of the GIFS Project (Geography of Inshore Fishing and Sustainability), which brings together English, French, Belgian and Dutch partners. This project was selected under the framework of the European programme of cross-border Interreg IV A 2 Mers Seas Zeeën, co-financed by the European Regional Development Fund (ERDF).

The GIFS Project began in 2012 and is the successor to the Anglo-French CHARM (CHannel integrated Approach for marine Resource Management) Project (www.charm-project.org). The objective of the GIFS Project is to study the overall socio-economic and cultural importance of inshore fishing so as to integrate these dimensions in fisheries policies, in maritime policy, in coastal strategies of urban regeneration, and more broadly, in the sustainable development of the communities.

The works of the GIFS Project cover the English Channel and the North Sea and involve six partners. All actions are implemented jointly between these various partners so that the project takes on a true cross-border nature

Geographical location of the Project's various partners

The actions carried out within this project are grouped into three main topics:

- ✓ Activity 1. Governance of coastal areas and maritime fisheries;
- ✓ Activity 2. Fishing grounds and communities;
- ✓ Activity 3. Economics and regeneration of fishing communities.

This report, which is linked to Activity 3, focuses on the non-market valuation of inshore fishing.

INTRODUCTION

The non-market valuation of coastal fishing can be based on the concept of multifunctionality, which was invented for agriculture. The OECD (2001) has defined multifunctionality as a feature of agriculture, that is to say, the ability to jointly[1] produce commodities (mainly food) and other products (maintenance of landscapes, conservation of the biodiversity, preservation of the territories' specificities, etc.). When these other products have some characteristics of public goods, markets are inefficient and supply may be insufficient. It is therefore legitimate to encourage the provision of these public goods through aid, coupled with production or even targeted on specific practices, depending on the intensity of the juncture and transaction costs (Vatn, 2001).

Unlike what happened with agriculture, where multifunctionality was very much questioned in the 2000s, academic work and political discussions on the multifunctionality of fishing are almost non-existent. In a recent paper on the development of small-scale fisheries in the Mediterranean and the Black Sea, Malorgio and Mulazzani (2013) attempted to apply the concept of multifunctionality to fishing, while carefully making the distinction with matters pertaining to the diversification of fishing activities. Among the functions that have some characteristics of public goods, these authors make the distinction between environmental, territorial and social functions.

With regard to the environmental function, fishing affects aquatic ecosystems rather negatively, notably through overfishing as well as the deteriorations caused by fishing gears and techniques. In addition, the absence of well-defined property rights, tied to the resources and the aquatic environment, does not contribute to raising the credibility of the claims concerning the environmental function of fishing. France is one of the few countries to have granted compensation in return for this function, through the "Blue Contracts" introduced in 2008.

Within the territorial and social functions listed by Malorgio and Mulazzani (2013), the ability of fishing activities to attract the visitors of tourist areas is one of the most credible functions with respect to the multifunctionality of fishing: "visitors like to see boats in ports and fish in the markets". In other words, visitors are sensitive to aesthetic and social as well as cultural and heritage amenities related to fishing activities, at sea and on land (boats, presence of fishermen, landing and marketing of fish). We are dealing here with nearly pure public goods, for which the juncture with the marketed goods and services depends on the type of activity (it is probably stronger for inshore fishing and direct sales than it is for offshore fishing and auction sales).

This study focuses on the demand for these amenities[2], which are produced jointly by commercial fishing, and that could legitimise public aid for this sector. We examined whether these attributes of coastal sites were valued by visitors by analysing the trade-offs made by the latter between different categories of attributes. However, the non-market value of fishing is difficult to assess as there is no market which directly observes the prices of these amenities. In this case, Alpizar *et al*. (2003) instead recommend using stated preference methods. Moreover, fisheries being very heterogeneous, methods of revealed preferences based on observed behaviours, such as real estate prices or recreational travel, raise complex empirical and econometric problems in this case (description of the attributes, uncontrolled attributes, spatial autocorrelation, etc.). This is why we preferred to resort to the more formal framework of the choice experiment, despite its hypothetical nature. As noted by Birol *et al.* (2005), choice experiments are among the most accurate non-market valuation methods to quantify the benefits of environmental goods that have multiple characteristics and functions. Initially, these methods of choice modelling were developed by Louviere and Hensher (1982), and Louviere and Woodworth (1983). The method of choice of experiments, through a survey, proposes a choice to the respondents between different goods described by attributes. This method, unlike the traditional contingent assessment method, makes it possible to estimate the willingness to pay for

[1] This definition refers to the production technology (primal approach). One can also define multifunctionality on the basis of production costs (dual approach). The joint nature of production then leads to economies of scope.

[2] The concept of amenity evokes the pleasant aspects of the environment that cannot be appropriated and have no monetary value.

each attribute (Agimass and Mekonnen, 2011). In addition, strategic behaviour is minimised because it is rather difficult for respondents to adopt strategic answers when faced with multiple choice sets (Bennett and Biro, 2010).

Through the selection of fictitious sites characterised by attributes, the trade-offs between attributes of interest (fishing boats, and the ability to buy fishery products directly from local fishermen) and control attributes typical of coastal sites (beach, coastal walk, marina, architectural heritage) were examined. The empirical application was conducted on a sample of around 2 000 people, surveyed across the departments bordering the English Channel and the North Sea in France, Belgium, the Netherlands and the United Kingdom. We demonstrate that the amenities produced by professional fishing are valued by visitors, as much as some traditional attributes of the coast, recreational or patrimonial, while emphasizing the observed differences between the countries surveyed.

This report successively presents the methodology used, while distinguishing the theoretical model of the design of the questionnaire and the survey protocol, the description of the sample and the first results of the survey, the results of the estimations on the different areas surveyed, followed by the calculation of the willingnesses to pay, before concluding.

What should be remembered

The main function of fishing is to provide basic commodities. However, fishing cannot be reduced to this single function because it jointly produces territorial, social and environmental values. This multifunctionality of fishing has not been studied very much. The objective of this study is to highlight part of this multifunctionality by measuring the appeal of patrimonial, cultural, landscape, etc., interests produced by commercial fishing on visitors of coastal sites. Indeed, the presence of a commercial fishing activity is likely to attract additional visitors compared to a coastal site that lacks such an activity. As such, commercial fishing creates non-market value.

This study is part of the 3rd activity of the GIFS Project "Economics and regeneration of fishing communities." It aims to measure the benefits produced by commercial fishing in an exclusively non-market framework. On-site expenses of visitors that came partly for the amenities produced by commercial fishing are a consequence of the multifunctionality of fishing. These expenditures correspond to the market benefits induced by the professional fishing activity. They were the subject of another study of Activity 3 of the GIFS Project.

To measure the non-market value of commercial fishing, a face-to-face survey has been carried out throughout the GIFS area. It was asked from people surveyed to choose between two fictitious coastal sites, described by the presence or absence of attributes (fishing boats, ability to buy fishery products directly from local fishermen, a beach, coastal walks, a marina, architectural heritage) as well as the distance they had to travel to get there. This distance is considered to be an indicator of the cost to get to the described site. The respondents could also choose not to go to any of the sites. By using the data concerning the distance of each site, it is possible to calculate the value that individuals grant to each of the attributes (value that may very well be negative, which would be the indication of an attribute that on average is repulsive rather than attractive). This report presents the methodology that was used, the results of the survey, and the statistical treatments, while differentiating them by country.

1. METHODOLOGY USED FOR THE NON-MARKET VALUATION

The adopted methodology is to propose choice alternatives to the individuals that are interviewed during a survey. These choice alternatives are fictitious coastal sites. The analysis of the choices made by the individuals requires a specific statistical treatment to rule on the attractiveness of the various characteristics that define the coastal sites. The various statistical treatments used are described in the following subsections.

1.1. Theoretical model

The joint analysis method can be used to assess the value of non-market goods. It is part of the so-called stated preference methods; that is to say, methods that directly interrogate individuals about their preferences between various goods, being non-market in this case. The joint analysis method implies that the individuals that are interviewed choose between mutually exclusive alternatives. These can be places, products, services, etc. These alternatives are hypothetical and described through their attributes. The data from joint analysis questionnaires is processed through econometrics with the help of random utility models (RUM). In this econometric framework, when the individual *i (i=1, 2, …, n*) selects an alternative *j (j=1, 2, …, J*), this gives him the following utility:

$$V_{ij} = U_{ij} + \varepsilon_{ij} \quad (1)$$

V_{ij} is known as the indirect utility function, comprising U_{ij}, the part of the utility that is observable by the analyst, and ε_{ij}, the random part of the utility (not observable by the analyst). An individual *i* chooses alternative *j* from *J*, if and only if it gives him more utility than any other alternative *h* from his sample of choices. Several model specifications are then possible depending on the hypotheses made on the random and observable parts of the model. We present the specifications that we will use in the next subsection.

1.1.1. Conditional logit model

The conditional logit model is the base model, in which the explanatory variables depend solely on alternatives *j*. The observable part of the indirect utility is specified as a linear function of the various attributes:

$$V_{ij} = \beta X_j + \varepsilon_{ij} \quad (2)$$

Where X_j is the vector of the explanatory variables (attributes of alternative *j*) and β is the parameter vector of the attributes. The observable part of utility U_{ij} is therefore fully determined by the values of parameters β and attributes X_j, and is therefore deterministic.

The individual probability of choosing alternative *j* rather than any other alternative *h* from the sample of choices is then expressed as the probability that the indirect utility V_{ij} is greater than any utility V_{ih}:

$$p_{ij} = p\ V_{ij} \geq V_{ih} \quad \forall\, j \neq h \quad (3)$$

$$p_{ij} = p\ U_{ij} - U_{ih} \geq \varepsilon_{ih} - \varepsilon_{ij} \quad \forall\, j \neq h \quad (4)$$

Assuming, for the random part, that the terms ε_{ij} are independent and identically distributed (*iid*) according to a law of extreme values of type I, the individual probability of choosing alternative *j* is written as:

$$p_{ij} = \frac{\exp(U_{ij})}{\sum_{h=1}^{J} \exp(U_{ih})} \quad (5)$$

The hypothesis that the random parts are *iid* according to a law of extreme values of type I leads to the property of independence from irrelevant alternatives (IIA) in the conditional model. This property means that the ratio of choice probabilities of two alternatives is independent from the introduction or removal of an alternative. If all the alternatives are very similar, or very different on the contrary, then this property is relevant. However, if the degree of similarity between the alternatives varies, then this property is not confirmed. Other statistical models such as the random parameters logit model can then be used.

1.1.2. Random parameters logit model

The random parameters logit (RPL) model is more flexible than the conditional logit model because it allows the parameters of the explanatory variables to vary according to individual preferences. In addition, this type of model makes it possible to raise the property IIA. The LPA model takes into account the different preferences between individuals, with regard to the attributes of the alternatives. The vector of the parameters of the utility function then depends on the heterogeneity of individual preferences and therefore varies from one individual to another. The utility of choice *j* for the individual *i* is written as follows:

$$V_{ij} = U_{ij} + \varepsilon_{ij} \tag{6}$$

$$V_{ij} = \beta_i X_j + \varepsilon_{ij} \tag{7}$$

The analyst observes neither the vectors of parameters β_i, nor the random terms ε_{ij}. He only observes the explanatory variables X_j. As in the conditional logit model, the random part ε_{ij} is supposed *iid* according to a law of extreme values. A law of parameters is specified for the distribution of coefficients β_i with a density function $f(\beta)$. This density depends on parameters such as the mean and standard deviation of β in the sample. The analyst selects the distribution that seems to be most relevant for β and estimates the parameters ϕ of these distributions. Individuals know their own vector of parameters β_i as well as the random parts ε_{ij} for all alternatives *j*. They therefore choose an alternative *j* if and only if $V_{ij} > V_{ih}$, regardless of $j \neq h$. However, the analyst only observes the explanatory variables X_j and the individuals' choices. In this context, the probability of choice (not conditioned by knowledge of β_i) is written as:

$$p_{ij} = \frac{\exp\ \beta_i X_j}{\sum_{h=1}^{J} \exp\ \beta_i X_h} f\ \beta\ d\beta \quad \forall h \neq j \tag{8}$$

Models of this type are also called mixed logit models due to the fact that they are an average of logit models where *f* is called the "mixing distribution".

In this study, the alternatives' attributes are the specific characteristics of the coastal sites. The parameters associated with each characteristic of the sites are specified by a mean and standard deviation instead of being fixed so as to take into account the heterogeneous preferences of our samples' population. This is referred to as unobserved heterogeneity.

1.1.3. **Estimation of willingnesses to pay**

Estimates of consumer surplus relative to an attribute's level change can be calculated in both previously presented types of models, through the procedure presented by Adamowicz *et al*. (1994). If, among the attributes, one is an attribute of price, then the associated parameter β_p is interpreted as the marginal utility of the income of individual *i*, or the marginal disutility of the payment. The parameter of each other attributes is interpreted as the marginal utility of the attribute. Thus, the Willingness To Pay (WTP) for a marginal change in the attribute *a* is expressed as the negative ratio of the parameter of attribute β_a over that of the attribute of price β_p:

$$WTP_a = -\frac{\beta_a}{\beta_p} \quad (9)$$

The WTP_a is the implicit price of attribute *a*. In the case of the random parameters logit model, the parameters being random, the WTP is random. To calculate the WTP, it is possible to use all the information on the distribution (which is complicated) or more simply the mean and standard deviation. In this case, it is then hypothesised that the parameter of the price attribute β_p is fixed; however the other parameters follow a probability distribution of mean β_a and standard deviation $\sigma_{\beta a}$. The WTP for attribute *a* follows the same probability distribution as that of the parameter, of mean $-\beta_a / \beta_p$ and standard deviation $\sigma_{\beta a}/\beta_p$. It is then possible to use the estimated values for the mean and standard deviation of the parameters.

What should be remembered

The conditional logit model estimates the probability of choosing a coastal site on the basis of the site's attributes. A positive parameter associated with an attribute means a positive impact of the attribute on the probability of choosing the site, on average. The attribute is therefore attractive to individuals, on average. However, individuals can be more or less sensitive to this factor. The random parameters logit model makes it possible to take into account the heterogeneity of the individuals, by estimating the means and standard deviations of the attributes' parameters. Thus, a large standard deviation reflects a significant heterogeneity of preferences, between individuals, for the attribute.

The estimation results of both types of models can be used to calculate the willingness to pay for the presence of each of the characteristics of a coastal site, that is to say what an individual would be willing to pay to enjoy each characteristic on a site.

1.2. Design of the questionnaire

The objective of the study is to see whether the attributes of coastal sites are valued by visitors. The method of choice experiments makes it possible to study individual preferences for the various attributes. Those that are particularly interesting under the framework of this study are the amenities produced jointly by the activity of inshore fishing. We wish to know whether for potential visitors of coastal sites, commercial fishing is an attractive, repulsive or neutral attribute. To answer this question, we aim to assess the non-market value of inshore fishing in the study area of the GIFS Project. People interviewed are thus placed in a situation to choose between recreational sites described by the attributes. The choice of these attributes is therefore crucial for this survey. These attributes will be used to build alternatives proposed in the sets of choices to the individuals interviewed (design of the questionnaire). In order for the data gathered to make it possible to estimate the selected models as well as possible (see Section 1), the design of the questionnaire must comply with certain statistical rules.

1.2.1. Selection of the attributes

We sought to determine what the relevant characteristics to describe a coastal site were, with the objective of being able to estimate the non-market value of inshore fishing. The amenities related to the presence of a fishing activity must therefore appear among the attributes. We focused on the visible part of this activity: fishing boats, and the ability to buy fishery products directly from local fishermen. The focus of the study being inshore fishing, the idea was initially to distinguish between inshore fishing boats and the rest. However, this solution was rejected because it was not guaranteed that the individuals surveyed could really make that distinction. The fishing port could have been selected as an attribute instead of the fishing boat attribute. This attribute could have been just as relevant for the purpose of the investigation in France. But it would certainly not have been as good for other survey areas where fishing boats are able to beach, as is the case in Hastings, England. In addition, respondents must be able to arbitrate between attributes related to fishing and other attributes that are typical of a coastal site but are independent from the presence of a fishing activity. To be realistic (Ryan and Wordsworth, 2000), and to make sense to the respondents (Bennett and Adamowicz, 2001), these attributes must be representative of coastal sites throughout the study area. After numerous discussions and consultations, six qualitative attributes were selected:

- ✓ fishing boats,
- ✓ coastal walks,
- ✓ the ability to buy products of local fishing directly from fishermen,
- ✓ a beach,
- ✓ a marina,
- ✓ historical architectural heritage (ramparts, a submarine base, old houses and buildings, etc.

These attributes are qualitative. Each one has two levels, presence/absence. In order to calculate the willingness to pay to benefit from these attributes, it is necessary to introduce a monetary attribute, referred to as payment vehicle. Access to recreational natural sites is mostly free; visitors of coastal sites in the area are not used to have to pay to enjoy these sites. As Hanley *et al*. (2002), Boxall and Macnab (2000) and Rulleau *et al.* (2011), the decision was to use the distance of travel to a coastal site by car as a proxy of the cost. For the estimation of the willingness to pay, this attribute of attribute is converted to transportation cost (return trip) with the following formula: *Distance in kilometres x 2 x 0.10325 euros*. The value of *0.10325 euros* is the average compensation for fuel cost per kilometre for vehicles from 5 to 7 fiscal horsepower[3], assuming that 75 % of the French automobile fleet runs on diesel. This value is close to that which is used in the Anglo-Saxon literature. This same value is used to calculate willingness to pay in each of the study's countries. The levels of this attribute must be balanced (same gap between the various levels), and the gaps between the levels large enough to be explanatory. After discussions and consultations, 4 levels were chosen, each separated by 20 kilometres (20 km, 40 km, 60 km, 80 km).

[3] Source: French tax rates: http://bofip.impots.gouv.fr/bofip/2095-PGP.html

What should be remembered

7 attributes were selected to describe the coastal sites of the study area, of which 2 are directly related to fishing: fishing boats, coastal walks, the ability to buy products of local fishing directly from fishermen, a beach, architectural heritage, a marina and the distance to get to the site. These attributes have 2 levels (presence, absence), except for the attribute of distance for which 4 levels were selected. The latter will subsequently make it possible to calculate the additional value that the presence of one of these 6 other attributes gives to a coastal site. These 7 attributes and their levels are used to define alternatives of the choice sets proposed to the respondents.

1.2.2. Design of the questionnaire

For each choice set, the respondents may choose to visit coastal site A or coastal site B, each of these fictitious locations being defined by different levels of attributes. In addition, a third alternative was introduced, namely the ability not to visit any of the proposed sites, alternative subsequently called *status quo*.

A factorial design was used to build the choice sets proposed to people interviewed. A full factorial design includes all possible combinations of levels of the various attributes that describe the choice alternatives. Such a design has the advantage of being orthogonal, that is to say that the attributes are not correlated. With six two-level attributes and one four-level attribute, (2^6x4^1) combinations are possible, that is to say 256 choice sets for a full factorial design. It however is not feasible to propose that many successive choices to a respondent. It is then possible to use a fractional factorial design, which may or may not be orthogonal, in order to reduce the number of choice situations. Huber and Zwerina (1996) have shown that efficient designs make it possible to result in more accurate estimations of the parameters than orthogonal designs for a design of the same size, and/or reduce the size of the design. An efficient design is therefore used here rather than an orthogonal design. The efficient design is constructed so as to optimise the estimations of the discrete choice models' parameters, while limiting the number of choices proposed to individuals. It is based on the exploitation of the information that is known about the values of the attributes' parameters: *the priors*. These *priors* can be derived from previous analyses. In the absence of data on the potential values of the parameters to be estimated, a preliminary survey may be conducted in order to estimate them (Huber and Zwerina, 1996). This solution was selected. In May 2013, a pilot survey was conducted among 100 people, first using an orthogonal fractional factorial design. A multinomial logit model was estimated from the data collected, which made it possible to obtain the *priors*. The efficient design was then constructed by minimising the D-error, that is to say the determinant of the asymptotic variance-covariance matrix (Bliemer and Rose, 2009). Several efficiency measurements exist (A-error, D-error), but the D-error is not sensitive to the magnitude of the parameters (Street *et al*. 2005), which usually leads to giving priority to this measurement. Despite the fact that the introduction of a *status quo* alternative reduces the efficiency of the design, it must be introduced in the questionnaire in order to improve its consistency with the theory of the consumer, and of real choices (Hoyos, 2010).

The final efficient design contains 32 choice situations (broken up into 4 blocks) while excluding dominant alternatives. Finally, for the survey to be feasible and acceptable, 8 choice sets of walks to be done over the course of one day on fictitious sites were presented to each respondent. 4 versions of the questionnaire were created that way (one version of the questionnaire is presented in the Appendix). Table 1 shows a choice set presented to a respondent.

Table 1: Example of a choice set presented to an individual

	Site A	Site B	Neither site
Choice	☐	☐	☐
Presence of fishing boats	X		
Presence of coastal walks	X		
Possibility to buy locally caught fresh fish/seafood			
Distance between your residence and the site	60 km	40 km	
Presence of a beach			
Presence of a marina		X	
Architectural history (harbour, old houses and buildings etc.).	X		

The choice sets were presented in a different order to the people surveyed so as to avoid an effect which could be linked to the weariness of respondents. Questions on the socio-economic characteristics of respondents as well as those on their views on fishing, on the main activities carried out on the coast, etc., were relegated at the end of the questionnaire to make sure they do not influence the answers of the respondents. Thus we avoid certain biases, strategic in particular, that would have been observed if we had insisted at the beginning of the questionnaire on coastal fishing. The attribute of distance was introduced in the middle of the list of attributes during the presentation of the choice sets in order not to give it too much prominence. That way we avoid that the respondents focus on this attribute in their answers and instead choose the *status quo*.

The questionnaire contained other sections than those of the choice experiments. The respondents had to rank the attributes according to the importance that they had given to them while choosing among the proposed alternatives, to subsequently ensure the consistency of their choices. The individuals surveyed were also questioned about their opinion of fishing. They were asked whether they had a connection with the fishing industry and which, if they originated from the seaside, what activities they practiced on the coast, what was the frequency of their trips to the coast, while distinguishing the summer from the rest of the year. Of course, information on the socioeconomic characteristics of the respondents was collected. All this information can help explain the choices made by the respondents, but also shed light on the findings, notably those on how the attributes are valued by the respondents.

What should be remembered

Respondents are asked to choose. Choices of walks to be done over the course of one day on fictitious sites were presented to them. For each choice set, the respondents may choose to visit coastal site A or coastal site B, each of these fictitious locations being defined by different levels of attributes. In addition, a third alternative was introduced, namely the ability not to visit any of the proposed sites, alternative subsequently called *status quo*. The 7 attributes selected, with their various levels, result in 256 choice sets that it is not conceivable in practice to present to the respondents. With the help of statistical techniques, 32 choice sets were defined, and divided into 4 versions of the questionnaire. In the end, 8 choice sets are proposed to each respondent.

1.3. Survey protocol and sampling plan

The objective of the study is to know whether inshore fishing influences the tourism demand of coastal populations across the study area of the GIFS Project (see Figure 1). A survey has therefore been carried out across the departments bordering the English Channel and the North Sea in France, Belgium, the Netherlands and the United Kingdom.

The survey that was conducted is a survey of individual choices between fictitious sites, described by attributes. Thus this survey does not need to be conducted on specific sites. However, people need to be interviewed face-to-face in order for them to clearly grasp the differences between the proposed alternatives. In addition, respondents being most often not familiar with this type of survey, it is necessary for the surveyor to carefully explain the principle. A pilot survey was conducted in France (in Brittany) among 100 people in the spring of 2013 to test the questionnaire. The objective was to check whether the principle of hypothetical choice was well understood by the respondents, whether the questionnaire was clear and did not pose any specific problem of understanding. The surveys were conducted face-to-face during the summer of 2013 for the final survey in France, in Belgium and in the Netherlands. The survey in Britain took place during the fall of 2013. 4 versions of the survey were used, each with 8 choice sets; each choice set introducing 3 alternatives, including the *status quo*.

Most valuations of non-market goods target specific recreational activities such as fishing, hiking, climbing (Greene *et al.,* 1997, Layman *et al*., 1996, Morey *et al*., 1993, Hanley *et al*. 2002). The survey then targets the practitioners of these activities. It can be carried out on-site or through these activities' associations of licensees. Here it is not a specific activity that is targeted but an area (that of the GIFS Project). However, it is difficult to get a truly representative sample because of the unavailability of a survey of reference representing this area and to which our sample could be compared. Random sampling is not possible because a joint analysis survey requires a face-to-face survey. The eligible area is divided into four sub-zones representing the four countries (Belgium, France, Netherlands and United Kingdom). We aimed for the number of questionnaires in each country to be dependant to the relative size of the country's population. Regarding our sampling plan, stratification by age and gender of the sample was imposed in order to adjust to the population structures of the four countries within the area covered by the GIFS Project (Table 2).

Table 2: Sampling plan

	Belgium		France		Netherlands		United Kingdom		**Total**
	Men	Women	Men	Women	Men	Women	Men	Women	
20-29 years old	16	16	79	79	12	11	55	53	**320**
30-39 years old	17	17	86	86	12	12	51	51	**331**
40-49 years old	19	19	93	93	14	12	57	58	**365**
50-59 years old	18	18	86	86	13	13	48	49	**330**
60-69 years old	13	14	71	79	11	11	42	44	**285**
70 years old and more	13	19	64	100	9	12	40	53	**310**
Total	**199**		**1 000**		**142**		**601**		**1 942**

Heterogeneity of the survey locations across the GIFS Project area was privileged: heterogeneity of the city size, geographical location, type of location (city centre, outskirts, etc.). The surveys were conducted in cities of different sizes, both on the coast and inland. No category of the population has been targeted in particular. Tourists and residents were interviewed equally, assuming that the behaviour would be no different as the site choices proposed are fictitious. However, the existence of differences in responses was tested during the econometric analysis of the respondents' choices. The estimation results showed no significant differences between the responses of tourists and those of the residents of the areas surveyed. The survey was conducted during the tourist season, identifying tourists and residents surveyed all the same. The status of "tourist" is determined by the place of stay. If it is different from the place of residence during the year, then the person is considered a tourist.

What should be remembered

The surveys (face-to-face) were conducted in cities of different sizes, both on the coast and inland. A sampling plan by age and gender was constructed in order for the investigation to be representative of each country's population.

2. SURVEY RESULTS

After introducing the descriptive statistics of the samples by countries, the motivations of the respondents when they visit the coast as well as the frequency of visits are analysed. Are also introduced the respondents' perception of inshore fishing as well as the connections they may have with the fisheries sector whether in a professional, recreational or domestic context.

2.1. Description of the sample

Eventually, 2 086 complete and usable questionnaires were collected with the following distribution: 1 005 in France, 491 in Belgium, 451 in Great Britain and 139 in the Netherlands. The number of questionnaires originally set by country was not respected in Belgium and in the United Kingdom. In Belgium, more than twice as many people were surveyed in relation to what was originally decided. However, fewer surveys than planned were conducted in the United Kingdom. This has not been a problem as for the econometric work the analysis was done separately on the sample for each country. This would not have been the case if the work had been done on the total sample of the GIFS Project area; more weight would have then been given to observations obtained in Belgium (compared to the actual proportion of the Belgian population in the area's total population), and less to those from the United Kingdom. Table 3 introduces the descriptive statistics of our sample, distinguishing each of the 4 countries.

Table 3: Descriptive statistics of the sample by country

		France	Belgium	Netherlands	United Kingdom
Variables		**Mean (standard deviation)**			
Household size		2.56	2.78	2.20	2.11
		(1.32)	(1.61)	(1.44)	(1.39)
Number of children < 18 years		0.54	0.54	0.94	1.33
		(0.87)	(0.91)	(0.91)	(1.45)
Variables		**Proportion**			
Gender (percentage of women)		51.94	50.16	48.15	56.80
Tourist (percentage)		20.91	40.91		
Originating from the seaside (percentage)		43.78	19.18	90.64	47.34
Holiday home on the coast (percentage)		13.34	19.76	3.62	3.55
Age (percentage)	20-29 years old	17.94	35.74	20.99	18.00
	30-39 years old	16.25	12.62	25.93	15.60
	40-49 years old	18.34	11.63	17.28	17.20
	50-59 years old	17.05	14.62	12.35	19.60
	60-69 years old	15.50	14.28	12.35	18.00
	>70 years old	14.96	9.30	11.11	11.60
Status (percentage)	Working	53.48	51.39	54.32	54.40
	Unemployed	5.78	2.65	11.11	8.00
	Retired	27.19	24.25	19.75	26.40
	Student	9.56	18.60	13.58	4.80
	Other	3.98	2.99	12.35	6.40
Net monthly household income (percentage)	< 1 500 €	25.34	15.61	45.67	27.60
	1 500-2 499 €	43.21	48.50	46.91	37.60
	2 500-4 999 €	23.53	28.24	7.41	24.80
	>5 000 €	9.56	7.64	0.00	9.60

Table 3 (continuation): Descriptive statistics of the sample by country

		France	Belgium	Netherlands	United Kingdom
Variables		**Proportion**			
Level of education (percentage)	Without diploma	11.12	3.32	2.47	0.20
	City and Guilds Certificate in vocational training or Technical School Certificate	22.51	26.58	56.79	14.40
	A LEVELS (or equivalent) or BTEC National Diploma	25.79	40.87	37.04	25.60
	Degree or Postgraduate qualification	40.50	28.90	3.70	39.60
Main seaside activities (percentage)	Beach	63.68	67.08	60.58	68.87
	Water sports	19.80	11.24	1.46	15.27
	Swimming	53.53	32.72	16.79	34.88
	Recreational fishing	20.90	4.91	6.57	9.29
	Walking	75.12	78.32	40.88	84.99
	Cultural visits	35.42	33.95	10.95	14.61
	Nature discovery	40.00	36.81	9.49	37.61
	Yachting	12.25	6.34	6.57	1.99
Frequency of trips to the seaside (percentage)					
In the summer	Everyday	18.89	4.98	16.05	24.40
	Several times / week	25.00	6.64	34.57	24.00
	Several times / month	29.75	28.24	26.63	24.40
	Less than once / month	16.29	52.16	12.34	22.80
	Never	9.95	7.97	7.41	4.00
Rest of the year	Everyday	10.18	4.65	9.87	17.20
	Several times / week	14.03	3.65	8.64	15.60
	Several times / month	27.15	15.61	19.75	24.40
	Less than once / month	31.45	61.46	30.86	30.00
	Never	17.08	14.62	30.86	12.40
Connections with the fishing world (percentage)	Commercial fisherman	1.09	0.82	2.92	3.10
	Recreational sea fisherman	18.81	1.02	0.73	9.10
	Recreational river fisherman	8.56	2.05	1.46	10.84
	Contact at work	4.58	0.41	10.95	1.99
	Family or friends	20.30	4.53	45.26	20.80
	No connection	57.91	90.86	49.63	71.97
What perception of inshore fishing? (percentage)	Important activity for the economy	73.33	67.01	52.52	53.74
	Polluting activity	11.84	6.11	5.76	7.49
	Conflicts with tourism	3.68	3.26	8.63	11.67
	Attractiveness of the territory	46.27	45.62	25.90	52.20
	Negative impact on natural resources	16.42	11.00	17.27	37.89
	Is a part of the heritage	65.17	54.79	43.88	83.48
Number of observations		1 005	491	139	451

It was intended that the surveyed areas within each country be as heterogeneous as possible. This was respected, except in the Netherlands where most of the surveys were conducted in a major port of Zeeland.

The descriptive statistics concerning the activities practiced on the coast, the perception of fishing or even the connections with the fishing industry are certainly not representative of the Netherlands, and econometric results may be biased. One must therefore be cautious about their interpretation.

In France, most people interviewed stated the income bracket in which their household's monthly income was positioned. On the contrary, many in Great Britain, the Netherlands and Belgium chose not to declare their income. Statistics on net monthly incomes were therefore calculated on 62.5 %, 58.2 % and 56 % of samples in the United Kingdom, the Netherlands and Belgium, respectively. The information on income will not be used for the econometric analysis of the choices. Only the people surveyed in France and Belgium have stated whether they were tourists or residents.

About 20 % of respondents in France, and 40 % in Belgium, indicate that they are vacationing in the surveyed area. Nearly half of the people surveyed in France and in the United Kingdom originated from the seaside, as opposed to only 20 % in Belgium, but nearly 90 % in the Netherlands.

The sampling plan was not always well respected. The result is an overrepresentation of age groups 20-29 years in Belgium and 30-39 years in the Netherlands. The average age of respondents is comprised between 30 and 39 years for Belgium and the United Kingdom, and between 40 and 49 years for France. Based on the average household size and average number of children less than 18 years of age, the respondents live mainly as couples, notably in France and Belgium. On the contrary, the average household size is smaller in the Netherlands and the United Kingdom, but the average number of children under 18 years of age by household is higher (more than double for the United Kingdom).

In each country, more than half of the sample is composed of working individuals; about a quarter consists of pensioners (slightly less for the United Kingdom). In France and the United Kingdom, about 40 % of those surveyed have a level of education higher than City and Guilds Certificate in vocational training, or Technical School Certificate, whereas they account for less than 4 % in the Netherlands. Nearly 57 % of people surveyed in the Netherlands have a City and Guilds Certificate in vocational training, or Technical School Certificate, and about 40 % in Belgium have an A Levels (or equivalent) or BTEC National Diploma.

What should be remembered

Objectives in terms of the number of usable questionnaires were reached in France and the Netherlands. In Belgium, almost 500 questionnaires were collected although no more than 200 were expected, while in England, 20 % of the original target is missing. The sampling plan was well respected in France and England, that is, 75 % of the total sample; less in the Netherlands with an overrepresentation of 30-39 year-olds, and in Belgium with a large overrepresentation of 20-29 year-olds. In the Netherlands, interviews were mainly conducted in a major port of Zeeland, contrary to the principle of heterogeneity of surveyed areas.

These infringements to the initial sampling plan constitute weaknesses in the survey that may lead to biased results. In the Netherlands, the responses to questions concerning the perception of fishing and the coast should be interpreted with caution. Similarly in Belgium, the answers to questions for which age can be an explanatory factor may not be representative of the entire population. This has not been a problem as for the econometric work the analysis was done separately on the sample for each country. This would not have been the case if the work had been done on the total sample of the GIFS Project area; more weight would have then been given to observations obtained in Belgium (compared to the actual proportion of the Belgian population in the area's total population), and less to those from the United Kingdom.

2.2. What are the individuals surveyed coming to do on the coast?

Regarding the main activities practiced by the seaside, over 60 % of respondents mention the beach. For more than 75 %, it is the walks, with the exception of individuals surveyed in the Netherlands (only 40 %). Over 50 % of people surveyed in France practice swimming, much less in the other three countries. Cultural visits are mentioned by a third of respondents in France and Belgium (much less elsewhere). With the exception of the Netherlands, the discovery of nature is practiced by a third of respondents. Finally, yachting, water sports, or recreational fishing are much more practiced by respondents in France.

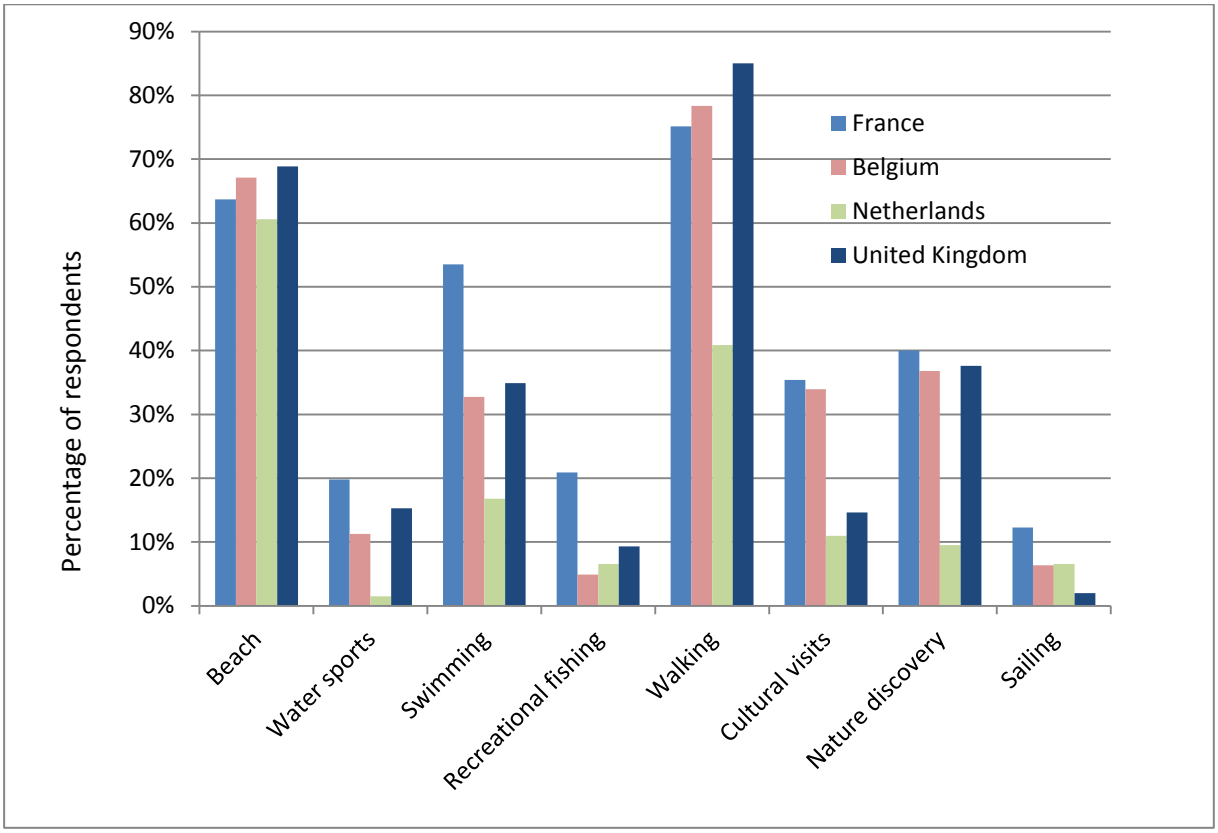

Figure 1: Main activities practiced on the coast

What should be remembered

Whatever the country, the beach and walks are the main activities practiced on the coast by the surveyed individuals.

2.3. Do they often come to the coast?

Regarding the frequency of visits by the seaside in the summer, nearly three-quarters of respondents go there several times a month, with the exception of Belgium (less than 40 %). Over 50 % of respondents in Belgium go to the coast less than once a month. Over the rest of the year, the frequency of visits is lower. They are close in France and the United Kingdom: more than 50 % of respondents go to the coast several times a month. About 30 % go to the seaside less than once a month in France, in the Netherlands and in the United Kingdom and over 60 % in Belgium. Finally more than 30 % of respondents in the Netherlands never go to the coast.

What should be remembered

Respondents regularly come to the coast in the summer (several times a month). However, the visitation of the coast is lower over the rest of the year.

2.4. What connections do they have with fishing?

Individuals were asked about their connections with the fishing world so as to eventually be able to perhaps explain their choice to visit a fictional site in particular. The majority of respondents have no connection with the fishing world, but we still observe large differences between countries. While more than 90 % of respondents in Belgium have stated to have no connection with fishing, they account for less than 50 % in the Netherlands. Respondents practicing recreational fishing are much more numerous in France and the United Kingdom than they are in Belgium and the Netherlands. As for river recreational fishing, it is as much practiced in France as it is in the United Kingdom, but recreational fishing at sea is twice as practiced by respondents in France than it is by those in the United Kingdom.

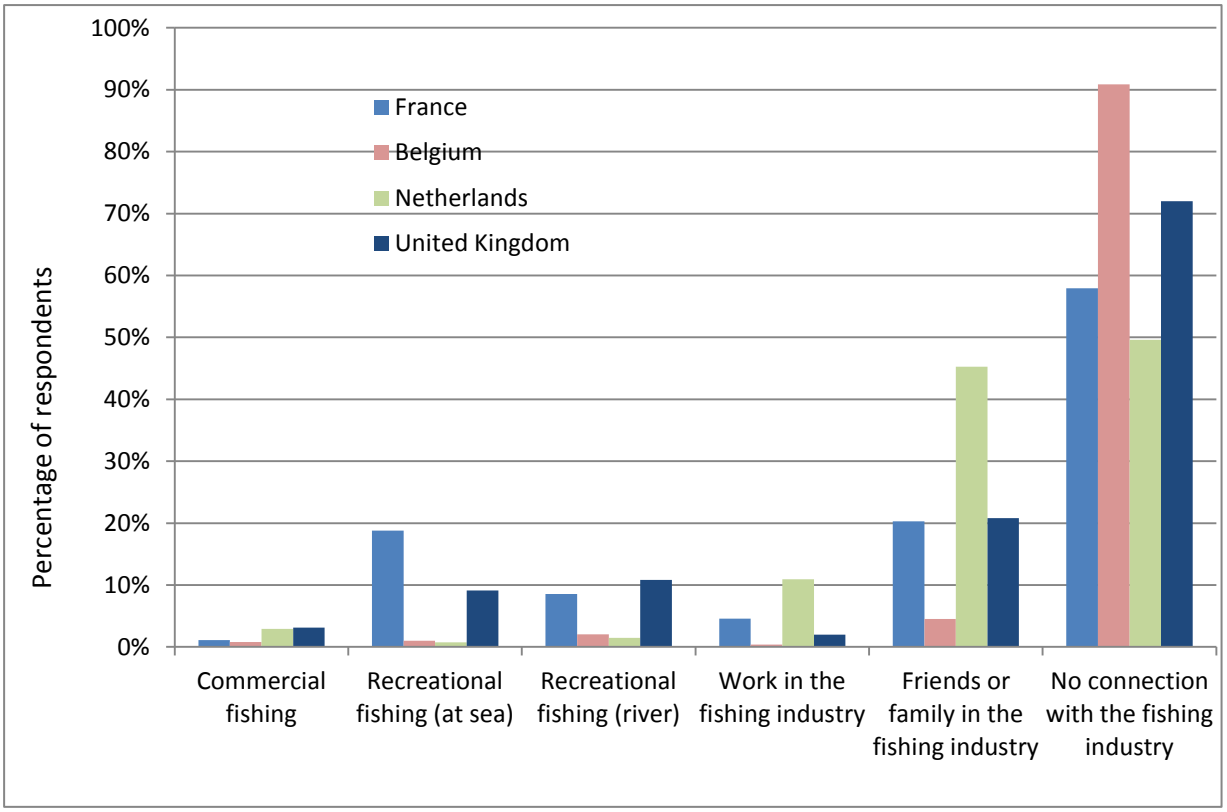

Figure 2: Connections with fishing

What should be remembered

The vast majority of respondents have no connection with the fishing industry. With regard to recreational fishing, it is practiced mostly by respondents in France and the United Kingdom.

2.5. What perception do they have of inshore fishing?

Most of the respondents rather have a positive image of commercial inshore fishing. Nearly three-quarters of the respondents in France and just over a half in the other three countries think that this is an important activity for the economy. For the vast majority of respondents in France and the United Kingdom, inshore fishing is part of the heritage, but this is less the case in the Netherlands and Belgium. For almost half of the respondents, inshore fishing contributes to the territory's attractiveness; with the exception of the Netherlands where only a quarter make that statement. Although they are relatively few to evoke the negative effects of inshore fishing, it is mainly in France (nearly 12 %) that individuals surveyed state that it is a polluting activity, and in the United Kingdom (nearly 12 %) that it conflicts with tourism. Less than 18 % of respondents in each of the countries mention the negative impact on natural resources and biodiversity, except in the United Kingdom where they account for nearly 40 %

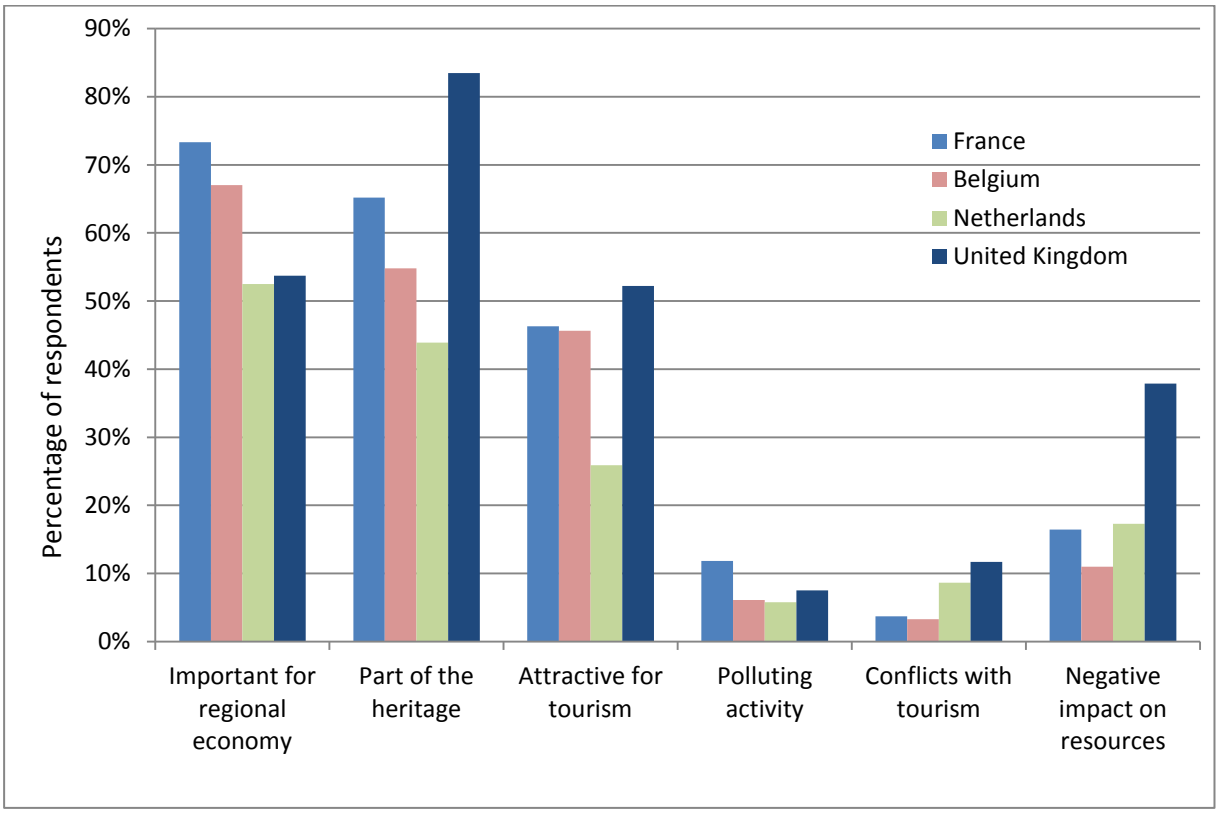

Figure 3: Perception of fishing

What should be remembered

Respondents generally have a good image of commercial fishing. For the majority of respondents, it is an important activity for the economy, it is part of the heritage and it contributes to the attractiveness for tourism. They are few to mention the negative aspects.

3. WHAT ARE THE CHOICE DETERMINANTS OF THE VISITS TO THE COAST?

In the description of recreational sites between which the respondents were asked to choose, several attributes are generated by fishing (presence of fishing boats, direct sales of products from local fishing). Thanks to the study of site choices made by the respondents, it is possible to know how these attributes of interest are valued by the people questioned, that is to say, if these attributes are as attractive as the presence of a beach or a coastal walk. In the estimated discrete choice models, if the estimated parameter of an attribute is positive, then the presence of this attribute increases the likelihood to visit a site that features this characteristic: then the attribute is attractive. These results are examined in more detail by checking whether there are differences in valuation depending on individual characteristics identified through the introduction of interactions between individual attributes and characteristics. The random parameters model, in addition to being less restrictive than the conditional model, makes it possible to introduce individual heterogeneity within the estimated attribute parameters but without identifying the specific individual characteristics that explain this heterogeneity. It is therefore more realistic.

3.1. What are the priority attributes as stated by the respondents?

After having selected alternatives among the choice sets of sites, respondents ranked the attributes defining choice alternatives according to the priority they had given them in the selection of sites. The idea was to see if these statements were consistent with the econometric results of the choices' analysis. These rankings are presented in Table 4 Over 50 % of respondents mention the presence of a beach as 1st or 2nd attribute of choice, with the exception of the Netherlands, where they are less numerous. In the Netherlands, they are as many respondents to state that the first attribute guiding their choice is the presence of fishing boats or the distance, or even the presence of a beach (one quarter of respondents). With the exception of the Netherlands, the presence of fishing boats is not the first attribute to have conditioned their choice of sites to visit.

Table 4: Ranking of the attributes by the respondents according to the importance given to them in their choice of sites to visit

	1st	2nd	3rd	4th	5th	6th	7th
				France (%)			
Fishing boats	8.98	8.58	12.87	16.07	17.37	**19.86**	16.27
Coastal walks	13.09	19.28	19.78	15.78	13.79	10.39	7.89
Direct sales	7.98	8.68	10.78	14.27	18.86	**22.26**	17.17
Beach	**33.57**	**21.08**	12.09	9.29	8.99	8.69	6.29
Marina	4.49	8.37	15.85	15.45	16.45	15.95	23.43
Architectural heritage	14.49	17.18	16.08	15.78	14.29	9.89	12.29
Distance	**18.26**	**17.17**	12.97	12.67	10.98	12.18	15.77
				Belgium (%)			
Fishing boats	2.71	3.75	8.96	15.21	**23.75**	**29.58**	14.79
Coastal walks	**28.12**	**28.12**	16.87	14.37	6.67	3.12	2.08
Direct sales	2.32	6.74	10.53	12.21	18.32	**22.74**	**26.32**
Beach	**44.14**	**23.22**	14.02	6.69	4.60	2.51	4.39
Marina	2.30	7.53	12.55	14.02	21.34	18.62	22.59
Architectural heritage	13.66	16.81	18.07	18.91	11.55	10.08	9.87
Distance	8.40	14.92	18.07	16.81	11.34	10.50	18.91
				Netherlands (%)			
Fishing boats	**25.24**	10.68	11.65	13.59	23.33	11.65	3.88
Coastal walks	5.00	11.0	15.00	17.00	12.00	**25.00**	15.00
Direct sales	1.98	7.92	13.86	11.88	17.82	**25.74**	20.79
Beach	**28.70**	14.81	12.96	10.19	10.19	14.81	8.33
Marina	5.94	8.91	5.94	7.92	22.77	11.88	36.63
Architectural heritage	16.98	13.21	18.87	23.58	8.49	5.66	13.21
Distance	**23.68**	**38.60**	18.42	10.53	2.63	2.63	2.63

	United Kingdom (%)						
Fishing boats	6.48	8.90	9.82	15.98	**20.78**	**21.92**	15.75
Coastal walks	18.73	**24.38**	**20.99**	15.58	9.71	6.77	3.84
Direct sales	3.88	8.68	13.47	13.01	16.67	20.09	**24.20**
Beach	**38.46**	**23.08**	13.35	11.54	5.88	5.66	2.04
Marina	3.87	10.25	12.30	14.35	17.54	16.63	25.06
Architectural heritage	11.79	11.11	16.78	17.91	12.24	18.37	11.79
Distance	17.27	13.41	13.86	11.59	16.36	10.91	16.36

3.2. Results of discrete choice models estimations

The results of the models estimations from data collected in each country are presented in Tables 5 to 8, for France, Belgium, the Netherlands and the United Kingdom respectively. A conditional logit model was first estimated (column (1) of Tables 5 to 8) with an alternative-specific constant, and integrating the presence of the six attributes of sites in addition to the attribute of distance as explanatory variables. An alternative-specific constant (ASC) was introduced for the *status quo* alternative in order to capture the effect of unobserved variables on the selection of the *status quo*. In a second model (column (2) of Tables 5 to 8), individual characteristics have been introduced, such as the number of children under 18 years of age, the socio-professional category, the fact of having no connection with the fisheries sector, cross-examined with the sites' attributes. Other individual characteristics such as age and income have been tested but the results were not significant

The results of the random parameters logit models estimations are presented in columns (3) and (4) of Tables 5 to 8. It is hypothesised that preferences relative to the six attributes specific to the proposed sites are heterogeneous among individuals surveyed. For the random parameters models, we will present the mean of the estimated random parameters in the upper part of columns (3) and (4), and the standard deviations estimates of the site-specific attributes' (except for the distance) random parameters in the lower part of the columns (3) and (4).

The models were estimated by assuming that the coefficients of site-specific attributes are normally distributed, with the exception of the distance attribute. Thus we hypothesise that preferences relative to the attribute of distance are homogeneous between the respondents, which then facilitates the calculation of the willingness to pay for each attribute. Indeed, the willingness to pay for each site-specific attributes are then distributed in the same way as the estimated parameters of these attributes (Hole and Kolstad, 2012).

3.3. Results of estimations across the survey area in France

The adjustment quality is quite good for the four models estimated from data collected in France. Indeed, the tests of the likelihood ratio indicate that the models are very significant. Pseudo R^2 are rather high, as a good adjustment quality for this type of model corresponds to Pseudo R^2 above 0.2 (Hensher and Johnson, 1981). For each model, the coefficients of site-specific attributes are all significant to the level of 1 %. These are therefore relevant determinants of site visit choices on the seaside.

These estimated coefficients are all positive, which means that each of the characteristics used to describe the sites contribute positively to the usefulness of the respondents. Only the estimated parameter for the attribute of distance is negative. Obviously, a shorter distance to travel to get to a site on the coast is preferred to longer ones. The constant is significant for each model. It is negative, meaning that for individuals surveyed in France, choosing to go to one of the proposed sites, rather than not choosing any of the sites, provides utility.

The estimated parameters indicate that respondents overwhelmingly prefer the beach attribute to the other site-specific attributes, while the marina attribute contributes the least to the utility of the respondent. In those models not taking into account individual characteristics of respondents (whether it be the conditional logit model or that of random parameters), the second attribute of choice is the architectural heritage, followed by the fishing boats attribute.

Taking into account the individual characteristics of the respondents, the fishing boats attribute is the second attribute (after the beach) for site selection, except for respondents with children under 18 years old, or those having no connection with fishing (in the family context, at work, etc.), or even when respondents are women. The importance given to the ability to buy fish freshly landed by local fishermen decreases when the respondent is unemployed or when he has no connection with the fisheries sector. On the contrary, respondents having no link with the fishing industry are more interested than others in the architectural heritage. Students attach much importance to the beach attribute in the selection of visits on the coast, while the opposite is true for pensioners. Finally, respondents with a professional activity bestow more importance on the attributes of marinas and coastal walks than others. Finally, women are less interested in the marina attribute.

The conditional logit model considers that hypothesis IIA be proven. This hypothesis was tested using the Hausman and McFadden test (Hausman and McFadden, 1984) (Appendix 2). The choices of site A, site B and *status quo* were successively removed from the sample. The test results are presented in Table 9 and indicate that hypothesis IIA is violated, leading to inconsistent estimates. The random parameters logit model relaxes hypothesis IIA, thereby justifying having undertaken estimations of this type of model in addition to the conditional logit. For random parameters models, the estimated means of the attributes' parameters are all highly significant and positive (except for the distance attribute, the mean of which is also very significant, but negative). The relative importance of each attribute in the utility of respondents remains the same as with the conditional logit model. All of the estimated standard deviations of the parameters of the site-specific attributes are highly significant, thus indicating heterogeneous preferences among the respondents for the attributes of the sites. Only the estimated standard deviation of the marina attribute's parameter of is non-significant. Individual characteristics were cross-examined with the sites' characteristics as is the case in the conditional logit model. We observe the same effects of individual characteristics on the decision to favour an attribute or another in the selection of site visits. In the case of the random parameters models, the test result of the log-likelihoods ratio presented at the bottom of columns (3) and (4) means that we can reject the null hypothesis of all estimated standard deviations of random parameters. The heterogeneity of preferences is therefore not fully explained by the observed characteristics of respondents. In the remainder of this work, the results of random parameters models estimations are used to estimate the willingness to pay of individuals surveyed in France for site-specific attributes.

Table 5: Model estimates for France

	Conditional logit		Random parameters logit	
	(1)	(2)	(3)	(4)
Mean of random parameters				
Constant specific to the *status quo* alternative	-0.641***	-0.636***	-0.581***	-0.580***
	(0.063)	(0.063)	(0.100)	(0.102)
Fishing boats	0.525***	0.960***	0.671***	1.102***
	(0.032)	(0.100)	(0.065)	(0.116)
Coastal walks	0.393***	0.665***	0.663***	0.624***
	(0.039)	(0.055)	(0.067)	(0.081)
Direct sales	0.440***	0.584***	0.517***	0.646***
	(0.038)	(0.054)	(0.068)	(0.079)
Beach	1.061***	0.991***	1.131***	1.037***
	(0.038)	(0.109)	(0.091)	(0.138)
Marina	0.366***	0.482***	0.445***	0.529***
	(0.033)	(0.109)	(0.068)	(0.126)
Architectural heritage	0.663***	0.583***	0.796***	0.711***
	(0.035)	(0.052)	(0.072)	(0.083)
Distance	-0.026***	-0.026***	-0.028***	-0.028***
	(0.001)	(0.001)	(0.002)	(0.002)
Fishing boats X woman		-0.118**		-0.1145**
		(-0.059)		(0.058)
Fishing boats X No. of children<18years		-0.086***		-0.083**
		(0.033)		(0.033)
Fishing boats X No connection with fishing		-0.353***		-0.343***
		(0.061)		(0.061)
Direct sales X No connection with fishing		-0.191***		-0.173***
		(0.063)		(0.064)
Heritage X No connection with fishing		0.158**		0.163**
		(0.065)		(0.064)
Coastal walks X Unemployed		-0.381***		-0.347**
		(0.136)		(0.137)
Direct sales X Unemployed		-0.374***		-0.388***
		(0.128)		(0.130)
Coastal walks X Working		0.128**		0.124**
		(0.066)		(0.066)
Marina X Woman		-0.121**		-0.104*
		(0.062)		(0.063)
Marina X Working		0.133**		0.144**
		(0.062)		(0.062)
Beach X Woman		0.116*		0.115*
		(0.066)		(0.066)
Beach X Retired		-0.486***		-0.471***
		(0.073)		(0.073)
Beach X Student		0.453***		0.471***
		(0.117)		(0.118)
Standard deviation of random parameters				
Fishing boats			0.164***	0.170***
			(0.043)	(0.044)
Coastal walks			0.185***	0.176**
			(0.059)	(0.069)
Direct sales			0.434***	0.443***
			(0.068)	(0.068)
Beach			-0.219***	-0.226**
			(0.074)	(0.080)
Marina			0.057	0.064
			(0.079)	(0.082)
Architectural heritage			0.258***	0.247***
			(0.058)	(0.064)

Table 5 (continuation): Model estimates for France

Number of observations	24 120	24 000	24 120	24 000
Log-likelihood	-6 907.92	-6 778.90	-6 848.23	-6 721.23
LR	3 849.85 (0.00)	4 019.99 (0.00)	119.37 (0.00)	115.34 (0.00)
Pseudo R^2	0.218	0.229		

***, **, * designate variables significant to the levels of 1 %, 5 % and 10 % respectively. The estimated standard deviations appear in brackets.

3.4. Results of estimations across the survey area in Belgium

The adjustment quality is good for all four models estimated from data collected in Belgium. The likelihood ratio tests indicate that the models are highly significant. Pseudo R^2 are higher than is the case for the models estimated from the French sample. The site-specific attributes' coefficients are all significant to the levels of 1 % and 5 %. As is the case for France, they are relevant determinants of the selection of seaside site visits. These estimated coefficients are all positive, which means that each of the characteristics used to describe the sites contributes positively to the utility of the respondents. Only the estimated parameter for the distance attribute is negative. The constant is significant and negative for each of the models. Thus for individuals surveyed in Belgium, choosing to visit one of the proposed sites, rather than not choosing any of the sites, provides some utility.

As is the case for France, the estimated parameters indicate that respondents overwhelmingly prefer the beach attribute to the other site-specific attributes. On the contrary, the direct sales attribute contributes most weakly to the utility of the respondents. The second attribute of choice is the presence of coastal walks, followed by architectural heritage.

In the model that takes into account individual characteristics, the fishing boats attribute becomes the third attribute of site selection of respondents for people with a connection to the fishing world (10 % of the sample). The importance given to the ability to buy fish freshly landed by local fishermen decreases when the respondent has no connection with the fisheries sector or when it is a woman, but it increases for pensioners from the Belgian sample. As is the case in France, student respondents bestow much importance to the beach attribute in their selection of coastal site visit, followed by respondents with children under 18 years old in their household, while it is the opposite for the surveyed pensioners.

Table 6: Model estimates for Belgium

	Conditional logit		Random parameters logit	
	(1)	**(2)**	**(3)**	**(4)**
Mean of random parameters				
Constant specific to the *status quo* alternative	-0.986*** (0.095)	-0.838*** (0.117)	-0.888*** (0.137)	-0.810*** (0.169)
Fishing boats	0.396*** (0.046)	0.744*** (0.177)	0.427*** (0.078)	0.723*** (0.202)
Coastal walks	0.835*** (0.056)	0.829*** (0.072)	0.914*** (0.102)	0.905*** (0.113)
Direct sales	0.170*** (0.054)	0.939** (0.250)	0.203*** (0.093)	1.023*** (0.281)
Beach	1.188*** (0.055)	1.162*** (0.099)	1.249*** (0.096)	1.042*** (0.134)
Marina	0.303*** (0.047)	0.349*** (0.060)	0.256*** (0.087)	0.426*** (0.116)
Architectural heritage	0.552*** (0.051)	0.563*** (0.064)	0.691*** (0.093)	1.180*** (0.212)
Distance	-0.020*** (0.001)	-0.021*** (0.001)	-0.023*** (0.002)	-0.024*** (0.002)
Beach X No. of children<18years		0.224*** (0.073)		0.261*** (0.077)
Fishing boats X No connection with fishing		-0.357** (0.184)		-0.357* (0.188)
Direct sales X Woman		-0.338*** (0.113)		-0.356*** (0.118)
Direct sales X No connection with fishing		-0.407*** (0.196)		-0.437** (0.204)
Direct sales X Retired		0.396*** (0.125)		0.445*** (0.133)
Beach X Retired		-0.544*** (0.140)		-0.540*** (0.140)
Beach X Student		-0.285** (0.111)		0.457*** (0.138)
Architectural heritage X Woman				-0.280** (0.112)
Standard deviation of random parameters				
Fishing boats			0.041 (0.097)	0.392*** (0.090)
Coastal walks			0.101 (0.115)	-0.008 (0.120)
Direct sales			0.242*** (0.085)	0.312*** (0.099)
Beach			0.096 (0.123)	0.075 (0.138)
Marina			0.278*** (0.069)	0.233** (0.119)
Architectural heritage			0.235*** (0.081)	-0.080 (0.124)
Number of observations (No. of ind. X 3 options X 8 choice sets)	11 784	7 872	11 784	7 872
Log-likelihood	-3 178.77	-2 083.37	-3 155.65	-2 047.27
LR	2 273.15 (0.00)	1 598.77 (0.00)	46.25 (0.00)	37.06 (0.00)
Pseudo R^2	0.263	0.277		

***, **, * designate variables significant to the levels of 1 %, 5 % and 10 % respectively. The estimated standard deviations appear in brackets.

Hypothesis IIA was tested in the estimated logit conditional models using data from surveys in Belgium, with the help of the Hausman and Mc Fadden test (Annexe 2). The choices of site A, site B and *status quo* were successively removed from the sample. The test results presented in Table 9 indicate that hypothesis IIA is violated, leading to inconsistent estimates. The random parameters logit model relaxes hypothesis IIA, thereby justifying having undertaken estimations of this type of model in addition to the conditional logit as was the case for France. For random parameters models, the estimated means of the attributes' parameters are all highly significant and positive (except for the distance attribute, the mean of which is negative and very significant, as expected). The relative importance of each attribute in the utility of respondents remains the same as with the conditional logit model. All estimated standard deviations of the parameters of the site-specific attributes are not significant, however the test result of the log-likelihoods ratio presented at the bottom of columns (3) and (4) means that we can reject the null hypothesis of all estimated standard deviations of random parameters. They are significant for the attributes of marina, direct sales and architectural heritage. Preferences are heterogeneous among individuals surveyed in Belgium for these site-specific attributes. On the contrary, the standard deviations of the random parameters of the fishing boats and beach attributes are not significant, the preferences therefore homogeneous among respondents for these characteristics. Individual characteristics were cross-examined with the sites' characteristics as is the case in the conditional logit model. We observe the same effects of individual characteristics on the decision to favour an attribute or another in the selection of site visits. For the standard deviations of random parameters, that of the fishing boats attribute becomes significant, but that of the architectural heritage is not any longer. The standard deviations of the rest of the significant random parameters remain so. Despite the introduction of the observed individual characteristics, the heterogeneity of preferences between respondents remains towards these attributes. In the remainder of this work, the results of random parameters models estimations are used to estimate the willingness to pay of individuals surveyed in Belgium for site-specific attributes.

3.5. Results of estimations across the survey area in the Netherlands

The adjustment quality is not as good on the data collected in the Netherlands, but the data are les numerous than in the other three countries surveyed. However, the likelihood ratio tests indicate that the models (1) and (2) are significant. Pseudo R^2 are lower than is the case for the models estimated from the other samples. The site-specific attributes' coefficients are all significant to the levels of 1 % and 5 %. As is the case for the other countries, they are relevant determinants of the selection of seaside site visits. These estimated coefficients are all positive, which means that each of the characteristics used to describe the sites contribute positively to the utility of the respondents surveyed in the Netherlands. Only the estimated parameter for the distance attribute is negative. The constant is non-significant for each of the models.

On the contrary to the results of estimations in France, Belgium and the United Kingdom, the estimated parameters indicate that respondents prefer the fishing boats attribute to the other site-specific attributes. However, the direct sales attribute contributes most weakly to the utility of the respondents. The second attribute of choice is the presence of coastal walks, closely followed by the beach attribute. If the individual characteristics of the respondents are taken into account, then the unemployed respondents attach more importance to the presence of fishing boats compared to other respondents, but those with no connection with fishing show less interest for this attribute. The interest in architectural heritage increases when respondents are students or when they have no connection with the fishing industry. Unemployed or retired respondents attach much less importance to the beach attribute in the choice of their coastal visits.

Hypothesis IIA was tested in the estimated logit conditional models using data from surveys in the Netherlands, with the help of the Hausman and Mc Fadden test (Annexe 2). The choices of site A, site B and *status quo* were successively removed from the sample. The test results presented in Table 9 indicate that hypothesis IIA is met, expected when the option Site A is removed. Estimations of random parameters logit models were also carried out. The estimated means of the attributes' random parameters are all significant and positive (except for the distance attribute, the mean of which is negative and significant). However, the estimated standard deviations of the random parameters of the site-specific attributes are nearly all significant. The test result of the log-likelihoods ratio presented at the bottom of columns (3) and (4) means that we can reject the null hypothesis of all estimated standard deviations of random parameters. A random parameter logit model is therefore not justified, especially as hypothesis IIA is only partially violated in the case of the conditional logit model. In the remainder of this work, only the results of the conditional logit models estimations are used to estimate the willingness to pay of individuals surveyed in the Netherlands for site-specific attributes.

Table 7: Model estimates for the Netherlands

	Conditional logit		**Random parameters logit**	
	(1)	**(2)**	**(3)**	**(4)**
Mean of random parameters				
Constant specific to the *status quo* alternative	-0.097 (0.168)	0.243 (0.218)	-0.049 (0.195)	0.173 (0.286)
Fishing boats	0.768*** (0.087)	1.061*** (0.168)	0.806*** (0.105)	1.066*** (0.189)
Coastal walks	0.729*** (0.102)	0.711*** (0.163)	0.772*** (0.132)	0.705*** (0.195)
Direct sales	0.288*** (0.101)	0.394*** (0.134)	0.296** (0.123)	0.373** (0.191)
Beach	0.707*** (0.099)	1.398*** (0.145)	0.737*** (0.121)	1.363*** (0.179)
Marina	0.292*** (0.090)	0.325*** (0.119)	0.331*** (0.110)	0.310** (0.148)
Architectural heritage	0.365*** (0.092)	-0.020 (0.173)	0.347*** (0.124)	0.010 (0.194)
Distance	-0.021*** (0.002)	-0.022*** (0.003)	-0.021*** (0.003)	-0.024*** (0.004)
Coastal walks X No. of children<18years		0.323*** (0.118)		0.353*** (0.126)
Fishing boats X No connection with fishing		-0.841*** (0.207)		-0.861*** (0.211)
Architectural heritage X No connection with fishing		0.571*** (0.216)		0.545** (0.219)
Fishing boats X Unemployed		1.121*** (0.343)		1.154*** (0.347)
Beach X Unemployed		-1.226*** (0.367)		-1.228*** (0.369)
Beach X Retired		-1.440*** (0.338)		-1.438*** (0.341)
Architectural heritage X Student		0.952*** (0.361)		0.939*** (0.365)

Table 7 (continuation): Model estimates for the Netherlands

Standard deviation of random parameters				
Fishing boats			0.104	0.295
			(0.199)	(0.269)
Coastal walks			0.275**	0.27
			(0.143)	(0.268)
Direct sales			0.003	0.414**
			(0.210)	(0.181)
Beach			-0.035	0.020
			(0.161)	(0.182)
Marina			-0.150	0.109
			(0.184)	(0.276)
Architectural heritage			0.134	0.117
			(0.162	(0.300)
Number of observations	3 336	2 160	3 336	2 160
(No. of ind. X 3 options X 8 choice sets)				
Log-likelihood	-1 057.12	-635.75	-1 055.50	-632.88
LR	329.07 (0.00)	310.49 (0.00)	3.24 (0.78)	5.74 (0.45)
Pseudo R^2	0.135	0.196		

***, **, * designate variables significant to the levels of 1 %, 5 % and 10 % respectively. The estimated standard deviations appear in brackets.

3.6. Results of estimations across the survey area in the United Kingdom

The adjustment quality is very good for models estimated from data collected in the United Kingdom. The likelihood ratio tests indicate that the models are highly significant. Pseudo R^2 are much higher than is the case for the models estimated from the other samples. The site-specific attributes' coefficients are all significant to the levels of 1 % and 5 %. Therefore, they are relevant determinants of the selection of seaside site visits. These estimated coefficients are all positive, which means that each of the characteristics used to describe the sites contributes positively to the utility of the respondents. Only the estimated parameter for the distance attribute is negative, but significant. The constant is significant and negative for each of the models. Thus for individuals surveyed in the United Kingdom, choosing to visit one of the proposed sites, rather than not choosing any of the sites, provides some utility.

As is the case for France and Belgium, the estimated parameters indicate that respondents prefer the beach attribute to the other site-specific attributes. However, the direct sales and marina attributes contribute most weakly to the utility of the respondents. The second attribute of choice is the presence of coastal walks, followed by the fishing boats attribute. Finally, as is the case in each of the countries, pensioners attach much less importance to the beach attribute in the choice of their coastal visits. Women are more interested in the coastal walks than men. As in the other countries surveyed, pensioners bestow much less importance to the beach than working, unemployed or student respondents. Finally, much heterogeneity of preferences is observed among respondents in the case of the architectural heritage attribute.

Hypothesis IIA was tested in the estimated logit conditional model (column (1)) using data from surveys in the United Kingdom, with the help of the Hausman and Mc Fadden test (Annexe 2). The choices of site A, site B and *status quo* were successively removed from the sample. The test results presented in Table 9 indicate that hypothesis IIA is met. These estimates are therefore consistent.

A random parameters logit model was also estimated, the estimated means of the attributes' parameters are all very significant and positive (except for the distance attribute, the mean of which is also very significant, but negative, which is expected for this type of parameter). The relative importance of each attribute in the utility of respondents remains the same as with the conditional logit model, expect for the fishing boats attribute which becomes more important than the architectural heritage attribute in the selections of site visits. The estimated standard deviations of the random parameters of the site-specific attributes are not all significant, however the test result of the log-likelihoods ratio presented at the bottom of columns (3) and (4) means that we can reject

the null hypothesis of all estimated standard deviations of random parameters. They are significant for the attributes of fishing boats, direct sales and beach. Preferences are only heterogeneous for these site-specific attributes among individuals surveyed in the United Kingdom. Preferences are homogeneous among respondents for the rest of the attributes. Individual characteristics were also cross-examined with the sites' characteristics as is the case in the conditional logit model. We observe the same effects of individual characteristics on the importance given to the attributes. For the standard deviations of random parameters, only that of the fishing boats attribute is significant. In the remainder of this work, the results of random parameters models estimations are used to estimate the willingness to pay of individuals surveyed in the United Kingdom for site-specific attributes.

Table 8: Model estimates for the United Kingdom

	Conditional logit		**Random parameters logit**	
	(1)	**(2)**	**(3)**	**(4)**
Mean of random parameters				
Constant specific to the *status quo* alternative	-2.020***	-2.014***	-2.080***	-1.948***
	(0.118)	(0.131)	(0.189)	(0.169)
Fishing boats	0.664***	0.794***	0.778***	0.779***
	(0.049)	(0.060)	(0.090)	(0.089)
Coastal walks	0.912***	0.693***	0.924***	0.784***
	(0.063)	(0.118)	(0.104)	(0.140)
Direct sales	0.487***	0.527***	0.443***	0.527***
	(0.061)	(0.068)	(0.123)	(0.102)
Beach	1.090***	1.400***	1.064***	1.388***
	(0.601)	(0.086)	(0.113)	(0.121)
Marina	0.424***	0.390***	0.479***	0.405***
	(0.051)	(0.058)	(0.088)	(0.096)
Architectural heritage	0.582***	1.124***	0.649***	1.156***
	(0.055)	(0.140)	(0.094)	(0.155)
Distance	-0.029***	-0.031***	-0.032***	-0.031***
	(0.001)	(0.002)	(0.002)	(0.002)
Coastal walks X Women		0.104**		0.097*
		(0.049		(0.051)
Architectural heritage X No. of children<18years		-0.095**		-0.082**
		(0.037)		(0.039)
Architectural heritage X No connection with fishing		-0.265**		-0.084**
		(0.128)		(0.039)
Architectural heritage X Working		-0.327***		-0.323***
		(0.120)		(0.120)
Architectural heritage X Unemployed		-0.557***		-0.554***
		(0.181)		(0.182)
Beach X Retired		-0.502***		-0.497***
		(0.149)		(0.149)

Table 8 (continuation): Model estimates for the United Kingdom

Standard deviation of random parameters				
Fishing boats			0.231***	0.279***
			(0.081)	(0.094)
Coastal walks			0.046	-0.102
			(0.138)	(0.116)
Direct sales			0.240**	0.177
			(0.094)	(0.126)
Beach			0.264**	-0.023
			(0.108)	(0.148)
Marina			0.112	0.169
			(0.113)	(0.117)
Architectural heritage			0.090	-0.013
			(0.119)	(0.112)
Number of observations	10 836	8 652	10 836	8 652
(No. of ind. X 3 options X 8 choice sets)				
Log-likelihood	-2 506.70	-1 948.13	-2 491.65	-1 941.74
LR	2 922.97 (0.00)	2 440.53 (0.00)	30.10 (0.00)	12.79 (0.05)
Pseudo R^2	0.368	0.385		

***, **, * designate variables significant to the levels of 1 %, 5 % and 10 % respectively. The estimated standard deviations appear in brackets.

What should be remembered

In view of our econometric results, the 7 attributes selected to describe a coastal site are relevant determinants of seaside site visit choices for the respondents in each country. Each of the characteristics used to describe the sites contributes positively to the satisfaction of the individuals surveyed, except for the distance attribute. Indeed, the individuals surveyed prefer to travel a short distance to get to a site on the coast. The contribution of each of the sites' characteristics to the satisfaction of the individuals varies. Thus, individuals give bestow more importance to the presence of a beach, and less to that of a marina or the ability to buy products of local fishing directly from fishermen.

4. ESTIMATION OF THE WILLINGNESSES TO PAY

From the estimates of the attributes' parameters, including that of distance, it is possible to assign a value to each of the characteristics of a coastal recreational site by calculating the willingness to pay per respondent, for the presence of each attribute present on a site. Differences in valuation depending on individual characteristics of respondents, or between countries, are highlighted and quantified

4. 1. What are the willingnesses to pay for the attributes of coastal sites?

The estimation of the parameters specific to site attributes can be interpreted as the marginal utility of the attribute, except that which is associated to the distance attribute, which is rather interpreted as the marginal disutility of the distance. The distance is used as a proxy variable for the cost, which is subsequently converted into a monetary value. To this end, several possibilities are mentioned in the literature. Only the cost of fuel without including the cost of vehicle wear was selected, thereby assuming that individuals only gave importance to the cost of fuel when choosing to visit a site or another, especially when distances are relatively short, as is the case in the proposed choice sets. The estimated coefficient corresponding to the distance attribute was converted into a coefficient associated with a cost as in Hanley *et al*. (2002) and Timmins and Murdoch (2007). For this purpose, a fuel cost of 0.10325 euros per kilometre was used. This coefficient was then multiplied by two so as to account for the return trip. This value is close to that used by Rulleau *et al*. (2011). From the conversion of the distance attribute's parameter, the marginal disutility of the payment was obtained. The survey by choice experiments allows to observe the choices of individuals through the

changes in attribute levels, the levels here being the presence or absence of the attribute on the coastal site. It is then possible to derive the willingness to pay (WTP) for each attribute from the models' estimates, such as the negative ratio of the attribute's estimated coefficient over the estimated parameter of the distance attribute converted into monetary value.

Table 10 presents the estimated average WTP for each attribute and for each country of the surveyed area average WTP. The values in brackets are the limits of the confidence intervals when the logit random parameters model estimates were used. They were calculated using the Delta method. Thus, for each attribute, these values indicate that WTP for the attribute may vary between the lower and upper limits depending on the individuals interviewed. WTP are all positive and significant to the levels of 1 % and 5 %. Each WTP is interpreted as the implicit price that the respondent grants to the presence of a specific attribute on a site. It is the price he is willing to pay to enjoy this attribute when he goes to the seaside.

Table 10: Estimates of the willingness to pay for the presence of the attributes on a coastal site according to the sample of each country.

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	Willingness to pay (EUR per visit and per individual)			
Attribute	**France**	**Belgium**	**Netherlands**	**United Kingdom**
Fishing boats	4.93***	3.81***	7.55**	4.99***
	[3.73 ; 6.13]	[3.43 ; 4.18]		[3.51 ; 6.47]
Coastal walks	4.87***	8.15***	7.17**	5.93***
	[3.51 ; 6.23]	[7.25 ; 9.05]		[5.63 ; 6.22]
Direct sales	3.79***	1.81***	2.91**	2.84***
	[0.61 ; 6.98]	[-0.35 ; 3.97]		[1.30 ; 4.39]
Beach	8.30***	11.14***	6.95***	6.83***
	[6.70 ; 9.91]	[10.28 ; 11.99]		[5.14 ; 8.53]
Marina	3.27***	2.28***	2.87***	3.07***
	[2.85 ; 3.69]	[-0.19 ; 4.76]		[2.35 ; 3.79]
Heritage	5.84***	6.17***	3.59***	4.17***
	[3.95 ; 7.73]	[4.07 ; 8.27]		[3.59 ; 4.74]

***, **: Significance to the levels of 1 % and 5 %.

The difference between the most valued attributes (maximum WTP) and the less valued (minimum WTP) is roughly the same in each country (between 4 euros and 5 euros), except in Belgium, where a much greater difference is observed between these implicit prices (a difference of about 9 euros). A very small difference is observed between countries with regards to the WTP for the presence of a marina (less than 1 euro), it is also one of the least valued attributes by respondents from each country, where the implicit price is half, or even a quarter, of the most valued attribute, depending on the country. More differences between countries are observed for the implicit prices of the presence of direct sales and architectural heritage (around 2 euros). Furthermore, the largest differences between countries concern the WTP for the presence of fishing boats, coastal walks, or a beach (about 4 euros).

Intuitively, it is expected that the WTP for the presence of a beach or coastal walks on a site be the highest. Indeed, the beach or walks are among the main activities mentioned by respondents when they go to the seaside, whatever the country. As expected, priority on a site is given to the presence of a beach, except in the Netherlands where it is the presence of fishing boats that has priority, with the implicit price for this attribute being the highest, closely followed by those for the presence of coastal walks, then of the beach. We also note that respondents surveyed in the Netherlands value the presence of fishing boats on a seaside site much more than the other three countries. However, it should be noted that 90 % of the population surveyed in the Netherlands originates from the seaside, and that nearly 50 % have mentioned having some connection with fishing. This is not surprising since the survey area was essentially a major commercial port of Zeeland. These results are therefore not representative of the population of the Netherlands

The WTP values in France and in the United Kingdom are fairly close, notably for the attribute of fishing boats. It is the third most valued attribute, with an implicit price that is not very far from that of the presence of heritage (2nd most valued attribute in France) or coastal walks (2nd most valued attribute in the United Kingdom; it also is the 2nd in Belgium and the Netherlands). It is in Belgium that individuals are the least willing to pay for the presence of fishing boats. The fishing fleet there is smaller than it is in France or the United Kingdom; it also is certainly less visible, which could explain this result. The estimation of random parameters models shows that there is some unobserved heterogeneity of preferences between individuals. We note in particular that the implicit price for the fishing boats attribute can be even higher for some individuals surveyed (over 20 % in France and 30 % in the United Kingdom). For France, the United Kingdom and the Netherlands, the presence of fishing boats is therefore one of the attributes that strongly influences the choice of visits of respondents, even if it is a priority in the Netherlands only.

WTP to attend the direct sale of fish by local fishermen is higher for the French respondents; it is even more than double that of Belgian respondents. This result is certainly due to the fact that there is, in parts of the English Channel in France, a strong tradition of selling direct to consumers directly on the quay or in the stalls, especially in Upper Normandy in the North. Based on the confidence interval, we see that for some individuals surveyed in France, this implicit price can be close to that of the presence of beaches, coastal walks or fishing boats, but it can also be almost zero for part of the survey population.

The WTP to attend the direct sale of fishery products by local fishermen is greater for French respondents; it is even more than double that of Belgian respondents. This result is certainly due to the fact that there is a strong tradition of direct sales to consumers directly on the quay or on stalls in certain parts of the Manche department in France, especially in Upper Normandy (department of Haute-Normandie) and in the department of Nord. On the basis of the confidence interval, we note that for certain individuals surveyed in France, this implicit price can be close to that of the presence of a beach, coastal walks, or fishing boats, but it can also be almost zero for part of the surveyed population.

Figure 4 presents the three highest average willingnesses to pay by country.

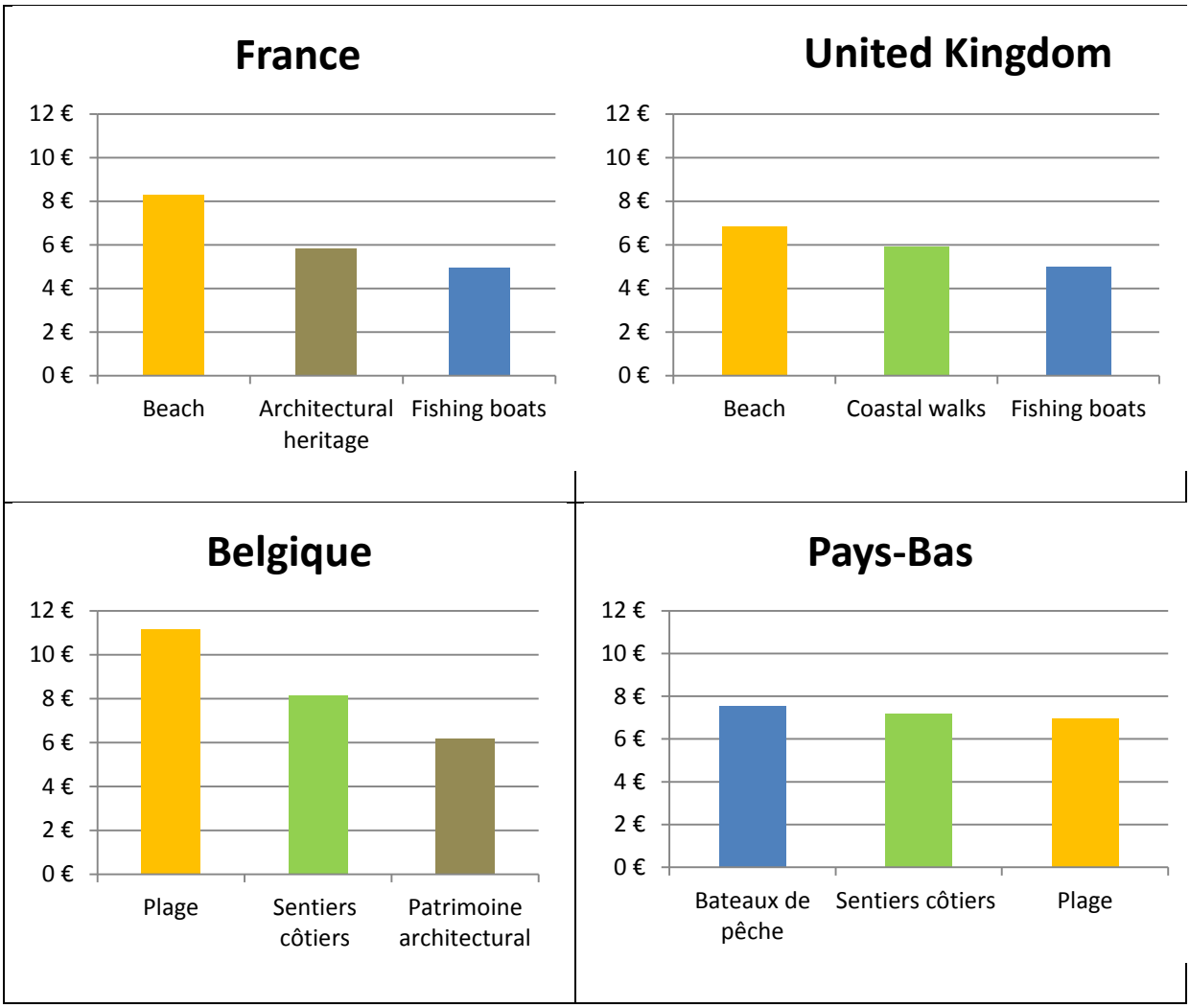

Figure 4: The 3 most valued attributes per countries

The use of distance as variable proxy for cost also allows makes it possible to interpret WTP differently for each attribute such as the maximum distance an individual is willing to travel to enjoy this characteristic by visiting a site (Rulleau *et al*., 2011). As mentioned by Rulleau *et al*. (2011), this information can be very useful for site managers and State decision makers. Table 11 presents the WTP in kilometres to get to a site. Thus, individuals surveyed in France are willing to travel 40 km to go to the beach, close to 24 km to see fishing boats on a coastal site, but only 15 km to enjoy a marina.

Table 11: Estimates of average willingnesses to pay in kilometres on the sample of countries surveyed

	Willingness to pay (km one way per visit and per individual)			
Attribute	**France**	**Belgium**	**Netherlands**	**United Kingdom**
Fishing boats	23.86	24.16	18.43	36.57
Coastal walks	23.56	28.71	39.49	34.71
Direct sales	18.37	13.77	8.78	14.09
Beach	40.20	33.08	53.93	33.67
Marina	15.82	14.87	11.05	13.90
Heritage	28.30	20.17	29.87	17.38

What should be remembered

Priority is given to the beach attribute for the majority of surveyed individuals. The fishing boats attribute is the 3rd most valued attribute, after the attribute of architectural heritage in France and after the attribute of coastal walks in the United Kingdom. It is therefore a factor of attractiveness on coastal sites. On the contrary, the ability to buy fishery products directly from local fishermen is much less so. However, it is most valued by respondents in France.

4.2. What differences in the valuation of attributes among respondents?

From the estimation results of random parameters models (except for the Netherlands) introducing certain individual characteristics cross-examined with the attributes, we calculated the WTP for the presence of each attribute according to these individual characteristics. Table 12 presents the average WTP (without providing the confidence intervals). Looking more specifically at the attributes of interest, we note that the WTP for the presence of fishing boats decreases when individuals have no connection with the fishing sector, by 30 % for French respondents, 50 % for those surveyed in the United Kingdom, and 80 % in the Netherlands, for whom this is an otherwise highly valued site characteristic. Note still that nearly 60 % of the surveyed population in France, 50 % in the Netherlands and 90 % in the United Kingdom, state not having any connection with fishing.

Having no connection with the fishing sector also reduces the implicit price of the direct sale of freshly landed produce by local fishermen. It decreases by nearly 30 % in France and 40 % in Belgium. It can be noted however that when Belgian respondents have a connection with fishing (only 10 % of the surveyed population), WTP for direct sales is relatively high. It is even more so (by more than 50 %) if the respondents are pensioners.

Finally, the pensioners surveyed display a much lower WTP for the presence of a beach than other individuals; this is true for each country. It even becomes negative in the Netherlands. It is the opposite for the surveyed students who give more priority to the beach, notably in France and Belgium. This is also the case for women in France.

Whatever the country that was surveyed, pensioners value the beach much less than other individuals, while students give it the greatest value, notably in France and Belgium. Where the marina is concerned, and only for France, we observe a significant (but relatively small) difference, working individuals valuing this attribute more than the others and women less than men. Finally, heterogeneity of preferences is observed in the UK mainly for the architectural heritage attribute.

Table 12: Estimates of willingnesses to pay per surveyed country for the presence of each attribute on a coastal site depending on the individuals surveyed

	Willingness to pay (EUR per visit and per individual)			
	France	**Belgium**	**Netherlands**	**United Kingdom**
WTP Fishing boats	8.13	6.23	9.96	5.19
No connection with fishing	5.67	3.16	1.88	
1 child less than 18 years old	7.52			
Unemployed			20.79	
Woman	7.29			
WTP Coastal walks	4.60	7.79	6.67	5.22
1 child less than 18 years old			9.99	
Unemployed	2.04			
Working	5.52			
Woman				5.86
WTP Direct sales	4.76	8.79	3.70	3.51
No connection with fishing	3.49	5.03		
Unemployed	1.90			
Pensioner		12.62		
Woman		5.73		
WTP Beach	7.65	8.72	13.12	9.25
1 child less than 18 years old		10.98		
Unemployed			1.60	
Pensioner	4.12	4.08	-0.38	5.98
Student	11.12	12.66		
Woman	8.50			
WTP Marina	3.89	3.67	3.05	2.70
Working	4.96			
Woman	3.13			
WTP Architectural heritage	5.24	10.15	-0.19	7.70
No connection with fishing	6.45		4.93	5.90
1 child less than 18 years old				7.14
Unemployed				4.01
Working				5.55
Student			8.63	
Woman		7.74		

What should be remembered

Heterogeneity of preferences for the attributes was observed between respondents. Thus, when people have no connection with fishing, they don't value the presence of fishing boats, or even direct sales, as much. Pensioners and students, but also men and women, differently value the various site attributes, certainly due to the practiced activities.

CONCLUSION AND DISCUSSION

This report presents the results of a study on seaside recreational demand using a methodology of choice experimentation. The objective of this work is to show that fishing activities have a significant role in the provision of non-market services, as amenities for visitors. We hypothesise that individual choices to visit a recreational site are functions of the site's attributes. A wide scale survey was conducted in the neighbouring departments of Manche in France, in Belgium, in the Netherlands, and in the United Kingdom. Several choice sets of sites on the coast were presented to respondents, each choice set consisted of three options, including a *status quo* option. The other two options were fictitious sites characterised by the presence or absence of site-specific attributes. For each choice set that was presented, the respondent had to choose one option ("go to site A", "go to site B", "choose none of the proposed sites" option called *status quo*). Among the seven attributes (including the distance to get to a site) defined to characterise a site, we were more particularly interested in two attributes, namely the presence of fishing boats, and the ability to buy produce landed by local fishermen. An efficient design was used for the construction of the choice sets. Throughout the surveyed area, a little over 2 000 complete and usable questionnaires were collected.

For the discrete choice econometric model, a conditional logit model was selected for each country. However, hypothesis IIA being violated for the conditional logit model applied to survey data from France and Belgium, we then considered a random parameters logit model which does not require that this hypothesis be proven. The advantage of the random parameters logit model is to be able to take into account the unobserved heterogeneity of preference for site-specific attributes between the surveyed individuals. Hypothesis IIA was proven for the model estimated from United Kingdom survey data. However, a random parameters logit model was also estimated, the results of which were also significant. For the Netherlands survey data, the choice of the random parameters logit model does not seem to be justified after analysing the estimations' results, indicating that the zero hypothesis for all standard deviations of random parameters could be accepted. On the basis of the estimations of these models' parameters, the willingnesses to pay were calculated for the site characteristics and for each country of the survey area.

The WTP for an attribute is interpreted as the implicit price per individual to enjoy the presence of the attribute on a coastal site. What should be remembered is that all WTP are positive. All selected attributes are therefore relevant to describe coastal sites. Each attribute present on a seaside site therefore contributes to the satisfaction of the respondent, but the preferred attribute for the individuals surveyed is the beach, except for the surveyed population in the Netherlands, however unrepresentative of the total population of the Netherlands, where individuals will instead favour the presence of fishing boats. For the individuals of the other surveyed countries, the presence of fishing boats is the third most valued attribute, with an implicit price equivalent to that of architectural heritage in France and that of the presence of coastal walks in the United Kingdom. WTP for the ability to buy fishery products directly from local fishermen is relatively higher in France than in the other countries. Surveyed individuals therefore like to see fishing boats when they walk along the coast and also attend direct sale (independently from purchasing). In France, fish freshly landed by local fishermen and sold directly to consumers on the harbour, on stalls, or in small markets is an attraction for visitors. However, WTP for these two attributes of interest decreases, but is still positive, when interviewed individuals have no connection with the fishing sector, whether in a family, recreational or professional context, especially in Belgium and the Netherlands, but this does not change anything for the respondents from the United Kingdom. These two characteristics of coastal sites are positive externalities generated by inshore fishing.

We sought to determine whether fishing was a factor of attractiveness for tourism on the coast. Given these results, this seems to be, as is the case for other attributes such as the beach. The results of our work therefore suggest that public support to fishing is legitimate in return for the amenities that attract visitors. The general problem of multifunctionality is to know whether aid should be coupled or targeted. This question depends on the degree of juncture between basic commodities (or production factors) and amenities. In fishing, as in agriculture, the juncture is stronger or weaker depending on the type of trade and activity. The strongest junctures are observed in the case of artisanal and inshore fishing (small-scale fishing) and that of direct sales. Coupled aid could therefore be considered, such as aid by boat or by fisherman, but only for these activities. The problem is that this type of coupled aid is also known to encourage overfishing, due to the decrease in cost of fishing effort. It is therefore necessary to ensure that fisheries resources are managed sustainably, that is to say, through quotas or other forms of property rights. In this respect, the French Great Atlantic scallop fisheries provide a canonical example, as they are both providers of amenities and relatively well managed in terms of the resource (FIFAS *et al*., 2003).

LIST OF ACRONYMS

ASC : **Alternative specific constant**

GIFS : **Geography of inshore fishing and sustainability**

IIA : **Independence from irrelevant alternatives**

RPL : **Random parameters logit**

RUM : **Random utility model**

WTP : **Willingness to pay**

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GIFS – *Geography of Inshore Fishing and Sustainability*

Survey on the nonmarket value of inshore fishing

Version 1

Interviewer code: ……..

Place of survey:……..

Date :…./…./…..

Explanation of the survey:

As part of a European research program, the project GIFS (Geography and sustainability of coastal fisheries) focuses on the coastline and in particular to the presence of coastal fisheries in terms of economic, social and cultural impacts.

To meet the objectives of this project, we need to conduct surveys of tourists and residents along the coast of the English Channel.

AGROCAMPUS WEST school agronomist and French partner GIFS project, thank you for the time allowed to complete this survey.

A. LOCATION

City / town of residence during the year.....

Postal Code: .....

Country: .....

Place of residence during the trip: .....

B. WHERE DO YOU PREFER GOING OUT TO A WALK?

In this part of the questionnaire we will have different scenarios with attributes (attributes have been studied and selected by the team). It offers a whole range of walks to do in one day. Each set of choices, consists of three options (visit the Site, go to site B, or being interested in any of the proposed sites) corresponding to different site characteristics (all or part). For each set of choices, you are asked which option you prefer, visit the Site A, the Site B or neither proposed sites.

B1	Site A	Site B	Neither
Choice	☐	☐	☐
Presence of fishing boats	✓		
Presence of coastal walks			
Direct sale of fishery products	✓	✓	
Distance to go to visit the site	50 miles	25 miles	
Presence of a beach	✓		
Presence of a marina		✓	
Architectural history (ramparts, submarine base, old houses, etc.).	✓	✓	

B2	Site A	Site B	Neither
Choice	☐	☐	☐
Presence of fishing boats		✓	
Presence of coastal walks	✓	✓	
Direct sale of fishery products	✓		
Distance to go to visit the site	25 miles	50 miles	
Presence of a beach		✓	
Presence of a marina	✓	✓	
Architectural history (ramparts, submarine base, old houses, etc.).		✓	

B3	Site A	Site B	Neither
Choice	☐	☐	☐
Presence of fishing boats	✓	✓	
Presence of coastal walks	✓	✓	
Direct sale of fishery products			
Distance to go to visit the site	38 miles	13 miles	
Presence of a beach		✓	
Presence of a marina			
Architectural history (ramparts, submarine base, old houses, etc.).	✓		

B4	Site A	Site B	Neither
Choice	☐	☐	☐
Presence of fishing boats			
Presence of coastal walks			
Direct sale of fishery products	✓		
Distance to go to visit the site	13 miles	38 miles	
Presence of a beach		✓	
Presence of a marina		✓	
Architectural history (ramparts, submarine base, old houses, etc.).			

B5	Site A	Site B	Neither
Choice	☐	☐	☐
Presence of fishing boats	✓		
Presence of coastal walks	✓		
Direct sale of fishery products		✓	
Distance to go to visit the site	25 miles	13 miles	
Presence of a beach		✓	
Presence of a marina	✓		
Architectural history (ramparts, submarine base, old houses, etc.).	✓		

B6	Site A	Site B	Neither
Choice	☐	☐	☐
Presence of fishing boats		✓	
Presence of coastal walks		✓	
Direct sale of fishery products	✓		
Distance to go to visit the site	38 miles	25 miles	
Presence of a beach	✓	✓	
Presence of a marina			
Architectural history (ramparts, submarine base, old houses, etc.).			

B7	Site A	Site B	Neither
Choice	☐	☐	☐
Presence of fishing boats	✓		
Presence of coastal walks		✓	
Direct sale of fishery products		✓	
Distance to go to visit the site	13 miles	50 miles	
Presence of a beach	✓		
Presence of a marina	✓		
Architectural history (ramparts, submarine base, old houses, etc.).		✓	

B8	Site A	Site B	Neither
Choice	☐	☐	☐
Presence of fishing boats		✓	
Presence of coastal walks	✓		
Direct sale of fishery products		✓	
Distance to go to visit the site	50 miles	13 miles	
Presence of a beach	✓		
Presence of a marina	✓		
Architectural history (ramparts, submarine base, old houses, etc.).	✓	✓	

C. GENERAL INFORMATION

C1. Regarding the previous question, can you order the 7 proposed criteria according to the importance you have given them? (1 (most important) to 7 (least important)).

	Presence of fishing boats
	Presence of coastal walks
	Direct sale of fishery products
	Presence of a beach
	Presence of a marina
	Architectural history (ramparts, submarine base, old houses, etc.).
	Distance to go to visit the site

C2. Are you born or your family is originally from the coast?

	YES		NO

C3. Do you own a second home on the coast?

	YES		NO

If yes, where (city and postal code) ?.....

C4. Do you have friends or family who live on the coast?

	YES		NO

C5. Apart from your vacation, how often do you come on the coast (a response by category)?

IN SUMMER	
1	Everyday
2	Several times a week
3	Several times a month
4	Less than once a month
5	Never

REST OF THE YEAR	
1	Everyday
2	Several times a week
3	Several times a month
4	Less than once a month
5	Never

C6. What are your main activities on the coast?

1		Beach
2		Water sports (kayaking, surfing, windsurfing)
3		Swimming
4		Recreational fishing
5		Walk
6		Cultural Tours
7		Discovering nature
8		Yachting
9		Other

C7. What is your relationship with the world of fishing?

1		I am a professional fisherman
2		I am an amateur fisherman at sea
3		I am an amateur fisherman in river
4		I am in touch with the world of fishing in my work
5		Members of my family or friends working in this sector
6		I have no link with the world of fishing
7		Other

C8. For you, what is inshore fishing?

1		This is an important activity for the regional economy.
2		This activity pollutes.
3		It is an activity that interferes with tourism.
4		It contributes to the attractiveness of the area (for tourism).
5		This is an activity that has a negative impact on natural resources and ecosystems.
6		It is part of the heritage.

D. SOCIO-ECONOMIC

D1. Gender

1		Man
2		Woman

D2. Age

1		20-29 years old
2		30-39 years old
3		40-49 years old
4		50-59 years old
5		60-69 years old
6		+ 70 years old

D3. Number of persons in the household: ..... children under 18 years old: .....

D4. What is your level of studies?

1		No diploma
2		City and Guilds Certificate in vocational training or Technical School Certificate
3		A LEVELS (or equivalent) or BTEC National Diploma
4		Degree or Postgraduate qualification

D5. What is your socio-professional category?

1		Employment
2		Unemployed
3		Retired
4		Student
5		Other

D6. What is the net monthly category of your household?

1		<£1200
2		£1200-£2500
3		£2500-£4200
4		> £4200

APPENDIX 2: RESULTS OF THE HAUSMAN-MC FADDEN TEST FOR HYPOTHESIS IIA

Sample	Statistic	p-value
	France	
Without Site A Option	61.34	0.000
Without Site B Option	46.41	0.000
Without *Status Quo* Option	95.72	0.000
	Belgium	
Without Site A Option	44.86	0.000
Without Site B Option	23.93	0.000
Without *Status Quo* Option	36.40	0.000
	Netherlands	
Without Site A Option	17.35	0.027
Without Site B Option	7.23	0.405
Without *Status Quo* Option	9.67	0.289
	United Kingdom	
Without Site A Option	8.65	0.373
Without Site B Option	4.95	0.666
Without *Status Quo* Option	19.49	0.012

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This report presents the results of the study on a Non-Market Values of Inshore Fishing in France, the Netherlands, Belgium and the United– Kingdom. The aim is to measure the non-market values of inshore fishing for tourism as these benefits are not usually taken into consideration despite the fact that they can often be much higher than direct benefits. A survey has asked individuals about their hypothetical choices which measures the attractiveness of a fishing place for tourism.

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