First results from a pilot survey of recreational fishing in France

ICES Annual Science Conference - 22-26 September 2008
Theme K: Small scale and recreational fisheries surveys, assessment, and management

Herfaut Johanna - Ifremer, Pointe fort, 97231 Le Robert, Martinique, France
[tel: +33 5 96 65 11 54 , fax: +33 5 96 65 11 56, e-mail: johanna.herfaut@ifremer.fr]

Levrel Harold - Ifremer, Technopole Brest-Iroise, BP 70, 29280 Plouzané, France
[tel: +33 2 29 00 85 27, fax: +33 2 98 22 47 76, e-mail: Harold.Levrel@ifremer.fr]

Thébaud Olivier - Ifremer, Technopole Brest-Iroise, BP 70, 29280 Plouzané, France
[tel: +33 2 98 22 49 60, fax: +33 2 98 22 47 76, e-mail: Olivier.Thebaud@ifremer.fr]

Tranger Hervé - BVA,   av Marcel Dassault, 31500 Toulouse, France
[tel: +33   , fax: +33   ,e-mail: herve.tranger@bva.fr]

Berthou Patrick - Ifremer, Technopole Brest-Iroise, BP 70, 29280 Plouzané, France
[tel: +33 2 98 22 43 79, fax: +33 2 29 00 85 47, e-mail: Patrick.Berthou@ifremer.fr]

Dintheer Christian - Ifremer, rue de l'île d'Yeu, BP 21105, 44311 Nantes Cedex 03, France
[tel: +33 2 40 37 42 39, fax: +33 2 40 37 42 13, e-mail: Christian.Dintheer@ifremer.fr]

Guyader Olivier - Ifermer, imm Fourmi, zac Houelbourg Voie Verte, 97122 Baie Mahault, Guadeloupe
[tel: +33 5 90 98 11 37, fax: +33 5 96 65 11 56, e-mail: Olivier.Guyader@ifremer.fr]

Morizur Yvon - Ifremer, Technopole Brest-Iroise, BP 70, 29280 Plouzané, France
[tel: +33 2 98 22 44 81, fax: +33 2 29 00 85 47, e-mail: Yvon.Morizur@ifremer.fr]

Abstract:

Between 2006 and 2008, Ifremer, in collaboration with the polling institute BVA, implemented a pilot survey of French recreational fisheries. The aim of the survey was to assess the overall population involved in this activity, taking into account the diversity of recreational fishing practices, from fish and shellfish gathering on the seashore to angling and spearfishing. The study was designed to provide first estimates of (i) fishing effort; (ii) catches and landings; and (iii) economic impacts of recreational fishing.
The protocol implemented was two-step. First, a telephone survey of French households, based on a sampling frame of the entire French population of people aged 15+, was carried out to assess the population of fishers and give a first general view of the diversity of fishing practices, Information was also collected regarding catches and landings and expenditure at various temporal scales (annual, previous three months, last fishing trip). Second, on-site surveys were carried out to establish more precise measures of catches and expenditure per fishing trip. Sampling schemes for both phases of the survey work were designed such that data collected from telephone and on-site surveys could be confronted and used jointly in the estimation of catches and expenditure by fishers at the national level.
The paper presents the methodology developed and first results obtained based on the telephone survey.

Keywords: recreational fishing, survey methodology, catch and effort assessment, economic impact

Introduction

A growing number of studies have stressed the importance of recreational fisheries, both in terms of their potential impacts on fish populations, and regarding their economic impacts (see e.g. Osborn et al., 1996; Henry et al., 2003; Coleman *et al.*, 2004; Anonym, 2004, 2005; National Research Council, 2006; Pawson et al., 2007). In France, several surveys of recreational fishing have been carried out in the past, which showed that the activity was significantly developed along French coasts (e.g. Dintheer et al., 2007; Maggi *et al*, 1998; Peronnet *et al.*, 2003; Dubreuil, 2005; Anomyne, 2007; Laspougeas, 2007; Véron and Appéré, 2004). In particular, a recent survey of the French recreational fishery for common bass showed that recreational fishing occupied a large proportion of the French population, and that recreational catches of seabass were probably of the same order of magnitude as catches by commercial fishers (Morizur and Fritsch, 2005; Morizur, 2004 ; Drouot *et al.*, 2003). However, these surveys all focused on a species, a region or a fishing mode, hence their results could not be extrapolated to the entire French population. Given that recreational fishing in the marine environment is totally free and open access in France, with no licence or permit system in place, the total number of recreational fishers has never been precisely known.

In 2001, the European Commission adopted Regulation N°1639/2001 which obligates Member States to produce annual statistics regarding their fisheries sector. This originally concerned mainly commercial fisheries (Anonym, 2004), but according to Appendix XI of the Regulation, recreational fishing must also be assessed for a selection of commercially important species (Mediterranean bluefin tuna, Atlantic salmon, North Sea cod). Given this requirement, and the absence of an overall view of the recreational fisheries sector in France, the French Directorate for Marine Fisheries and Aquaculture and Ifremer designed a study aimed at producing a first snapshot of recreational fisheries at the national level. Built as part of the Fisheries Information System operated by Ifremer, the study consisted in two combined surveys: an off-site telephone survey of fishers and an on-site survey of recreational fishing trips at fishing access sites.

The objective of the study was to appraise the overall population involved in recreational and produce a typology of fisher profiles, as well as provide a first assessment of effort, catches and landings, and economic impacts of recreational fishing on the national economy. Information was also sought concerning perceptions of recreational fishers as regards trends in their activity, and attitudes towards regulations. A specificity of this study is that all fishing modes were considered, including anglers (both from the shore and from boats), fish and shellfish gathering on the seashore and spear fishing. The study was carried out by Ifremer, in collaboration with the polling institute BVA. However, its conduct was placed under the auspices of a steering committee, coordinated by the Directorate for Marine Fisheries and Aquaculture, which associated the main stakeholders concerned by recreational fisheries in France, including the two major recreational fishing federations, as well as the national committee for commercial fisheries.

This objective of this paper is to present the protocol adopted for this pilot study and the first results obtained via the telephone survey. The paper is structured as follows: section 1 presents the overall methodology and section 2 presents the first results obtained concerning recreational fishing in France.

1   Methodology

Data collection was carried out over a two-year period, and was divided into two parts. The first part was a survey by telephone, which aimed at producing a first estimate of the population of recreational fishers at the national level, along with a typology of fishers and fisher activity. This served as a basis for establishing the sampling plan of the second phase, which consisted in on-site surveys aimed at obtaining measures of trip-level data on catch and expenditure.

The study considered French residents aged 15+, since this is the population for which soci-demographic indicators were available to assess representativeness of the samples. A specificity of the study is that all modes of recreational fishing at sea were considered. The sampling plan and questionnaire were validated by the steering committee. Participation of recreational fishing federations proved very helpful, as it allowed to obtain information regarding fishing practices and

fishing sites which greatly facilitated the design of survey instruments. The surveys were carried out in collaboration by the polling institute BVA and Ifremer, along with two local organisations based on the Mediterranean and on the Atlantic coast. This collaborative format was made possible by the design of standardized survey instruments which could be administered by different groups but dealt with centrally in terms of data validation and analyses.

1.1   Survey protocol

First stage: telephone survey of recreational fishers

The fishers were interviewed via telephone using a questionnaire built specifically for the study. The aim of the survey was to contact a representative sample of French households all along the year, in every region of France, and interview recreational fishers aged 15+ when these were encountered in households. The interviews were carried out with the computer-assisted telephone interviewing system (CATI) used by BA.

The questionnaire contained five different sections, with 100 hundred questions in total:
- Parts A deals concerns fishing activity over the previous three months;
- Part B concerns the last fishing trip;
- Part C concerns fishing activity during the previous year (2005);
- Part D concerns the costs of owning and using a boat for the fishers who possess a boat;
- Part E concerns perceptions by fishers of recreational fisheries and their attitude with respect to regulations.

The survey was spread out over five waves of interviews in France mainland. Each wave referred to a period of 2006. This permitted coverage of the whole of year 2006 (Table 1). When there were several recreational fishers, only one was randomly selected to be interviewed. The interviewees were questioned about their fishing activity during the reference period, as well as in the previous year.

Table 1: Repartition of the five waves of the telephone survey in France (Metropolitan area)

	Survey date	Number of households interviewed	Period of reference
	Test stage		
Wave 1	April 2006	2 061	January, February and Marsh 2006
	Study stage		
Wave 2	June 2006	3 003	April and May 2006
Wave 3	September 2006	5 012	June, July and August 2006
Wave 4	November 2006	3 003	September and October 2006
Wave 5	January 2007	2 006	November and December 2006
Total		15 085	1 year = 2006

The sampling plan was constructed taking consideration of the dwelling location and socio-demographic criteria of the households. The coastal zones were over-sampled based on knowledge derived from previous studies, which showed a greater proportion of recreational fishers in coastal populations, with higher levels of fishing effort and catch levels than for fishers coming from inland regions. This allowed to improve the cost-effectiveness of the survey, while keeping a good representativeness of the sample.

Second stage: on-site survey of fishing trips

The second stage survey consists in an intercept survey of recreational fishers at fishing access sites. The on-site survey is complementary with the telephone survey. With telephone survey methods we are able to estimate the proportion of the French population practising recreational fishing with accuracy. But estimates of catches and expenditure is more difficult via telephone surveys, while reliable and more detailed data concerning these can be obtained via intercept surveys (Drouot et al., 2003; Pollock, Jones and Brown, 1994).

A total of 1 500 interviews were carried out during a full year in order to cover all fishing seasons. 150 sites were chosen, corresponding to different fishing modes and different regions of metropolitan France. In each season, around 30-40 sites were visited by the pollsters. Interviews were carried out at fishing sites exclusively, during or at the end of fishing trips. Contrary to others studies, angling competitions were excluded, because they were not deemed representative of usual practices as regards recreational fishing.

The questionnaire of the on-site survey was based on the same structure as the one used in the telephone survey:
- The first section aims to detail the fishing trip of the day of the interview;
- The second section concerns the fishing activity during the previous year (2006 or 2007);
- The third section specifies the costs of owning and using a boat for the fishers who possess a boat;
- The last section concerns the characteristics of the fisher (age, sex, job, residence, etc.).

Species were identified but fish were neither weighed nor measured to minimise conflict and maximise cooperation with fishers who tend to associate length measurements with regulations and enforcement. The pollster had to estimate weigh and length of fish caught via his observation of the catch. A set of questions was repeated in both the on-site and telephone surveys, in order to allow for observations to be linked between the two surveys. These questions concerned mainly the annual activity profile of fishers.

A pilot survey was first carried out focusing on Cod fishing in the English Channel and North Sea. This survey was carried out in response to a specific request to assess the importance of recreational fishing of this species by the European Commission. The study provided a first experience with on-site survey management, which was used to establish the general survey protocol.

The sampling plan was developed based on the information collected via the telephone survey regarding location of the last fishing trip of interviewees. The statistical unit for the survey being the fishing trip, sampling was organised so as to represent the seasonal and regional distribution of fishing trips measured in stage one of the study. Three criteria were used as a basis for the plan: the façade (Atlantic coast, English Channel and Mediterranean Sea), the season and fishing modes (Table 2). A total of 44 strata were created. Winter and boat fishing were over-sampled, in this case to ensure that a sufficient number of observations would be collected for information to be derived on these relatively less frequent practices.

Table 2: Sampling plan of the on-site survey

	Summer 2007	Autumn 2007	Winter 2007-2008	Spring 2008	Total
English Channel					
Seafood harvest	40	50	40	20	150
Off shore by boat	50	40	40	50	180
On shore and on foot angling	50	30	70	40	190
Total English Channel	140	120	150	110	520
Atlantic					
Seafood harvest	70	30	40	40	180
Off shore by boat	80	40	70	30	220
On shore and on foot angling	60	30	60	30	180
Total Atlantic	210	100	170	100	580
Mediterranean Sea					
Seafood harvest	20	20	0	20	20
Off shore by boat	30	50	40	40	110
On shore and on foot angling	40	20	60	20	190
Spear fishing from shore	20		0		60
Spear fishing on boat	20		0		20
Total Mediterranean sea	130	90	100	80	400
Total number of interviews expected	480	310	420	290	1500

These on-site interviews were carried out by BVA. The sampling plan was defined in collaboration between BVA and Ifremer. A total of 1500 interviews were programmed between July 2007 and May 2008.

1.2 Assessment and estimation method concerning household's survey by telephone

At this stage, on-site survey has not been completed and analysis concerns only survey by telephone.

1.2.1 Data correction and adjustment

Database is compiled on Microsoft Access and most of calculi are made with SPSS.
Corrections were applied to the sample data in order to take into account voluntary bias in the sampling strategy as well as deviation observed between our sample and the whole population regarding socio-demographic characteristics.
The correction looks for initial distribution according to five variables:
- Sex by residence zone (coastal or inland),
- Age by residence zone (coastal or inland),
- Socio-professional group by residence zone (coastal or inland),
- Size of household (coastal of inland),
- INSEE region,
- Number of interviews carried out during each of the 5 waves.

An adjustment of the weight of individual responses was also made necessary to account for the varying number of fishermen in different households.
Application of corrected weights to the observations allowed to generalize the information regarding the sample to the entire French population aged 15+. The range of final weights applied to individual observations varied from 0.25 to 2.94.

1.2.2 Appraisal of the number of household and the number of fishers

To be able to estimate the number of households containing at least one recreational fisher, three steps were required: (1) summing the weights applied to individual observations in order to obtain the number of interviews carried out, (2) summing the weights of households with at least one recreational fisher to get the number of households containing fishers in our sample; (3) calculating the ratio between these two sums to get a penetration rate of recreational fishing in French households.

To be able to estimate the number of recreational fishers in France, four steps were required: (1) summing the weighted number of people over 15 by households in order to obtain the population over 15 taken into account by the sample, (2) summing the weighted numbers of recreational fishers over 15 by interviewed households to get the number of fishers over 15 taken into account by our sample, (3) calculating the ratio between these two amounts in order to get a penetration rate of recreational fishing in French population over 15 years old.
This rate, applied to the French population over 15, gives us an appraisal of the number of fishers in France.

1.2.3 Captures extrapolation calculating

Catch estimation were based on three specific questions:
1. What species did you catch during your last trip and what is the weight of these catches ?
2. What are the three main species that you catch in 2005 and what is the weight of them ?
3. How much fish, shellfish, crustaceans and cephalopods did you globally catch in 2005 ?

The most accurate estimation concerning catch is declaration regarding last trip because recreational fishers are able to remind information on it[1]. By crossing this information with number of trips along the year 2006, we get an estimation of the total catches for the main species.

---

[1] We have adopted the most commonly used confidence interval of 95 percent for our analysis.

One limit to this method is that data are not enough good to get precise estimation for most of species and hence to propose global approximation.

The solution adopted was to complete this with the results of the two last questions regarding the three target species and the total catches in 2005.

Because only three species are taken into account in the second question, it allows to provide a low appraisal of catches.

Because it is hard for recreational fishers to remind the total weight of their catches during 2005, we must take caution with the estimation provided by this question.

Nevertheless, by crossing all these sources of information, we can assume that we get a good approximation of the real catches.

1.2.4   Typology elaboration

The typology is obtained through a multivariate analysis. The predictor variables are "number of fishing trip by season", "fishing mode", "fishing zone" (English Channel, Atlantic or Mediterranean Sea), "area of main residence" (coastal or inland), "type of capture" (fishes, shellfishes, crustacean or cephalopods) and boat ownership.

1.2.5   Expenditures extrapolation

Economic analysis is based on :
- § Description of the last trip allowing to describe the time spent for practising recreational fishing, (preparation, transport, time spent to fishing) and the expenditure related to the trip (transport cost, food, fuel, housing…). These elements are named funtioning costs ;
- § Investment related to fishing equipments, clothing and depreciation of boats.

Extrapolation were carried out as follow :
- § Number of recreational fishers X investment related to recreational fishing;
- § Number of boat owners X (depreciation of boats + maintenance costs) X relative importance of boats for recreational fishing ;
- § Number of trips X functioning costs.

2   Results from the telephone survey

2.1   Preliminary frequenting results

2.1.1   Representativeness of the sample and penetration rate

A total of 15 085 households have been called. Among them, 1 137 have declared having at least one person who have fished in 2005 or in the reference period of 2006.

When a population register frame is used, the sample size is negligible compared to the population size. In general, a sample of 1066 gives a result with a 95% confidence limit of 3%, even with the most unfavourable standard error.

After correction our sample seems representative of the French population (Table 3).

Table 3: Characteristics of the family chief of our sample after redressing

	INSEE French households data	Interviewed households (15 085)		INSEE French households data	Interviewed households (15 085)
Sexe			Age		
Men	74%	74%	15-24 years old	4%	4%
Women	26%	27%	25-34 years old	16%	17%
			35-49 years old	30%	30%
			50-64 years old	23%	23%
			65 and more	27%	26%
Region			Profession		
North	6%	6%	Agriculturist	12%	12%
East Parisian basin	8%	8%	Artisan, shopkeeper, professional men	15%	15%
West Parisian basin	9%	10%			
West	13%	13%	Officers and intermediate professions	14%	14%
South West	11%	11%			
Mediterranean region	13%	12%			
Central East	12%	12%	Employee	12%	12%
East	9%	8%	Worker	19%	20%
Parisian region	19%	19%	Retired and others inactive	39%	38%

On Table 4, we can see the penetration rate of the different waves of interviews in coastal zone and inland zone. In 2005, the penetration rate in coastal zone is 11.1% and 5.4% in inland zone, that is to say a total penetration rate of 6.7% of the interviewed households in 2005.

Table 4: Results of penetration rate for the different waves in 2005 and in 2006 by periods of reference

	Test phase First measure	Second measure	Third measure	Forth measure	Fifth measure
Year 2005					
Coastal zone	10,6%	8,7%	9,8%	13,4 %	15,1%
Inland zone	3,4%	4,5%	5%	6,5%	7,8%
Total	5,2%	5,5 %	6,2 %	8,2 %	9,5 %
Period of reference in 2006	January, February and March 06 (2061 interviews)	April and May 06 (3003 interviews)	June, July and August 06 (5012 interviews)	September and October 06 (3003 interviews)	November et December 06 (2006 interviews)
Coastal zone	2,9%	5,1%	8,8%	7,3%	3,4%
Inland zone	0,3%	1,4%	4,2%	1,8%	0,5%
Total	0,9 %	2,3%	5,3%	3,1%	1,1%

2.1.2 Number of recreational fishers and fishing effort

Given that population taken into account by this survey is 31 377, that the number of recreational fishers over 15 interviewed about recreational fishing for 2005 is 1 016, that the average number of fishers is 1.57 per household, we can estimate the total number of over 15 years old recreational fishers around 2.45 millions (+/- 0,15 millions) in France (mainland) in 2005, that is 5.1 % of the whole French population (Table 5).

The socio-demographic profile of the recreational fishers is characteristic: male (82 %), middle age class (84 % between 25 and 64 years old), belong to middle and high class (Table 6). Recreational fishing is twice more important in coastal area than in rest of the country (Figure 1).

Table 5: Number of recreational fishers in 2005, results of the extrapolation

	Year 2005
Number of recreational fishers over 15 interviewed about 2005	1 016
Mean number of fishers by household	1.57
Total number of recreational fishers represented in our ample	1 599
Number of people over 15 in our sample	31 377
Penetration rate based on individual over 15	5.1%

Table 6: Socio-professional categories of recreational fisher population regarding French population

	Recreational fisher population	French population
Sex		
Male	82 %	48 %
Female	18 %	52 %
Age		
15-24	4	16
25-34	21	17
35-49	38	27
50-64	25	20
65 and more	12	20
Socio-professional category		
Farmer	1	2
Self-employed	18	17
Executive manager and intermediate non manual worker	21	14
Employee	13	10
Manual worker	21	23
Retired and non working population	26	34

Less than 5%
From 5% to 10%
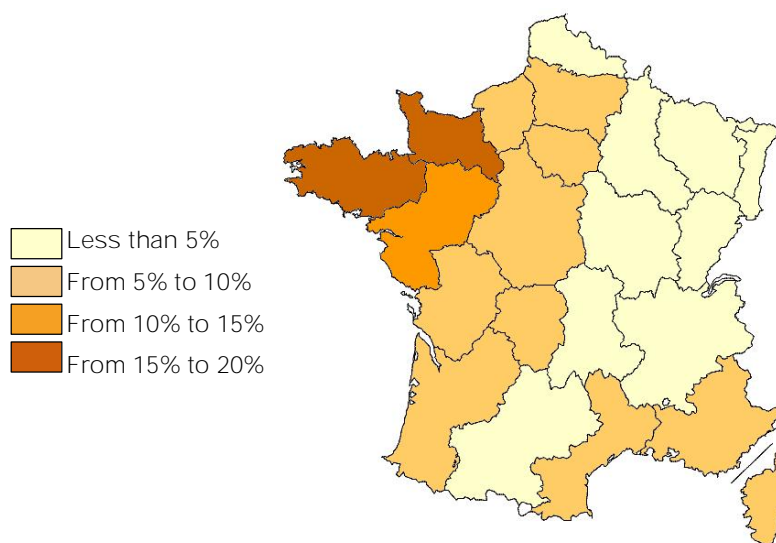From 10% to 15%
From 15% to 20%

Figure 1 : Penetration rate by regions

Average number of outings by fisher is 13 in 2005. Half of them occurs during summer (June, July and August). The main part of recreational fishers fish from the shore on foot (71 %) and 25 % use a boat. Two-thirds of them caught at least one shellfish in the year, 55 % one fish, 51 % one crustacean and 12 % one cephalopod. Average catch of fishes per fisher is 11 kg in 2005. The most targeted species declared are sea bass (24 % of fishers), mackerel (15 %) and breams (11 %). Other species are mentioned by less than 5 % of fishers.

To have more precise information, it is possible to analyse answer concerning the recreational fishers trip during the last three month along of the year 2006. This allows to propose a new distribution of the recreational fishing along the year by mode of fishing (Figure 2).
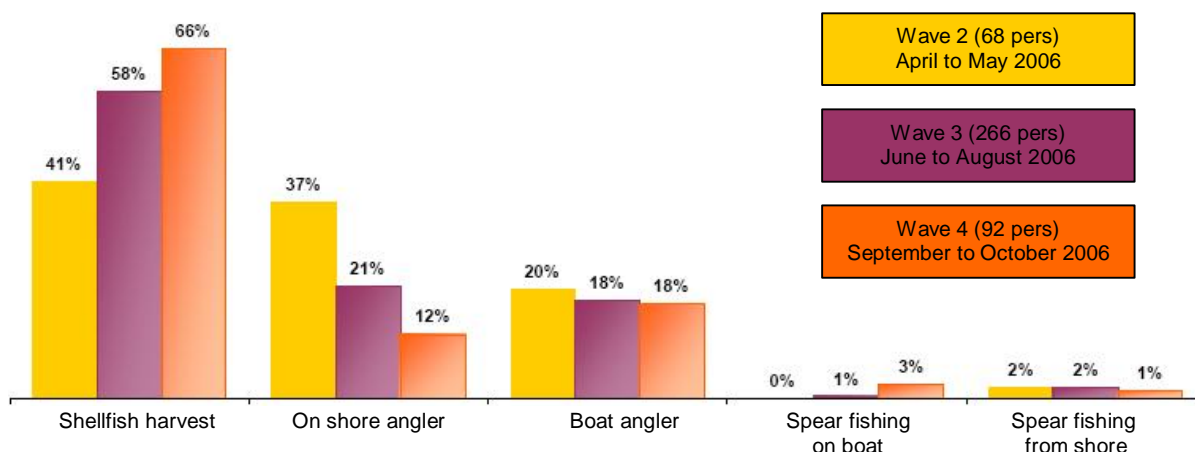

Figure 2: Repartition of the fishing mode used during the last fishing trip by wave[2]

Another interesting result is that for the last fishing outing, the more used engines are shellfish gathering with 48% of the practices declared, next angling with 36%, spoon-netting with 12%, hand fishing line with 9%, netting with 6 %. The others techniques are each under 2% of declaration.

Finally, it enable us to show that a large majority of fishers get a catch during their last fishing trip (Figure 3): 94% of the shellfish harvesters, 87% of the boat anglers and 84% of the shore anglers.
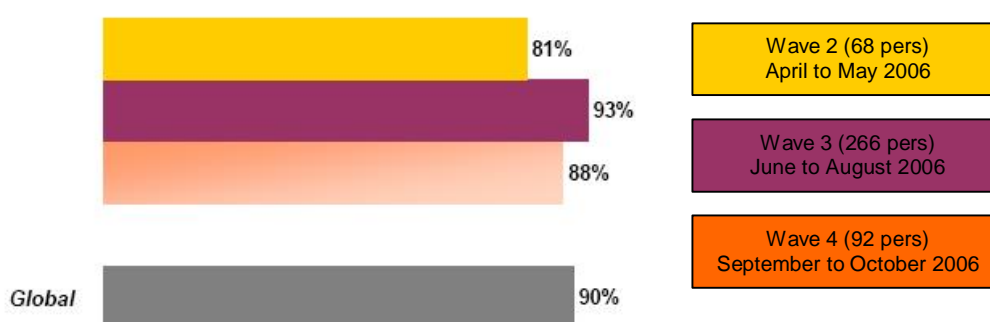

Figure 3: Percentage of fishers that declare at least one catch during their last fishing trip (wave by wave)

2.1.3   Captures

Concerning the catch estimation, we have retained species for which confidence interval is acceptable and propose a global approximation by crossing the three questions regarding catch estimation (Table 7).

---

[2] The results of the waves 1 and 5 are not presented because the number of respondent is too low to give reliable data.

Table 7: Estimation of annual catches for the main species

	Annual catches (tonnes)	Confidence interval
Fish	15 000	
Seabass	4 900	+/- 1 200
Mackerel	3 300	+/- 500
Seabream	1 600	+/- 1 000
Shellfish	12 000-15 000 T	
Mussels	4 300	+/- 1 200
Oyster	3 000	+/- 900
Cockle	2 500	+/- 800
Clam	2 300	+/- 700
Crustaceans	1 500 T	
Edible and spider crab	800	+/- 400
Prawn	300	+/- 180
Cephalopod	500 T	

It is interesting at this stage to highlight that total recreational catches represent around 10 % of the fresh fish landings in 2005, that is 32 000 t. / 317 472 t. (OFIMER, 2006).

2.1.4 Typology of recreational fishers

Seven classes of fishers have been identified from the multivariate analysis. It allows to distinguish 7 classes of recreational fishers:
- Summer shellfish harvesters (39%). They harvest shellfishes on the beach during summer (between 2 and 5 times). Most of them are tourists on holidays, especially on English Channel and Atlantic Ocean façades. There are more women in this category than in others.
- Spring tide seafood harvesters (13%). As summer shellfish harvesters, they fish only a few times during the year. But they fish all along the year. Most them of them fish on the Atlantic coast.
- Summer shore anglers (17%). They are tourists and fish only during their summer holidays. They mainly look for fishes. They have often started fishing in freshwater and think that recreational fishing is expensive.
- Boat anglers (13%). Most of them are tourists. They go out for fishing between April and October. They own a boat and take fishes and cephalopods. They think that recreational fishing is expensive.
- Spear and free diving fishers (3%). They are very few in number. They go for fishing all along the year but mainly between April and October. Most of them fish on the Mediterranean sea coast and own a boat. They think that natural resources decrease and that they are well informed about regulation rules. They are opposed to setting of licence.
- Regular recreational fishers (12%). They live in the coastal area. They go for fishing all along the year but not in summer. They enjoy shellfish gathering and shore angling. They consider that they are well informed about regulation rules.
- Experienced recreational fishers (4%). They are very few in number but they fish intensively during all the year. They usually live in the coastal area and are members of fishing club. They fish mainly on the Mediterranean Sea coast. They are mainly interested in shore angling. Most of them are retired and are over 65. They consider that they are well informed about regulation rules and resources stock status. They also think that marine resources are decreasing and are favourable to new management measures (excluding fishing licence). They think that recreational fishing is expensive.

2.1.5 Expenditures per typology profile

This part presents the different types of expenditures (Table 8):
- Functioning costs: trip (boat and car), feeding, lodging…
- Investment costs: material, bait, magazines, boat renting, guide…
- Costs related to boat: amortization, maintenance…

A recreational fisher spends an average of 6 € for a trip and 22 € for feeding and lodging that is to say a total of 28 € per outing. Variation goes from 11 € to 35 € depending on the typology. The experienced recreational fishers spend less per outing than the others. For the year 2005, the total of this functioning costs is estimated at 1,4 billions euros.

In 2005, recreational fisher spends an average of 70 € for his equipment and his bait, 17€ for renting a boat or a guide and buy specialised magazines. Extrapolated to the 2,5 millions of fishers, this represents a total cost of 249 millions euros.

Using a boat for recreational fishing cost an average of 1 100 € in 2005 (equipment, maintenance, insurance…). An average of 600 € per year have to be added for amortization. Extrapolated to the 235 000 boat used for recreational fishing, this represents an annual budget of 400 millions euros for 2005.

Table 8: Recapitulative table of costs for recreational fishing in 2005

	Summer shore anglers (17%)	Spear and free diving fishers (3%)	Boat anglers (13%)	Experienced recreational fishers 4%)	Spring tide shellfish harvesters (13%)	Regular recreational fishers (12%)	Summer shellfish harvesters (39%)	Total
Number of outings	4 354 255	1 766 944	5 237 329	20 608 798	4 353 864	2 323 543	11 277 699	49 922 432
Number of recreational fisher	373 315	56 879	264 586	256 082	252 502	342 782	1 002 636	2 548 782
Number of boat	25 877	17 027	103 883	39 511	18 128	4 935	25 594	234 954
Cost per outing per person for trip (car and boat)	6,45 €	3,70 €	4,12 €	7,08 €	5,77 €	6,73 €	6,70 €	6,37 €
Cost per outing per person for feeding and lodging	23,57 €	11,18 €	25,13 €	4,36 €	10,85 €	21,03 €	27,87 €	21,59 €
Total operating costs	131 M€	26 M€	153 M€	236 M€	72 M€	64 M€	390 M€	1 396 M€
Cost for bait and equipment	95,16 €	201,45 €	139,26 €	232,91 €	99,88 €	44,20 €	12,12 €	70,14 €
Other cost per person per year	43,49 €	ns	14,08 €	107,38 €	3,74 €	12,84 €	0,55 €	17,16 €
Total investment costs	52 M€	11 M€	41 M€	87 M€	26 M€	20 M€	13 M€	249 M€
Annual cost per boat	1 069 €	3 081 €	1 335 €	3 945 €	687 €	2 739 €	830 €	1 701 €
Total cost for boats used for recreational fishing	28 M€	52 M€	139 M€	156 M€	12 M€	14 M€	21 M€	400 M€
Total	211 M€	89 M€	333 M€	479 M€	110 M€	98 M€	424 M€	2 045 M€

Even if experienced recreational fishers represent only 4% of whole recreational fishers population, they have the biggest budget for this activity. Their expenditure per outing are low but numerous. They also are the most important buyers of equipment and bait.

2.1.6 Perceptions of their activity by recreational fishers

This part summarize recreational fishers opinions regarding resources trends, regulation rules, information, fishing activity and so on.

Only 1% of recreational fisher declare to be adherent to a club or an association.
Most of them have started to fish when they were very young: 61% have begun recreational fishing before the age of 15.
42% of interviewed fishers declare to spend less time than before to fish and only 17% declare spend more time.
Most of fishers think that recreational fishing is a cheap activity (Figure 4).
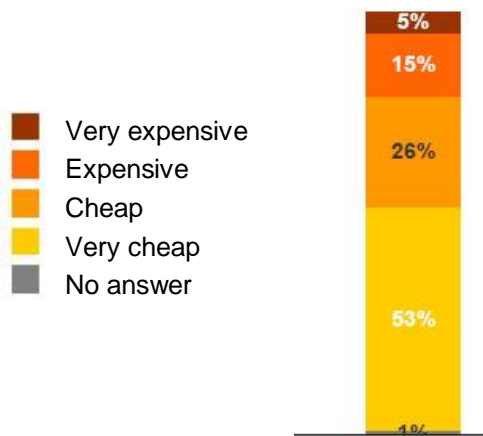

Figure 4: Feeling about the cost of their recreational fishing activity

A total of 61% think that resources have decreased during the past five years (Figure 5). But a majority of fishers consider to be well informed about rules regulation (minimal size of catch, date of closing…).
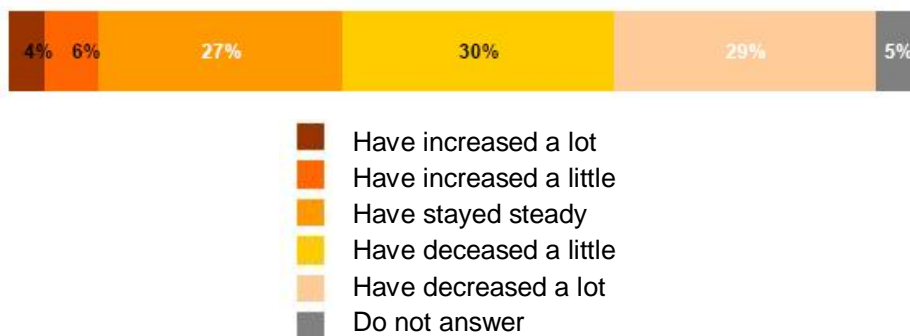

Figure 5: Feeling about the evolution of the resources in general all species included

90% of interviewed fishers are favourable to biological rest, 84% to limitation of catches per outing, 82% to strengthening control, 59% to creation of a license for specific species and 41% for all species.

Conclusion

Even if this national pilot survey on recreational fishing is not finished at this stage because on-site survey has not yet been completed, the first statistical analysis based on telephone survey give us new basic and essential elements on this practice.

First, because the study heeds all fishing modes and all species, we can have a more or less global picture of recreational fishing in France, that is:
- the number of recreational fishers which look very important (2.5 millions of fishers) ;
- the relative weight of different recreational fishing modes which allow to underline that shellfish harvesting is very important in France;
- the national distribution of recreational fishing in France which highlight that western regions are over represented in France;
- the relative weight of recreational fishing in terms of catches, especially regarding commercial fishing catches;
- a first approximation of economic impact of recreational fishing on national economy.

These elements supply a first reference state from which it will be possible in the following year to monitor social, economic and ecological trends.

Second, the study has permitted to draw first reference tables that we'll need for systematic follow-up of recreational fisheries. It concerns 3 dimensions:
- Species: it was elaborated with the data from the telephone survey, and then was completed by the on-site survey. It can be progressively improved. And it is linked with the national Fisheries Information System.
- Fishing modes: it already seems very complete; nearly all recreational fishing practices are indexed.
- Recreational fishing sites: it was elaborated in crossing several data from others study, administration, local knowledge… Now we need to identify more precisely the couple site-period on each façade to have a good reference matrice that can help the sample plan elaboration.

Third, this study allows to understand better the social context around the recreational fishing issue. In particular, we have a set of statistics which should help to improve discussion between commercial and recreational fishers, and to mediate conflicts on common resources. Next we have obtained important information on the perception of recreational fishers regarding communication and regulation system, that could be useful for the forthcoming political discussion on this practise.

Because these new information are of substantial importance for improving governance of marine social-ecological system, we need now to develop a long-term monitoring system regarding recreational fishing in France. The frequency and the modality on-field have to be defined but this study is a very good start to carry on this way.

References

ANOMYN, 2004. Report of pilot survey of recreational fishing in Finland, Finnish Game and Fisheries Research Institute, Commission Regulation (EC) No 1639/2001, 12 p.

ANONYME. 2005. Enquête sur la pêche récréative au Canada, Analyses économiques et statistiques, Secteur des politiques, Pêches et Océans, Canada, Ottawa, 58p., online : http://www.dfo-mpo.gc.ca/communic/statistics/recreational/Canada/2005/index_f.htm

ANOMYNE, 2007. La pêche à pied récréative sur Marenne-Oléron, Programme « R.E.V.E. » 2006 – 2009, Second rapport intermédiaire 2007, Association IODDE, 118 p.

COLEMAN F.C., FIGUEIRA W.F., UELAND J.S. and CROWDER L.B., 2004. The Impact of United States Recreational Fisheries on Marine Fish Populations, Science 305 (24 September 2004), 1958, DOI: 10.1126/science.110097, www.sciencemag.org.

DINTHEER C., HERFAUT J., THEBAUD O., SENAC S., TRANGER H. et LE GUEN C., 2007. La pêche de loisir en mer au cabillaud sur la façade septentrionale de la France (Manche - Mer du nord, zones CIEM VIIed et IVc), Rapport de l'étude pilote menée dans le cadre du règlement (CE) n°1584/2004. Programme français RDC/DCR 2006, Ifremer et BVA, mai 2007, 35 p.

DROUOT B., DAURES F., GUYADER O. and LESUEUR M., 2003. An economic evaluation of the recreational fishing on foot in the Gulf of Morbihan (Brittany, France), Session 9.3. EAFE 2003 proceedings: the fifteenth annual conference of European Association of Fisheries, Economists, 15-16 May 2003, Actes de colloques, Ifremer no.37, 5pp.

DUBREUIL J., 2005. Caractérisation de la pêche de loisir dans la région de Banyuls-sur-Mer (N.O Méditerranée) : typologie, « effet réserve » et perceptives. Rapport de Master pro Université de perpignan, 33 p.

HENRY G. W. AND LYLE J. M., 2003. The National Recreational and Indigenous Fishing Survey, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, Australia, 190p. online: http://www.daff.gov.au/fisheries/recreational/recfishsurvey

LASPOUGEAS C., 2007. Etude des gisements naturels de mollusques bivalves accessibles en pêche à pied en Basse-Normandie. Université de Caen.

MAGGI P., CHAPRON V. et RATISKOL G., 1998. Evaluation de la fréquentation des zones de pêche récréative durant des grandes marées de 1997, Résultats des campagnes menées sur le littoral compris entre la baie du Mont-Saint-Michel (Ille-et-Vilaine) et la Pointe de Châtelaillon (Charente-Maritime). Ifremer Laboratoire côtier DEL de Nantes R.INT.DEL/Nantes/98.19, 68 p.

MORIZUR Y., 2004. Sondage national sur pêches récréatives (dont celle du bar) réalisé par BVA en 2003. Ifremer, 12 p.

MORIZUR Y. and FRITSCH M., 2005. La ressource en bar commun (Dicentrarchus labarx) en Atlantique nord-est et son exploitation. Ifremer, R.INT.STH-Brest/nov.2005, rapport contractuel à l'issue de l'étape 3 à destination de le Région Bretagne et de la région Pays de Loire, 32 p.

National Research Council (Committee on the Review of Recreational Fisheries Survey Methods), 2006. Review of recreational fisheries survey methods, National Research Council of the National Academies of Sciences, National Academies Press of Washington, 202 p.

OFIMER, 2007. Bilan annuel de production 2006, Ministère de l'agriculture et de la pêche et OFIMER, 101p.

OSBORN M.F., VAN VOORHEES D.A., GRAY G., SALZ R., PRITCHARD E. and HOLLIDAY M.C., 1996. Marine Recreational Fishery Statistics Survey. National Marine Fisheries Service, Fisheries Statistics and Economics Division, Silver Spring, Maryland. http://www.recfin.org/mrfssov.htm

PAWSON M.G., TINGLEY D., PADDA G. and GLENN H., 2007. Final Report: EU contract FISH/2004/011 on "Sport Fisheries" (or Marine Recreational Fisheries) in the EU for The European Commission Directorate-General for Fisheries. EC Directorate-General for Fisheries Sport Fishing C2362 Unit FISH-1, 242 p. online: http://www.cefas.co.uk/publications/files/sportsfishing-c2362.pdf

PERONNET I., TALIDEC C., DAURES F., GUYADER O., DROUOT B., BOUDE JP. Et LESUEUR M., 2003. Etude des activités de pêche dans le golfe du Morbihan –Partie 2 : Pêche de loisir, Schéma de Mise en Valeur de la Mer du golfe du Morbihan. Ifremer, 241 p.

POLLOCK K.H., JONES C.M. and BROWN T.L., 1994. Anglers survey methods and their application in fisheries management, American Fisheries Society Special Publication 25, 371.

VERON G. AND APPERE G., 2004. Pêche récréative en Iroise, in Boncoeur J., *Activités halieutiques et activités récréatives dans le cadre d'un espace à protéger : le cas du Parc National de la Mer d'Iroise*, Rapport final, Université de Bretagne Occidentale, pp.153-174