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Analysis of Socio-Economic Survey Results

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Introduction

This report reviews and analyses the results of the socio-economic surveys that were implemented in 14 European marine protected areas (MPAs) within the framework of the EU funded EMPAFISH research project. It is composed of 5 chapters. Chapter 1 to chapter 4 are dedicated to a synthetic presentation of the field survey results, by type of activity surveyed. Chapter 5 makes use of these results to assess the impact of MPAs on the local economy. The following introduction provides a short description of the case studies and of the surveys.

1. A short presentation of the case studies¹

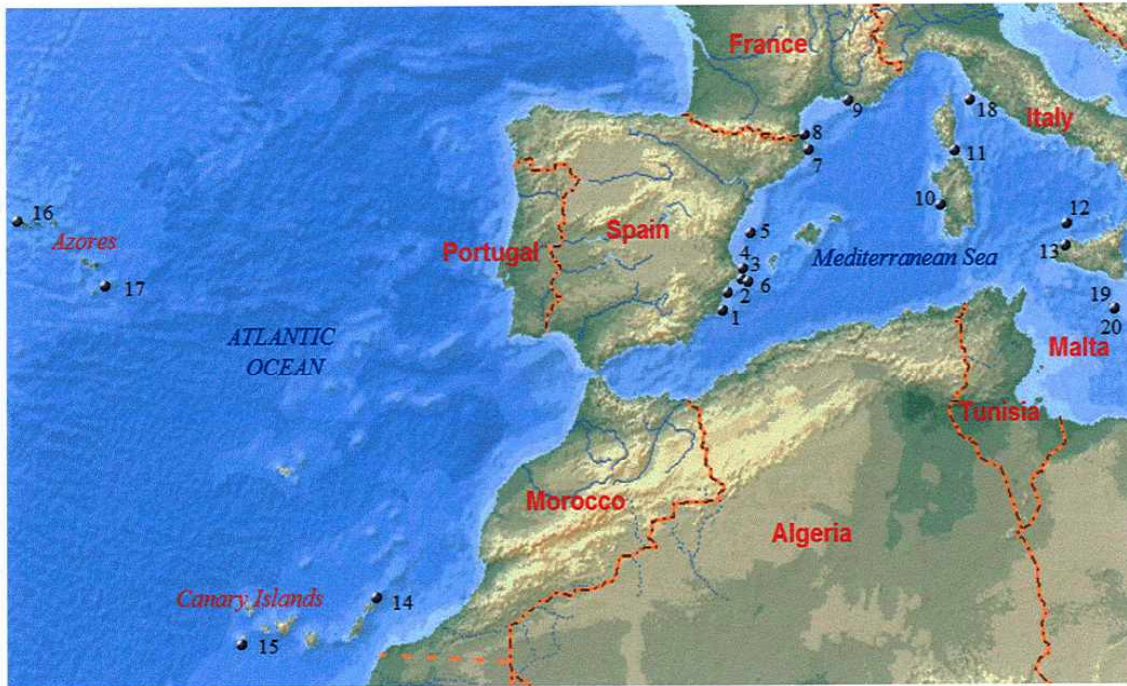
Figure 1 displays the 20 MPAs within the scope of EMPAFISH. Among these, case studies for socio-economic field surveys are written in bold letters. They are located as follows:

- Western Mediterranean:
 - Benidorm, Cabo de Palos, Columbretes, Medes, Tabarca (Spain)
 - Banyuls, Bonifacio, Côte Bleue (France)
 - Sinis, Tuscany Archipelago (Italy)
 - 25 NM fisheries management zone and Rdum-Majjiesa / Ras ir-Raheb (Malta)
- Atlantic:
 - La Graciosa, La Restinga (Spain, Canary Islands)
 - Monte da Guia (Portugal, Azore Islands)

The two Maltese case-studies differ significantly from the other ones. Malta FMZ is composed of the whole exclusive fishing zone spreading 25 nautic miles from the Maltese shore. Rdum-Majjiesa / Ras ir-Raheb is a project of MPA that was not yet implemented at the time of the field surveys. In the presentation of field survey results, these two case studies are considered jointly.

¹ This section is based on information provided by MPA management authorities, and complemented by EMPAFISH project partners. For a more detailed description, see Planes et al., 2006.

Figure 1. Location of MPAs studied by EMPAFISH
(MPAs covered by socio-economic surveys are written in bold letters)



1. **Cabo de Palos**
2. **Tabarca**
3. San Antonio
4. **Serra Geralda and Benidorm Islets**
5. **Columbres Islands**
6. Anti-trawling zones (SE Spain)
7. **Medes Islands**
8. **Cerbère-Banyuls**
9. **Côte Bleue**
10. **Sinis-Maldiventre**
11. **Bouches de Bonifacio**
12. Ustica Island
13. Gulf of Castellammare (trawl-ban area)
14. **La Graciosa**
15. **La Restinga**
16. **Montge da Guia / Fayal**
17. Formigas Islet / Dollabarat bank
18. **Tuscany Archipelago**
19. **Malta 25 NM Fisheries Management Zone (FMZ)**
20. **Rdum-Majjiesa / Ras ir-Raheb MPA**

The sizes of the case studies are very heterogeneous, as shown by Table 1. The case of the Malta FMZ is quite specific: this zone covers approximately 10700 km², i.e. 58 times the average surface of the other MPAs (185 km²). Even setting aside this case, the size-heterogeneity of the case studies remains high: the largest one (Bonifacio) reaches 800 km², while the smallest one (Monte da Guia) is only 4 km² large. On the average, 5% of the total surface of the MPA is dedicated to an integral reserve, or no-take zone. This proportion varies between 0% (Benidorm) and 43% (Columbretes).

Table 1. Size of MPAs covered by socio-economic surveys

MPA name	Area (ha)		NTZ / Total
	Total	Integral reserve or no-take zone (NTZ)	
BANYULS	715	65	9%
BENIDORM	4 920	0	0%
BONIFACIO	80 000	1 200	2%
CABO DE PALOS	1 898	270	14%
COLUMBRETES	4 400	1 893	43%
COTE BLEUE	9 873	295	3%
LA GRACIOSA	70 700	1 225	2%
LA RESTINGA	750	180	24%
MALTA FMZ	1,07.10 ⁶	0	0%
MEDES	511	93	18%
MONTE DA GUIA	443	10	2%
RDUM-MAJJIESA / RAS IR-RAHEB*	885	88	10%
SINIS	25 673	529	2%
TABARCA	1 400	100	7%
TUSCANY	56 766	6 147	11%
Mean**	18 495	864	5%
Standard Deviation**	28 609	1 626	
Variation coefficient**	1,55	1,88	

* Planned. ** Except Malta FMZ.

Considering only the 12 cases where the MPA includes an integral reserve or no-take zone (NTZ)², we find a fairly good positive non linear correlation between the size of the NTZ and the total size of the MPA³ (fig.3). According to this correlation, the elasticity of the NTZ size to the total MPA size is 0.716, which means that, on the average, increasing the total size of the MPA by 1% results in increasing the NTZ size by 0.716%. As a consequence, the relative share of the MPA which is instituted as a NTZ tends to be lower in large MPAs than in smaller ones.

² Which come to exclude Benidorm and Malta FMZ from the list displayed by table 1.

³ More specifically, what is obtained is a linear correlation between the natural logarithm of the total MPA surface and the natural logarithm of the NTZ surface. This implies a constant elasticity of the NTZ surface to the total MPA surface, the value of which is equal to the slope of the OLS straight line displayed on figure 1.

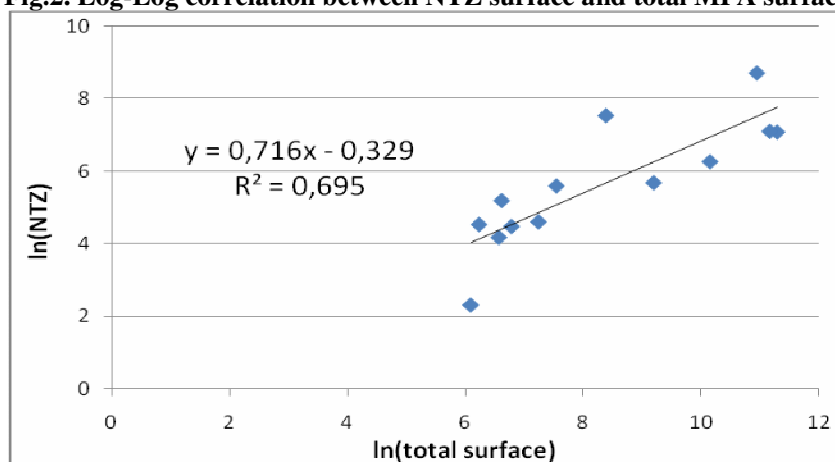
Fig.2. Log-Log correlation between NTZ surface and total MPA surface

Table 2 displays information concerning the number of visitors of the MPA, and the number of users of its ecosystemic services.

Table 2. Estimations concerning the yearly number of visitors and users of the MPA

MPA name	Fishing boats (commercial)	Recreational fishers	Divers	Diving operators	Visitors
BANYULS	8	1 460	13 000	22	100 000
BONIFACIO	30	150	10 000	16	150 000
CABO DE PALOS	7	<i>n.a.</i>	9 000	6	17 400
COLUMBRETES	60	<i>n.a.</i>	3 500	10	3 000
COTE BLEUE	40	6 870	16 000	32	<i>n.a.</i>
LA GRACIOSA	30	1 250	<i>n.a.</i>	<i>n.a.</i>	75 000
LA RESTINGA	33	1 500	2 700	9	<i>n.a.</i>
MEDES	21	<i>n.a.</i>	18 000	7	268 000
MONTE DA GUIA	80	340	1 300	3	4 000
SINIS	124	<i>n.a.</i>	350	3	2 500
TABARCA	<i>n.a.</i>	2 350	1 000	<i>n.a.</i>	80 000
TUSCANY	121	<i>n.a.</i>	3 500	1	310 000
Mean	50	1 989	7 123	11	100 990
Standard deviation	41	2 277	6 376	10	110 952
Variation coefficient	0,82	1,15	0,90	0,90	1,10

According to case studies and to uses, the information provided by table 2 may be more or less accurate. This caveat applies particularly to recreational fishing, which is totally unformal in many cases (no operators, no permits). Nevertheless, table 2 clearly suggests that recreational uses play a major role in the patterns of uses of the MPAs covered by the survey. According to available information, each of these MPAs is visited each year by approximately 110,000 persons on average. More specifically, around 7,000 scuba-divers and 2,000 recreational fishers (a figure probably underscoring reality) make use of its ecosystemic services on average. In comparison, professional fishing seems rather limited, considering the

fact that, in most cases, professional fishing boats operating in the fishing zone of the MPA are small-size (see below, chapter 2). However, the situation is far from uniform. In order to take into account the heterogeneousness of MPA sizes, we calculate indicators of apparent pressure, dividing the number of users / visitors by the surface of the MPA (either total MPA surface, or NTZ surface). Tables 3 and 4 display these ratios.

Table 3. Yearly number of visitors and users of the MPA, per 100 ha (total surface)

MPA name	Fishing boats (commercial)	Recreational fishers	Divers	Diving operators	Visitors
BANYULS	1,12	204,2	1 818,2	3,077	13 986
BONIFACIO	0,04	0,2	12,5	0,020	188
CABO DE PALOS	0,37	<i>n.a.</i>	474,2	0,316	917
COLUMBRETES	1,36	<i>n.a.</i>	79,5	0,227	68
COTE BLEUE	0,41	69,6	162,1	0,324	<i>n.a.</i>
LA GRACIOSA	0,04	1,8	<i>n.a.</i>	<i>n.a.</i>	106
LA RESTINGA	4,40	200,0	360,0	1,333	<i>n.a.</i>
MEDES	4,11	<i>n.a.</i>	3 522,5	1,370	52 446
MONTE DA GUIA	18,06	76,7	293,5	0,677	903
SINIS	0,48	<i>n.a.</i>	1,4	0,012	10
TABARCA	<i>n.a.</i>	167,9	71,4	<i>n.a.</i>	5 714
TUSCANY	0,21	<i>n.a.</i>	6,2	0,002	546
Mean	0,24	9,4	33,8	0,052	479

Table 4. Yearly number of visitors and users of the MPA, per 100 ha (NTZ)

MPA name	Fishing boats* (commercial)	Recreational fishers*	Divers	Diving operators	Visitors
BANYULS	12	2 246	8 462	33,85	153 846
BONIFACIO	3	13	833	1,33	12 500
CABO DE PALOS	3	<i>n.a.</i>	3 333	2,22	6 444
COLUMBRETES	3	<i>n.a.</i>	186	0,53	159
COTE BLEUE	14	2 329	5 424	10 ,05	<i>n.a.</i>
LA GRACIOSA	2	102	<i>n.a.</i>	<i>n.a.</i>	6 122
LA RESTINGA	18	833	1 500	5,56	<i>n.a.</i>
MEDES	23	<i>n.a.</i>	19 355	7,53	288 172
MONTE DA GUIA	800	3 400	13 000	30,00	40 000
SINIS	23	<i>n.a.</i>	66	0,57	473
TABARCA	<i>n.a.</i>	2 350	1 000	<i>n.a.</i>	80 000
TUSCANY	2	<i>n.a.</i>	57	0,02	5 043
Mean	5	199	712	1,09	10 102

* Fishers are not supposed to operate within the NTZ, but their activity may be influenced by spillover effects due to biomass export from the NTZ (see e.g. Planes, Coord., 2005).

According to the results presented in the two tables above, the apparent pressure exerted by visitors on the MPA is highly variable. It is very important in small coastal MPAs located in

highly touristical spots (e.g. Banyuls, or Medes⁴), and tends to be much lower in more remote places such as Columbretes. Diving pressure is particularly high in Medes.

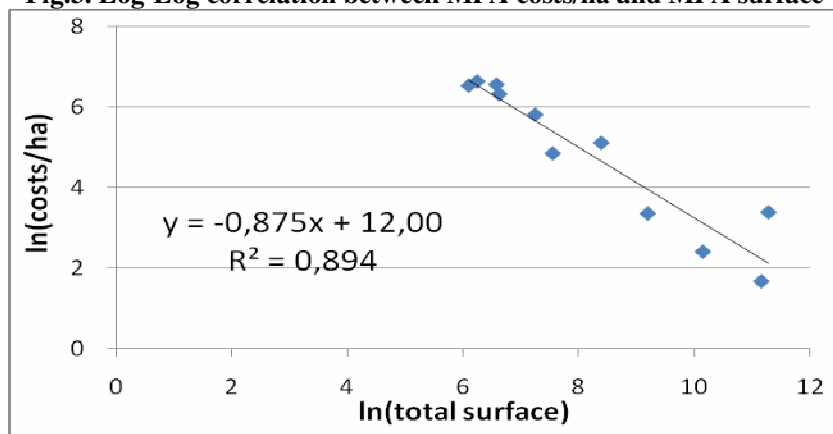
Table 5 displays information about costs related to the management of these areas (for 11 case studies where this information was available). On the average, labour costs represent 57% of the total amount. This share is far from uniform: according to the information that could be gathered, it spreads from 31% (Banyuls, Monte da Guia) to more than 90% (Cabo de Palos). Average costs per unit of surface are not uniform either (see table 5, last column). However, they display a fairly constant negative elasticity to the total surface of the MPA (fig.3): according to the correlation that could be worked out, increasing the total MPA surface by 1% leads to decreasing costs per hectare by 0,875%.

Table 5. MPA yearly management costs* (euros)

MPA name	Labour costs	Other costs	Total costs	Total costs / ha
BANYULS	162 041	352 540	514 581	720
BONIFACIO	1 100 000	1 300 000	2 400 000	30
CABO DE PALOS	230 717	14 823	245 540	129
COLUMBRETES	455 125	286 450	741 575	169
COTE BLEUE	178 766	108 504	287 270	29
LA GRACIOSA	313 890	67 687	381 577	5
LA RESTINGA	367 641	56 623	424 264	566
MEDES	156 496	240 112	396 608	776
MONTE DA GUIA	96 313	213 520	309 833	699
SINIS	239 000	50 000	289 000	11
TABARCA	365 000	110 000	475 000	339
Mean	333 181	254 569	587 750	33
Standard deviation	276 637	363 470	616 898	
Variation coefficient	0,83	1,43	1,05	

* Including scientific and enforcement costs.

Fig.3. Log-Log correlation between MPA costs/ha and MPA surface



⁴ This MPA is composed of small islands close to the shore, in one of the most touristical areas in Spain.

Information concerning cost recovery was very uncomplete. In the two cases where information concerning visitors fees was available (Banyuls, Bonifacio), it was found that these fees covered only 3% of the total management costs of the MPA.

2. Presentation of the field surveys

The aim and methodology of the EMPAFISH socio-economic surveys were presented in a previous project report⁵. Each survey was focused on a particular group of users of the ecosystem of the MPA. The following uses were concerned:

- professional fishing
- recreational fishing
- scuba diving
- snorkelling

Professional fishing was covered by one survey. For recreational fishing, three types of surveys were organised:

- “individual” fishers
- charter-fishing customers
- charter-fishing operators

As regards scuba diving, two types of surveys were implemented:

- scuba divers
- scuba diving operators

In the case of snorkelling (one survey), for practical reasons the population surveyed was restricted to visitors of submarine trails.

On the whole, 7 surveys were carried out with a common methodology for the 14 case studies. However, not all surveys were implemented in each case: if scuba diving surveys were carried out almost everywhere, the professional fishing survey was carried out in 9 case studies, the recreational fishing survey (individual fishers) in 7 case studies, the snorkelling survey in 3 case studies, and the charter-fishing surveys in one case study only. Table 6 displays the number of questionnaires filled in each case for each survey.

Table 6. EMPAFISH socioeconomic field surveys: number of answers (updated May 2007)

Types of uses	Fishing				Non-extractive uses			Total
	Professional	Recreational			Scuba diving		Snorkelling (submarine trails)	
		Individual	Charter		Operators	Divers		
Case studies			Operators	Customers	Operators	Divers		
Banyuls					11	82	164	257
Benidorm					6	307		313
Bonifacio		10			6	108	17	141
Cabo de Palos	4				4	132		140
Côte Bleue		262			17	689	311	1279
Columbretes	20				8	257		285
La Graciosa	14	184						198
Malta	184	47			30	250		511
Medes	16				6	147		169
Monte da Guia	51	56	2	20	3	57		189
La Restinga	28	142				159		329

⁵ Alban et al., 2006b.

Sinis	36	25			3	34		98
Tuscany	1				1	63		65
Tabarca					1	108		109
Total	354	726	2	20	96	2393	492	4083

For a part, differences between case studies are due to the heterogeneity of local situations (e.g. submarine trails are organised in a few MPAs only). Others come from the fact that case study partners allotted differently their means and time available for the implementation of field-surveys.

The overall process relied on an interaction between the team in charge of coordinating the socio-economic workpackage of the project (WP3), and the 14 teams in charge of each case study (Table 7).

**Table 7. Carrying out field surveys:
Allocation of tasks between WP3 coordinating team and case study partners**

WP3 coordinating team	Case study partners
- General methodology of the surveys*	
	- Decision concerning surveys to implement
	- For each of these surveys: <ul style="list-style-type: none"> ○ Identifying mean population ○ Defining the sampling strategy ○ Carrying out fieldwork ○ Reporting results under a predefined format
- Screening and processing collected data	
- Creating a comprehensive individual database	
- Elaborating a synthesis and reporting	

* in coordination with case study partners and coordinating teams of other WPs (5 and 6).

Despite careful checking, some inaccuracies may have survived this process. When interpreting the results presented in this report, special attention should be paid to the number of answers and to answering rates. Another caveat concerns the strong influence exerted by individual case studies on aggregated results, due to their relative size (Malta in the case of professional fishing, Côte Bleue in the case of recreational uses).

Each one of the next four chapters of this report is dedicated to one type of use, and presents the major results of the corresponding survey(s): chapter 1 focuses on professional fishing, chapter 2 on recreational fishing, chapter 3 on scuba diving, and chapter 4 on snorkelling. Statistics are normally presented in tabular form. For quantitative questions, they provide two types of information per case study and at the aggregated level: mean value, and standard deviation (SD). As regards frequencies, 100% represents the total of answers in the corresponding case. In each table, the right column (in grey) displays answering rates (AR). An appendix, at the end of the report, provides detailed statistics concerning choice criteria of fishing or diving sites (for the sake of legibility, these data, unlike other results, are presented in graphic form in the main body of the report).

Chapter 1

Professional Fishing

1.1 Introduction

For each case study, the professional fishing survey targeted professional fishing vessels having a direct and significant economic link with the MPA⁶. It was implemented by means of face-to-face interviews of skippers / owners. A total of 354 questionnaires, covering 9 case studies, were filled during years 2005 and 2006. The sampling rate, close to 20% for the full sample, varies greatly according to case studies. This factor, combined with the heterogeneous sizes of main populations, results in a high variability of sample sizes per case study (Table 1.1). The mean size is 39 questionnaires, but two samples are under 5 questionnaires. As regards Cabo de Palos (4 questionnaires), this feature is related to the small size of main population (only 7 boats). In the case of Tuscany archipelago (1 questionnaire), it is due to a low sampling rate (121 boats in the main population), and the significance of the results presented below is questionable. When interpreting the results presented in this chapter, it should be kept in mind that the Malta case exerts a strong influence on aggregated results, due to its relative size (52% of the whole sample).

Table 1.1. Professional fishing: distribution of interviews and sampling rates

Name of MPA	Number of questionnaires filled	Main population (Vessels in activity, 2005-2006)	% Surveyed
Cabo de Palos	4	7	57%
Columbretes	20	60	33%
La Graciosa	14	30	47%
Malta	184	1 425	13%
Medes	16	21	76%
Monte da Guia	51	80	64%
La Restinga	28	33	85%
Sinis	36	124	29%
Tuscany	1	121	1%
FULL SAMPLE	354	1 901	19%

Source: EMPAFISH Professional Fishing survey 2005-2006

This chapter is organised as follows: boat skipper, owner and crew (1.2); vessel and activity (1.3); fishing revenue and costs (1.4); other incomes (1.5); choice of a fishing zone and perceptions of MPA (1.6).

⁶ This definition was intended to exclude boats with a range of action much wider than the fishing zone of the MPA, as well as boats mainly targeting stocks the dynamics of which is not related to the MPA.

1.2 Boat skipper, owner and crew

1.2.1 Skipper

According to survey results, skippers are 46 years old on average, with 27 years of fishing experience (Tables 1.2 and 1.3). The mean size of their household is 3,6 persons (Table 1.4).

Table 1.2. Professional fishing: skipper's age (in 2006)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	50	12	100%
Columbretes	44	8	100%
La Graciosa	44	12	100%
Malta	--	--	0%
Medes	--	--	0%
Monte da Guia	51	10	96%
La Restinga	41	11	100%
Sinis	43	6	97%
Tuscany	52	0	100%
FULL SAMPLE	46	10	43%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.3. Professional fishing: skipper's fishing experience (number of years, in 2006)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	38	15	100%
Columbretes	28	9	100%
La Graciosa	30	13	93%
Malta	--	--	0%
Medes	--	--	0%
Monte da Guia	31	15	96%
La Restinga	22	12	100%
Sinis	25	7	100%
Tuscany	21	0	100%
FULL SAMPLE	27	13	43%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.4. Professional fishing: size of skipper's household (number of persons)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	3,5	0,5	100%
Columbretes	3,5	0,7	95%
La Graciosa	4,1	1,4	100%
Malta	--	--	0%
Medes	--	--	0%
Monte da Guia	3,2	1,7	100%
La Restinga	--	--	0%
Sinis	3,9	1,1	100%
Tuscany	2,0	0,0	100%
FULL SAMPLE	3,6	1,4	35%

Source: EMPAFISH Professional Fishing survey 2005-2006

1.2.2 Vessel ownership

In most cases, skippers are owners or co-owners of the boat they operate (Table 1.5). The only significant exceptions are found in Columbretes, La Graciosa, and, to a lesser extent, La Restinga. Similarly, multiple vessels ownership is noticed in these three cases (Table 1.6). However, these common features cover heterogenous situations: Columbretes vessels are mainly large offshore vessels where the owner may not be onboard; in La Restinga, some vessels are commonly shared among several fishers during certain periods of the year, especially during the tuna fishing months (“Zafra”).

Table 1.5. Professional fishing: are you the owner of the vessel?

MPA	Owner	Co-owner	Not the owner	Answering Rate
Cabo de Palos	75%	25%	0%	100%
Columbretes	50%	30%	20%	100%
La Graciosa	64%	7%	29%	100%
Malta	79%	18%	3%	97%
Medes	100%	0%	0%	100%
Monte da Guia	94%	6%	0%	100%
La Restinga	54%	36%	11%	100%
Sinis	58%	39%	3%	100%
Tuscany	100%	0%	0%	100%
FULL SAMPLE	76%	19%	5%	98%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.6. Professional fishing: number of boats owned by the same owner

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	1,0	0,0	100%
Columbretes	1,5	0,7	100%
La Graciosa	1,6	0,5	100%
Malta	1,0	0,1	99%
Medes	1,0	0,0	100%
Monte da Guia	1,1	0,3	100%
La Restinga	1,5	0,9	100%
Sinis	1,0	0,2	97%
Tuscany	1,0	0,0	100%
FULL SAMPLE	1,1	0,4	99%

Source: EMPAFISH Professional Fishing survey 2005-2006

1.2.3 Crew

Crew size is related to boat size, and to the type of fishing activity. For a boat with multi-gear activity, it may vary during the year. According to survey results, usual crew size (table 1.17) is under 3 persons on average in all cases except Columbretes, where fishing boats are larger. In the case of Medes Islands, it is close to 1 person.

Table 1.7. Professional fishing: usual crew size (number of persons, including skipper)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	2,8	1,1	100%
Columbretes	4,2	1,0	100%
La Graciosa	2,9	1,6	100%
Malta	3,0	1,7	72%
Medes	1,1	0,3	100%
Monte da Guia	2,1	1,5	100%
La Restinga	1,9	0,9	100%
Sinis	2,4	0,8	100%
Tuscany	2,0	0,0	100%
FULL SAMPLE	2,7	1,6	86%

Source: EMPAFISH Professional Fishing survey 2005-2006

1.3 Vessel and activity

1.3.1 Vessel characteristics

This section describes technical and economic characteristics of the boats in the sample. Some survey results have been complemented by information from WP2. In case of multiple boat ownership, information concerns only the first vessel mentioned in the questionnaire.

With the noticeable exception of Columbretes, mean boat length is under 12 metres in all case studies (Table 1.8). Malta is intermediate between Columbretes and other cases. A similar pattern appears in Tables 1.9 and 1.10, concerning GRT and HP.

Table 1.8. Professional fishing: boat length (metres)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	8,8	1,6	100%
Columbretes	19,7	5,1	100%
La Graciosa	10,6	3,4	100%
Malta	11,6	6,1	99%
Medes	6,6	1,3	94%
Monte da Guia	8,4	2,8	98%
La Restinga	7,9	1,9	100%
Sinis	8,6	2,7	100%
Tuscany	7,0	0,0	100%
FULL SAMPLE	10,7	5,6	99%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.9. Professional fishing: boat tonnage (GRT)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	5	2	100%
Columbretes	57	41	100%
La Graciosa	9	8	100%
Malta	32	48	64%
Medes	3	1	94%
Monte da Guia	8	12	75%
La Restinga	4	4	100%
Sinis	5	4	97%
Tuscany	5	0	100%
FULL SAMPLE	21	38	77%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.10. Professional fishing: boat engine power (Kw)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	43	26	100%
Columbretes	455	287	100%
La Graciosa	78	45	93%
Medes	22	12	94%
Malta	240	200	100%
Monte da Guia	66	56	100%
La Restinga	64	54	100%
Sinis	80	64	100%
Tuscany	35	0	100%
FULL SAMPLE	179	196	99%

Source: EMPAFISH Professional Fishing survey 2005-2006

The mean age of boats in the sample is fairly high (23 years), with a maximum of 34 years in La Restinga (table 1.11). The Medes case is not significant (only one answer).

Table 1.11. Professional fishing: age of boat (2006)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	13	4	100%
Columbretes	10	8	100%
La Graciosa	29	20	100%
Malta	24	20	93%
Medes	1	0	6%
Monte da Guia	24	25	94%
La Restinga	34	8	100%
Sinis	19	11	97%
Tuscany	26	0	100%
FULL SAMPLE	23	19	91%

Source: EMPAFISH Professional Fishing survey 2005-2006

Vessels were bought 13 years on average before the survey (Table 1.12). In the case of Medes, La Graciosa and La Restinga, this duration is significantly longer.

Table 1.12. Professional fishing: year of boat purchase

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	1997	1	100%
Columbretes	1996	8	100%
La Graciosa	1986	20	100%
Malta	1995	10	95%
Medes	1983	9	100%
Monte da Guia	1996	11	98%
La Restinga	1988	14	100%
Sinis	1992	9	78%
Tuscany	1998	0	100%
FULL SAMPLE	1993	11	95%

Source: EMPAFISH Professional Fishing survey 2005-2006

Some professional fishing boats are engaged in charter fishing as a side-activity. Table 1.13 presents the number of boats of the sample that are involved, and the maximum number of passengers they can carry. On the whole, few fishers reported to be involved in charter fishing. The only significant exception is Monte da Guia (Azores). In this case, the maximum number of passengers per boat is 3 on average.

Table 1.13. Prof. fishing: maximum number of passengers for boats with a side charter-fishing activity

MPA	Number of vessels involved	Maximum number of passengers		Answering Rate
		Mean	Standard Deviation	
Cabo de Palos				
Columbretes				
La Graciosa				
Malta				
Medes				
Monte da Guia	50	3	1	98%
La Restinga				
Sinis				
Tuscany	1	7	0	100%
FULL SAMPLE	51	3	2	14%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.14 gives the mean estimated value of boats in the sample. Interviewed persons were asked to estimate how much money would be obtained if the boat was sold with all its gears and equipments (this method was considered as safer than using insurance value). The mean resulting estimation ranges from 30 000 € to 730 000 €. Three groups appear: cases with mean value under 75 000 € (Monte da Guia, Sinis, Tuscany, La Restinga); cases with mean value between 100 000 € and 130 000 € (Cabo de Palos, La Graciosa, Medes, Malta), and a unique case with mean value over 700 000 € (Columbretes).

Table 1.14. Professional fishing: estimated value of boat, including fishing gears and equipments (euros)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	126 203	106 170	75%
Columbretes	730 093	570 568	100%
La Graciosa	107 157	112 766	100%
Malta	118 308	184 233	52%
Medes	101 625	9 013	50%
Monte da Guia	67 028	70 288	92%
La Restinga	30 625	19 613	100%
Sinis	73 257	54 953	97%
Tuscany	50 000	0	100%
FULL SAMPLE	139 972	268 125	71%

Source: EMPAFISH Professional Fishing survey 2005-2006

1.3.2 Fishing activity

Fishing gears are usually diversified in small-scale fisheries. Questions concerning fishing operations and gears used were often poorly answered. Answers were complemented by information from WP2, and provided by case-study partners. For the sake of this survey, gears were classified into nine categories (the names appearing in the right column of table 1.15 are the ones that were provided by the survey results and case-study partners).

Table 1.15. Professional fishing: gear description

Gear Category	Gear Names
FAD	Fish Aggregating Devices (FAD)
Hook and line	Electric reel, handline, hook and line, pole and line, fishing rod, jigging, jig, troll line
Longline	Bottom longline, surface longline, longlines
Net	Gillnet, nets, Trammel net
Pot	Pots, fish trap
Trawl	Trawl
Spear fishing	Spear fishing
Purse seine	Purse seine
Other	Shellfish gathering, beach seine (sonsera)

A fleet is defined as a set of boats with similar characteristics and fishing strategies. The degree of homogeneity implied by this definition may be adapted to circumstances. In this survey, three categories of fleets were defined, on the basis of the typology of gears.

Table 1.16. Professional fishing: fleet description

Fleet Category	Combination of gears
FAD Polyvalent	FAD and longline / pots / nets / hook and line
Other polyvalent	Hook and line / nets / Pots / Longlines / Purse seine / Spear fishing / Other
Trawler	Trawl

Table 1.17 describes the distribution of boats by fleet. With the exception of Columbretes, most boats in the sample are “polyvalent”. The case of Malta is specific, due to the frequent use of fishing aggregating devices. In the case of Columbretes, 70% of the boats in the sample are trawlers (trawlers are usually larger than polyvalent boats, which explains the differences in boat technical and economic characteristics that were noticed above).

Table 1.17. Professional fishing: fleet category

MPA	FAD Polyvalent	Other Polyvalent	Trawler	Answering Rate
Cabo de Palos		100%		75%
Columbretes		30%	70%	100%
La Graciosa		100%		100%
Malta	59%	34%	7%	88%
Medes		100%		100%
Monte da Guia		100%		100%
La Restinga		100%		100%
Sinis		100%		100%
Tuscany	--	--	--	0%
FULL SAMPLE	29%	63%	8%	93%

Source: EMPAFISH Professional Fishing survey 2005-2006

Except for trawlers (mainly represented in Columbretes), boats generally use various types of gears (mainly hook and line, longlines, nets and pots). Nets are the only type of gear used in all case studies. In La Graciosa, La Restinga and Monte da Guia, more than 90% of boats use hook and line. Longlines are used by half of the Maltese boats. In Cabo de Palos, Medes and Sinis, nets are used by a large majority of boats. The practice of spear fishing by a large number of boats seems to be a specificity of La Restinga (table 1.18).

Table 1.18. Professional fishing: distribution of gears by case study
(% of boats using considered gear at least once a year)

MPA	FAD	Trawl	Hook and line	Long line	Net	Pot	Spear fishing	Other	Purse seine	Answ. Rate
Cabo de Palos				50%	75%	50%				75%
Columbretes		70%		10%	15%					95%
La Graciosa			93%		21%	14%		7%		100%
Malta	52%	6%	6%	51%	7%	7%				87%
Medes				13%	81%			13%		100%
Monte da Guia			96%	14%	14%	22%			14%	100%
La Restinga			93%		7%	18%	64%	11%		96%
Sinis				22%	81%	36%				100%
Tuscany	--	--	--	--	--	--	--	--	--	0%
FULL SAMPLE	27%	7%	28%	32%	21%	13%	5%	2%	2%	92%

Source: EMPAFISH Professional Fishing survey 2005-2006

The average number of fishing trips (Table 1.19) is close to 100 per year, with a high standard deviation (78 trips). The highest figures are found in the most recent fleets (Cabo de Palos and Columbretes), but also in the oldest one (La Restinga). The number of trips at sea reported for Malta (53/year on average) seems low. The percentage of trips at sea inside the MPA ranges from 26% in Columbretes to 68% in La Graciosa. In Monte da Guia, the zero value is due to the fact that the MPA is composed of an integral reserve and a buffer-zone where fishing is prohibited. As regards Tuscany, it should be kept in mind that only one questionnaire was filled.

Table 1.19. Professional fishing: annual number of trips at sea (per boat)

MPA	Mean	Standard Deviation	% of trips inside MPA	Answering Rate
Cabo de Palos	203	4	36 %	75%
Columbretes	185	17	26 %	100%
La Graciosa	126	41	68 %	100%
Malta	53	54	65 %	55%
Medes	98	34	59 %	100%
Monte da Guia	71	42	0 %	76%
La Restinga	206	91	57 %	100%
Sinis	156	44	45 %	100%
Tuscany	120	0	100 %	100%
FULL SAMPLE	105	78	59 %	73%

Source: EMPAFISH Professional Fishing survey 2005-2006

When reported, the time at sea is usually between 600 and 1200 hours / year (Table 1.20). Unsurprisingly, it is significantly higher in Columbretes (nearly 2000 hours / year). It is particularly low in Malta (400 hours / year), but the answering rate is very low (13%).

Table 1.20. Professional fishing: number of operating hours per year (per boat)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	1 190	404	75%
Columbretes	1 920	140	100%
La Graciosa	1 150	616	50%
Malta	401	704	13%
Medes	588	203	100%
Monte da Guia	--	--	0%
La Restinga	--	--	0%
Sinis	1 026	612	97%
Tuscany	840	0	100%
FULL SAMPLE	998	738	30%

Source: EMPAFISH Professional Fishing survey 2005-2006

On the whole, trip durations for fishing inside and outside MPA are not very different (Table 1.21). Trips for fishing outside MPA are longer in La Graciosa and Sinis. The opposite situation prevails in Columbretes, where the MPA is far from the shore. In the case of Malta, the low answer rate and the important standard deviation should be underlined.

Table 1.21. Professional fishing: trip duration when fishing inside/outside MPA (hours)

MPA	Trip duration for fishing <i>inside</i> MPA			Trip duration for fishing <i>outside</i> MPA		
	Mean	Std Dev.	Answering Rate	Mean	Std Dev.	Answering Rate
Cabo de Palos	5,7	2	75%	5,7	2	75%
Columbretes	11,8	6	90%	9,9	2	90%
La Graciosa	1,4	0,3	100%	2,3	1	100%
Malta	26,7	51	66%	26,7	51	66%
Medes	6	0	44%	6	0	94%
Monte da Guia	--	--	0%	--	--	0%
La Restinga	--	--	0%	--	--	0%
Sinis	6,8	3	92%	8,3	2	86%
Tuscany	6,0	0	100%	0,0	0	100%
FULL SAMPLE	19,2	41	58%	19,1	41	59%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.22 presents the volume of annual landings per boat, and the share of these landings coming from MPA (except for Cabo de Palos and Tuscany Archipelago, where this information was not provided). As regards annual landings per boat, the case of Columbretes is quite specific, with 65 tons on average, to be compared with 10 tons or less in all other cases. This result is in accordance with the characteristics of the major Columbretes fleet (trawlers). With the exceptions of Monte da Guia and Malta, the share of catches obtained in the MPA ranges from 18% (Medes) to 58% (La Graciosa). The % obtained in Monte da Guia is consistent with the special feature of this MPA (see above). In the case Malta, the explanation is less straightforward, but, here again, the answering rate is very low (14%).

Table 1.22. Professional fishing: total annual landings per boat (tons, all species)

MPA	Mean	Standard Deviation	% from MPA	Answering Rate
Cabo de Palos	--	--	--	0%
Columbretes	65	39	20%	100%
La Graciosa	7	4	58%	100%
Malta	4	7	0%	14%
Medes	1	1	18%	44%
Monte da Guia	7	7	0%	88%
La Restinga	10	9	50%	96%
Sinis	3	3	45%	69%
Tuscany	--	--	--	0%
FULL SAMPLE	13	24	23%	46%

Source: EMPAFISH Professional Fishing survey 2005-2006

1.4 Fishing revenue and costs

Assessing economic performance of boats implies comparing their revenue and costs. Variable costs depend on the daily level of activity. Other costs are called “fixed”. Questions concerning costs were often poorly answered. Moreover, even after careful screening, answers concerning revenues and costs should be considered with special caution, some of them still raising important doubts.

1.4.1 Revenue

Table 1.23 presents answers to the survey concerning the value of annual landings per boat. The average landing price was computed on the basis of answers concerning quantities and values. With the usual exception of Columbretes (234 K€), mean turnover ranges from 18 K€ (Medes) to 50 K€ (Cabo de Palos, but only 1 answer in this case). The dispersion of mean prices is important, ranging from 3.3 €/Kg (La Restinga) to 16.9 €/Kg (Sinis).

Table 1.23. Professional fishing: annual value of landings per boat (€/year) and average price (€/Kg)

MPA	Mean value of landings (€/Year)	Standard Deviation	Answering Rate	Average price (€/Kg)
Cabo de Palos	50 000	0	25%	--
Columbretes	234 142	80 621	100%	4,7
La Graciosa	39 543	22 670	100%	6,0
Malta	32 867	65 514	31%	5,3
Medes	18 238	12 960	44%	11,6
Monte da Guia	40 667	47 789	90%	5,6
La Restinga	26 532	22 368	100%	3,3
Sinis	29 190	22 636	81%	16,9
Tuscany	--	--	0%	--
FULL SAMPLE	53 206	78 675	57%	7,0

Source: EMPAFISH Professional Fishing survey 2005-2006

1.4.2 Variable costs

Variable costs are classified in three categories: i) fuel and lubricant, ii) ice and bait, iii) other variable costs. Labour costs are not considered. Estimating these costs raises a special problem. In all cases, crew is rewarded according to the so-called “share system”, which implies that wages correspond to a given percentage of the value of landings, minus so-called “common costs” (fuel, ice, bait...). Unfortunately, the question concerning the percentage in use has been poorly answered. Table 1.24 presents the total yearly value of variable costs per boat. With provision for the specific case of Columbretes (82 650 euros per year), these costs range from 4 222 euros per year (Monte da Guia) to 11 447 euros per year (Malta).

Table 1.24. Professional fishing: total variable costs per boat (€/year), labour costs not included

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	5 918	4 328	100%
Columbretes	82 650	49 675	100%
La Graciosa	7 310	7 153	100%
Malta	11 447	26 163	76%
Medes	4 839	1 300	56%
Monte da Guia	4 222	7 132	92%
La Restinga	6 414	4 474	100%
Sinis	5 204	3 972	100%
Tuscany	5 520	0	100%
FULL SAMPLE	13 365	29 212	84%

Source: EMPAFISH Professional Fishing survey 2005-2006

Tables 1.25 to 1.27 give the detail of each type of cost. For a given case study, the sum of mean values appearing in these three tables is not necessarily equal to the corresponding mean value appearing in table 1.24 (dedicated to total variable costs). This is due to the fact that answering rates vary according to questions. Answers concerning fuel costs (Table 1.25) were checked by confronting them to alternative information (number of trips at sea, comparison of quantities and values, validation by computing an average price of fuel per litre...). When only the information on quantities was available, the value was estimated by using the mean price per litre in the MPA. “Other variable costs” (Table 1.27) appear to be quite high, but the answering rate concerning these costs is very low. Despite the fact that interviewers asked for details, little information was provided on the nature of these costs.

Table 1.25. Professional fishing: fuel and lubricant costs per boat (€/year)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	5 904	4 342	100%
Columbretes	78 019	51 451	100%
La Graciosa	5 590	5 618	100%
Malta	7 767	15 088	73%
Medes	2 397	743	56%
Monte da Guia	4 488	7 096	84%
La Restinga	4 971	4 158	100%
Sinis	5 032	3 845	100%
Tuscany	5 520	0	100%
FULL SAMPLE	11 211	25 185	82%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.26. Professional fishing: ice and bait costs per boat (€/year)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	55	0	25%
Columbretes	4 248	4 440	95%
La Graciosa	1 853	1 734	100%
Malta	3 105	7 458	21%
Medes	586	211	56%
Monte da Guia	107	233	90%
La Restinga	1 444	1 541	100%
Sinis	78	67	86%
Tuscany	--	--	0%
FULL SAMPLE	1 720	1 803	53%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.27. Professional fishing: other variable costs per boat (€/year)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	--	--	0%
Columbretes	5 950	3 550	10%
La Graciosa	0	--	100%
Malta	7 519	19 607	32%
Medes	1 856	547	56%
Monte da Guia	500	0	2%
La Restinga	--	--	0%
Sinis	--	--	0%
Tuscany	--	--	0%
FULL SAMPLE	6 646	17 974	22%

Source: EMPAFISH Professional Fishing survey 2005-2006

1.4.3 Fixed costs

Fixed costs were also split into three categories: boat fixed costs (repair and maintenance), gear costs, and other fixed costs (fishing licenses, insurance and management costs). Total fixed costs (yearly value per boat) are presented in table 1.28. As for variable costs, fixed costs are significantly higher in Columbretes (47 K€/year) than in the other case studies, where they range from 2 K€/year (Cabo de Palos) to 11.5 K€/year (Monte da Guia).

Table 1.28. Professional fishing: total fixed costs per boat (€/year)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	2 030	727	75%
Columbretes	47160	24 598	90%
La Graciosa	5 758	9 533	100%
Malta	6 258	12 751	53%
Medes	1 584	672	81%
Monte da Guia	11 581	17 860	98%
La Restinga	5 084	1 992	100%
Sinis	6 607	3 887	100%
Tuscany	6 300	0	100%
FULL SAMPLE	9 713	16 782	74%

Source: EMPAFISH Professional Fishing survey 2005-2006

Tables 1.29 to 1.31 present the detail of fixed costs, by category. The caveat that was raised for variable costs also applies here.

Table 1.29. Professional fishing: boat fixed costs per boat (€/year)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	1 700	1 300	50%
Columbretes	12 673	5 241	80%
La Graciosa	2 035	4 442	100%
Malta	3 106	8 789	27%
Medes	716	170	75%
Monte da Guia	2 162	3 310	92%
La Restinga	2 294	1 250	100%
Sinis	2 238	1 648	100%
Tuscany	1 000	0	100%
FULL SAMPLE	3 136	5 780	58%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.30. Professional fishing: gear fixed costs per boat (€/year)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	1 200	0	25%
Columbretes	17 370	12 297	90%
La Graciosa	1 675	1 764	100%
Malta	6 266	11 377	27%
Medes	1 450	0	6%
Monte da Guia	1 837	3 941	92%
La Restinga	--	--	0%
Sinis	4 158	2 251	89%
Tuscany	5 000	0	100%
FULL SAMPLE	5 344	9 113	46%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.31. Professional fishing: other fixed costs per boat (€/year)

MPA	Mean	Standard Deviation	Answering Rate
Cabo de Palos	745	505	50%
Columbretes	20 841	10 559	80%
La Graciosa	2 049	3 537	100%
Malta	2 730	5 487	29%
Medes	1 507	143	44%
Monte da Guia	8 321	12 151	92%
La Restinga	360	0	4%
Sinis	693	646	97%
Tuscany	300	0	100%
FULL SAMPLE	5 312	9 605	50%

Source: EMPAFISH Professional Fishing survey 2005-2006

1.5 Other incomes

Fishers may receive incomes from other sources than their fishing activity. Table 1.32 gives a qualitative view of incomes provided by other activities and pensions. In most cases, a significant number of fishers receive incomes from one of these sources. The only significant exception is Columbretes. The proportion of fishers declaring they receive other activity incomes reaches 50% in La Graciosa and La Restinga. As regards pensions, the highest figures are found in La Graciosa (29%) and Monte da Guia (22%).

Table 1.32. Professional fishing: existence of other incomes (activity or pension)

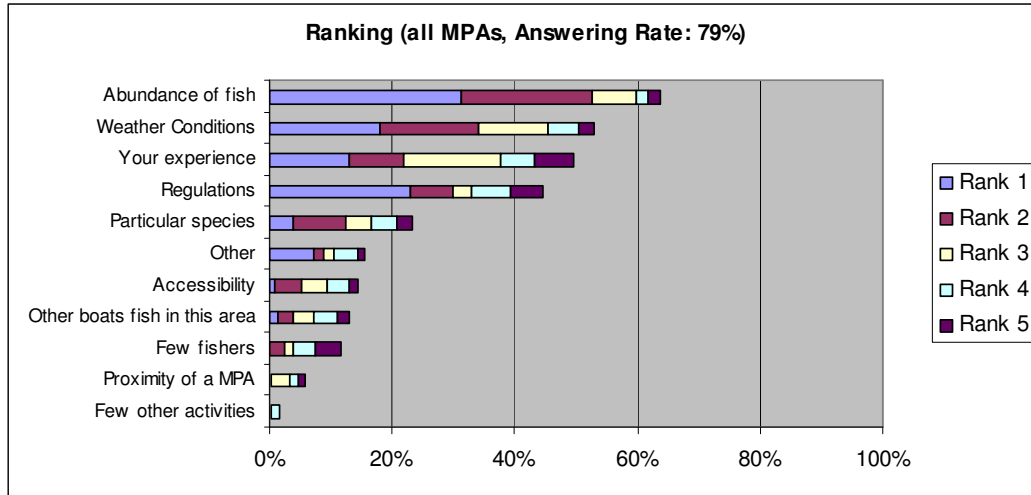
MPA	No	Yes, an activity income	Yes, a pension	Answering Rate
Cabo de Palos	67%	33%	0%	75%
Columbretes	90%	10%	0%	100%
La Graciosa	21%	50%	29%	100%
Malta	--	--	--	0%
Medes	--	--	--	0%
Monte da Guia	55%	24%	22%	100%
La Restinga	46%	50%	4%	100%
Sinis	74%	26%	0%	94%
Tuscany	100%	0%	0%	100%
FULL SAMPLE	60%	30%	11%	43%

Source: EMPAFISH Professional Fishing survey 2005-2006

1.6 Choice of fishing zone and perceptions of MPA

1.6.1 Choice criteria of fishing grounds

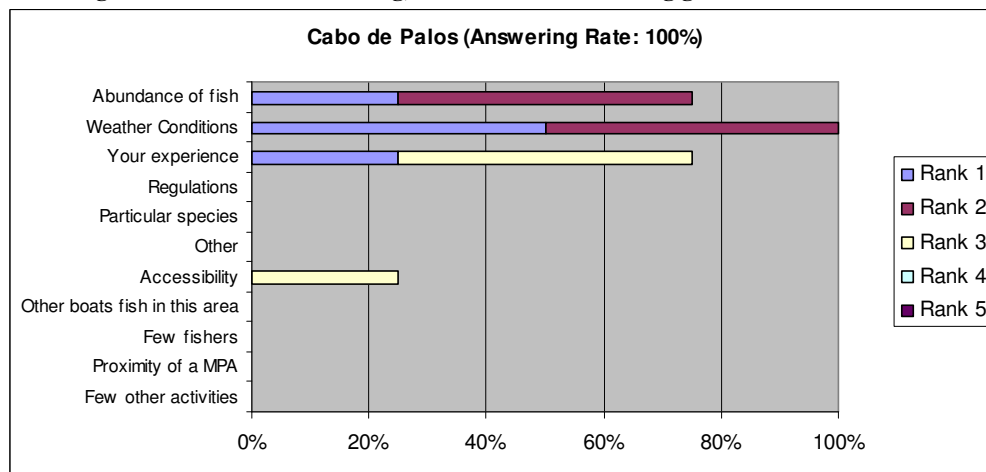
Fishers were asked to select, from a list of 11 items, the 5 major factors influencing their choice of a fishing area, and to rank them. Figure 1.1. presents the results for the full sample.

Figure 1.1. Professional fishing, choice criteria of fishing grounds: full sample

Source: EMPAFISH Professional Fishing survey 2005-2006

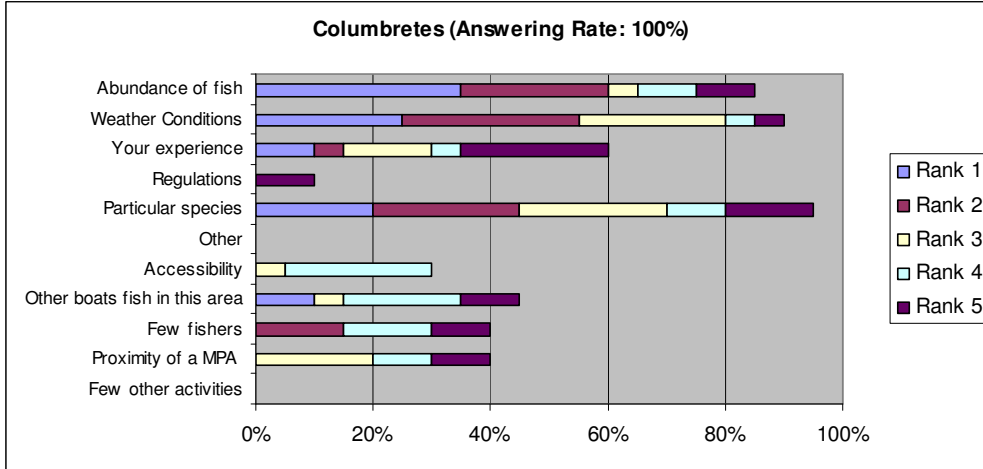
For the whole sample (354 interviews), the most important factor is the abundance of fish: more than 60% of interviewed fishers have selected this proposition, and nearly 30% ranked it first. Three other factors are considered important: weather conditions, fisher's experience of the area and regulations. Proximity of a MPA ranks low, which does not imply this factor has no impact on fishing strategies: if a no-take zone generates significant spillover effects in the surrounding area, answers concerning abundance of fish suggest that it will attract fishers.

Results per case-study are detailed in the 9 following figures. Factors are always presented in the same order, in order to help comparisons. However, for some cases, it is difficult to draw significant conclusions due to the limited number of answers (4 answers in Cabo de Palos, and only 1 in Tuscany). In Monte da Guia, the methodology that was used during the interviews does not allow full comparability of the results with other case-studies.

Figure 1.2. Professional fishing, choice criteria of fishing grounds: Cabo de Palos

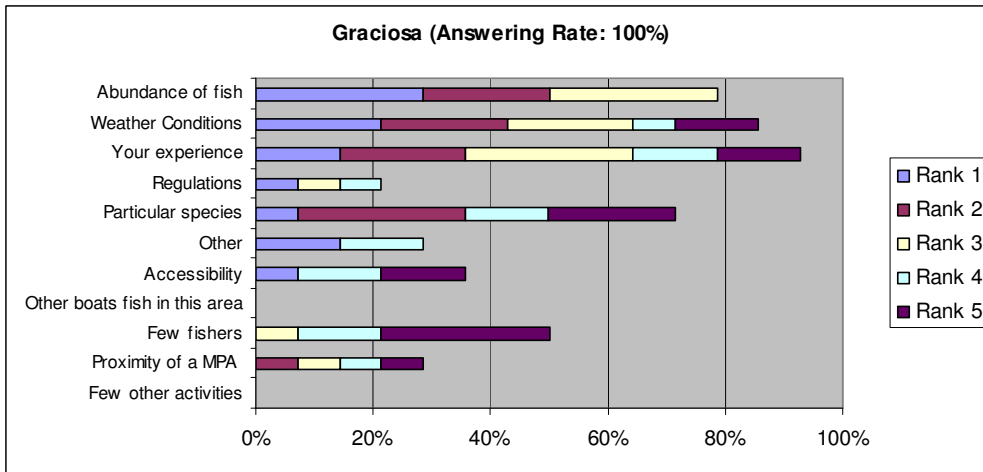
Source: EMPAFISH Professional Fishing survey 2005-2006

Figure 1.3. Professional fishing, choice criteria of fishing grounds: Columbretes



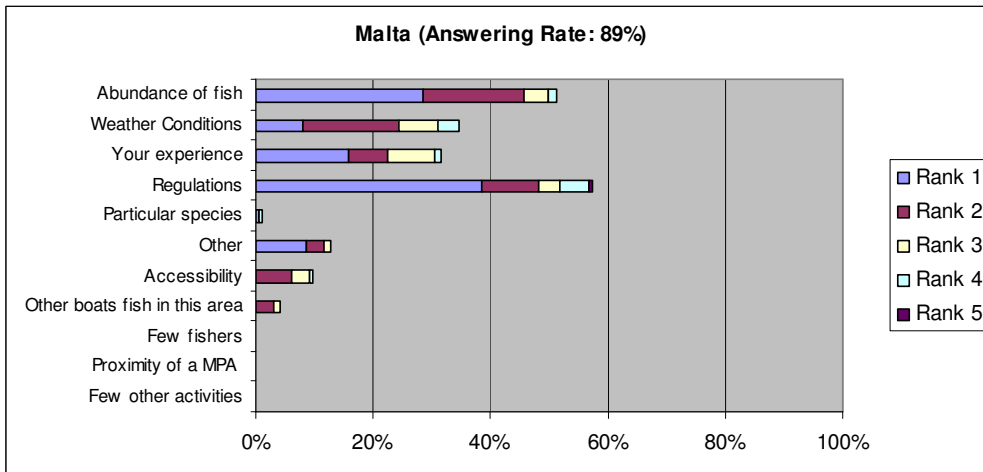
Source: EMPAFISH Professional Fishing survey 2005-2006

Figure 1.4. Professional fishing, choice criteria of fishing grounds: La Graciosa



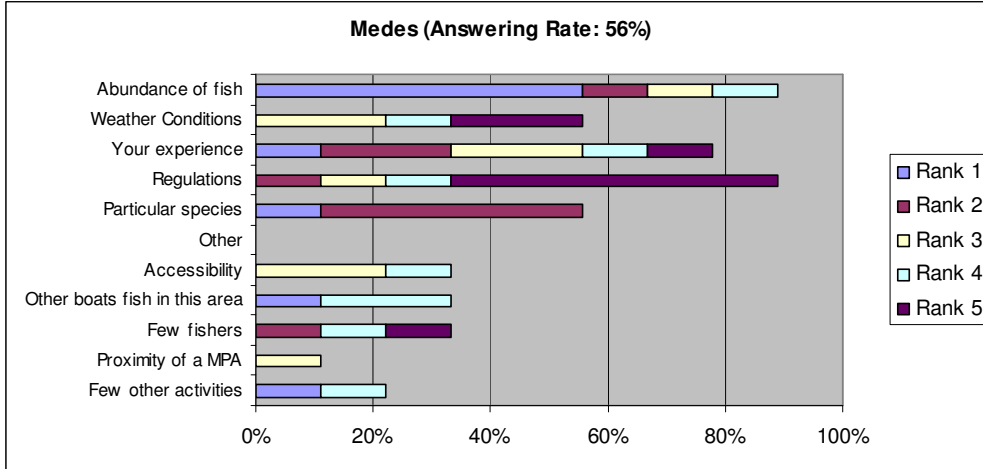
Source: EMPAFISH Professional Fishing survey 2005-2006

Figure 1.5. Professional fishing, choice criteria of fishing grounds: Malta



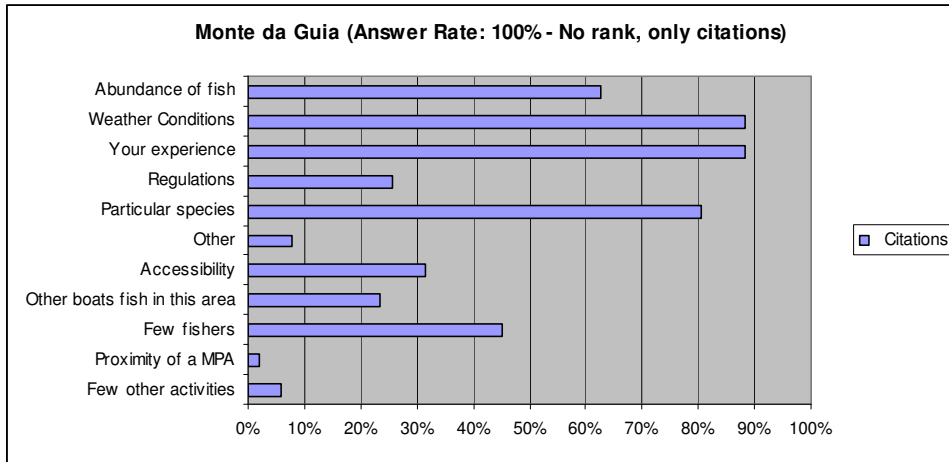
Source: EMPAFISH Professional Fishing survey 2005-2006

Figure 1.6. Professional fishing, choice criteria of fishing grounds: Medes



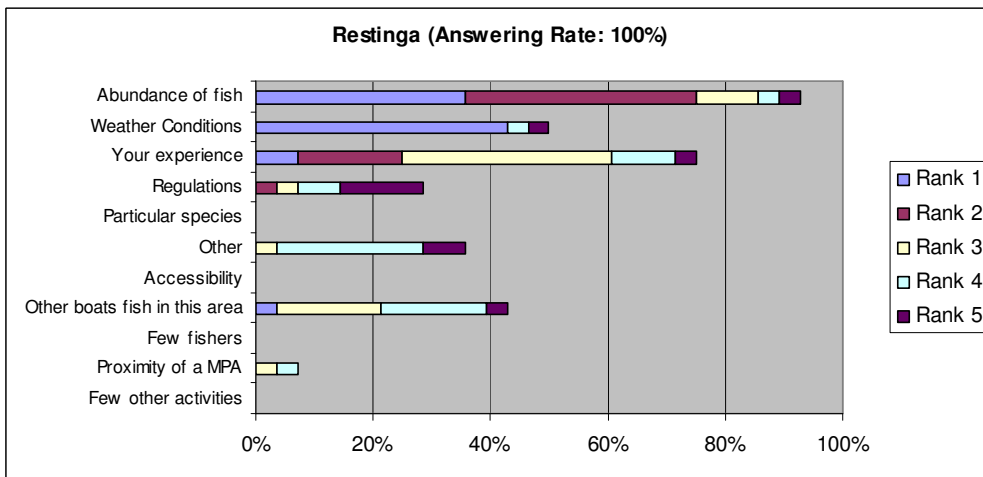
Source: EMPAFISH Professional Fishing survey 2005-2006

Figure 1.7. Professional fishing, choice criteria of fishing grounds: Monte da Guia

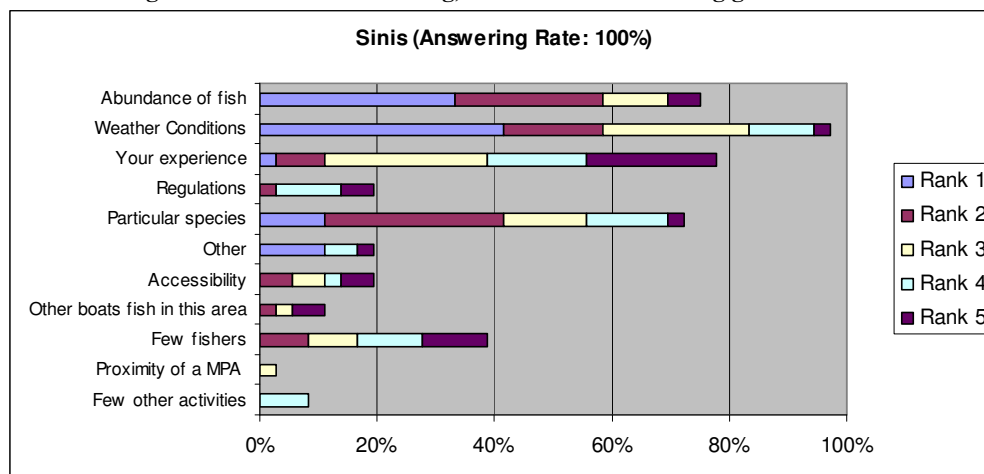


Source: EMPAFISH Professional Fishing survey 2005-2006

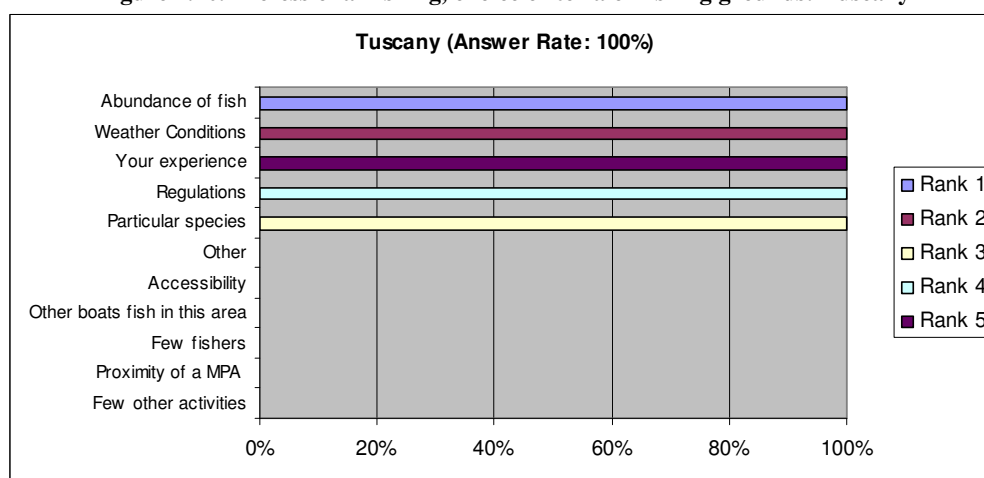
Figure 1.8. Professional fishing, choice criteria of fishing grounds: La Restinga



Source: EMPAFISH Professional Fishing survey 2005-2006

Figure 1.9. Professional fishing, choice criteria of fishing grounds: Sinis

Source: EMPAFISH Professional Fishing survey 2005-2006

Figure 1.10. Professional fishing, choice criteria of fishing grounds: Tuscany

Source: EMPAFISH Professional Fishing survey 2005-2006

According to the results presented in the figures 1.2 to 1.10, weather conditions are particularly important criteria in Cabo de Palos, Columbretes, La Graciosa, Sinis, and Monte da Guia. Presence of particular species is often mentioned in Columbretes, La Graciosa, Medes, Monte da Guia and Sinis. In Malta, regulations rank first.

1.6.2 Relations with other users of the MPA

Possible conflicts in the MPA have been investigated through a series of questions, concerning relations with other professional fishers and other MPA users (Tables 1.33-1.39).

Table 1.33. Professional fishing: relations with other professional fishers

MPA	Conflict	Good cooperation	No contact	Answering Rate
Cabo de Palos	0%	100%	0%	75%
Columbretes	40%	55%	5%	100%
La Graciosa	23%	77%	0%	93%
Malta	9%	85%	6%	89%
Medes	--	--	--	0%
Monte da Guia	8%	90%	2%	98%
La Restinga	--	--	--	0%
Sinis	8%	89%	3%	100%
Tuscany	0%	100%	0%	100%
FULL SAMPLE	11%	84%	5%	81%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.34. Professional fishing: relations with charter-fishing operators

MPA	Conflict	Good cooperation	No contact	Answering Rate
Cabo de Palos	0%	100%	0%	25%
Columbretes	0%	0%	100%	15%
La Graciosa	8%	15%	77%	93%
Malta	--	--	--	0%
Medes	--	--	--	0%
Monte da Guia	22%	41%	37%	100%
La Restinga	--	--	--	0%
Sinis	0%	69%	31%	100%
Tuscany	0%	0%	100%	100%
FULL SAMPLE	11%	47%	42%	30%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.35. Professional fishing: relations with individual recreational fishers (except spear fishers)

MPA	Conflict	Good cooperation	No contact	Answering Rate
Cabo de Palos	0%	67%	33%	75%
Columbretes	5%	5%	89%	95%
La Graciosa	77%	15%	8%	93%
Malta	15%	75%	10%	88%
Medes	--	--	--	0%
Monte da Guia	25%	45%	29%	100%
La Restinga	--	--	--	0%
Sinis	61%	17%	22%	100%
Tuscany	0%	100%	0%	100%
FULL SAMPLE	25%	55%	21%	81%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.36. Professional fishing: relations with recreational spear fishers

MPA	Conflict	Good cooperation	No contact	Answering Rate
Cabo de Palos	100%	0%	0%	25%
Columbretes	--	--	--	0%
La Graciosa	92%	0%	8%	93%
Malta	1%	72%	27%	87%
Medes	--	--	--	0%
Monte da Guia	16%	27%	57%	100%
La Restinga	--	--	--	0%
Sinis	64%	17%	19%	100%
Tuscany	100%	0%	0%	100%
FULL SAMPLE	18%	52%	31%	74%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.37. Professional fishing: relations with scuba divers

MPA	Conflict	Good cooperation	No contact	Answering Rate
Cabo de Palos	50%	0%	50%	50%
Columbretes	0%	10%	90%	100%
La Graciosa	15%	31%	54%	93%
Malta	5%	67%	28%	88%
Medes	--	--	--	0%
Monte da Guia	14%	27%	59%	100%
La Restinga	--	--	--	0%
Sinis	53%	19%	28%	100%
Tuscany	100%	0%	0%	100%
FULL SAMPLE	13%	47%	39%	81%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.38. Professional fishing: relations with jet-ski users

MPA	Conflict	Good cooperation	No contact	Answering Rate
Cabo de Palos	--	--	--	0%
Columbretes	0%	10%	90%	100%
La Graciosa	54%	0%	46%	93%
Malta	2%	64%	34%	86%
Medes	--	--	--	0%
Monte da Guia	10%	16%	75%	100%
La Restinga	--	--	--	0%
Sinis	28%	3%	69%	100%
Tuscany	100%	0%	0%	100%
FULL SAMPLE	9%	40%	50%	79%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.39. Professional fishing: relations with surfers*

MPA	Conflict	Good cooperation	No contact	Answering Rate
Cabo de Palos	--	--	--	0%
Columbretes	0%	10%	90%	100%
La Graciosa	0%	23%	77%	93%
Malta	2%	64%	34%	86%
Medes	--	--	--	0%
Monte da Guia	2%	16%	82%	100%
La Restinga	--	--	--	0%
Sinis	11%	14%	74%	97%
Tuscany	0%	0%	100%	100%
FULL SAMPLE	3%	43%	54%	79%

* including windsurfers and kite-surfers. Source: EMPAFISH Professional Fishing survey 2005-2006

Relations with other professional fishers are usually reported to be good, except in Columbretes where 40% of interviewed fishers mention conflicts (Table 1.33).

Relations with sport fishers are more contrasted (Table 1.35): reported as good in Cabo de Palos, Tuscany, and Malta, they are described as conflictual by a majority of interviewed professional fishers in La Graciosa and Sinis. The case of Monte da Guia is intermediate, with 25% fishers reporting conflicts and 45% reporting good cooperation. In Columbretes, most answers report “no contact” with sport fishers, which may be explained by the fact that the MPA is distant from the shore and the majority of professional fishing boats are trawlers.

Relations seem to be even more conflictual with spear fishers (Table 1.36): in Cabo de Palos, La Graciosa and Tuscany, most answers mention conflictual relations, and the same is true for

2 answers out of 3 in Sinis. The Malta case, where relations between professional fishers and recreational spear fishers are described as conflictual by only 1% of answers, seems to be quite an exception (though influencing deeply the overall results, due to its specific weight).

As regards other recreational users, the rate of answers mentioning “no contact” is usually important, and conflicts seem to be less frequent. Significant percentages of answers mentioning conflicts appear in Monte da Guia (with charter fishing operators), Cabo de Palos (scuba divers), Sinis (scuba divers and jet ski users), and La Graciosa (jet ski users).

1.6.3 Perception of benefits provided by MPA

A series of questions aimed at assessing the perceived impacts of the MPA on environment, on fishing and on the local economy. In each case, an assertion was presented to the interviewed person, who was asked to formulate an opinion concerning this assertion.

Tables 1.40 to 1.42 describe opinions of professional fishers on the biological effects of MPAs. Except in the Malta case, a large majority declare that MPAs have a positive impact on marine biodiversity (Table 1.40). Concerning fish abundance, it is necessary to distinguish two situations. In four case-studies (Columbretes, Monte da Guia, Sinis, La Restinga) a majority of fishers believe the MPA has favourable effects on fish abundance inside the protected area, and the opposite opinion is shared by a majority of fishers in only one case-study (La Graciosa) – let alone the Tuscany case, with only one answer -. Fishers seem to be more sceptical about spillover effects: only two case-studies display a majority of positive opinions on this topic (Monte da Guia, La Restinga), and a majority of negative opinions is found in four case-studies (Cabo de Palos, Columbretes, La Graciosa, Sinis).

Table 1.40. Professional fishing: do you think that MPA helps to protect biodiversity?

MPA	fully agree	rather agree	rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	75%	25%	0%	0%	0%	100%
Columbretes	100%	0%	0%	0%	0%	100%
La Graciosa	71%	0%	14%	7%	7%	100%
Malta	5%	17%	9%	1%	68%	67%
Medes	--	--	--	--	--	0%
Monte da Guia	16%	67%	8%	0%	10%	100%
La Restinga	68%	29%	0%	0%	4%	100%
Sinis	46%	29%	9%	11%	6%	97%
Tuscany	0%	0%	100%	0%	0%	100%
FULL SAMPLE	30%	27%	8%	2%	34%	78%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.41. Prof. fishing: do you think that MPA helps to enhance fish abundance inside protected area?

MPA	fully agree	rather agree	rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	50%	0%	50%	0%	0%	100%
Columbretes	85%	5%	0%	5%	5%	100%
La Graciosa	29%	7%	29%	36%	0%	100%
Malta	4%	27%	27%	5%	37%	72%
Medes	--	--	--	--	--	0%
Monte da Guia	12%	65%	16%	0%	8%	100%
La Restinga	68%	29%	0%	0%	4%	100%
Sinis	23%	37%	17%	17%	6%	97%
Tuscany	0%	0%	100%	0%	0%	100%
FULL SAMPLE	21%	32%	20%	6%	20%	81%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.42. Prof.fishing: do you think thatMPA helps to enhance fish abundance outside protected area?

MPA	fully agree	Rather agree	rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	25%	0%	75%	0%	0%	100%
Columbretes	10%	30%	0%	55%	5%	100%
La Graciosa	29%	7%	14%	43%	7%	100%
Malta	1%	19%	26%	1%	54%	68%
Medes	--	--	--	--	--	0%
Monte da Guia	10%	63%	20%	0%	8%	100%
La Restinga	64%	14%	0%	0%	21%	100%
Sinis	15%	18%	35%	18%	15%	94%
Tuscany	0%	0%	100%	0%	0%	100%
FULL SAMPLE	13%	26%	22%	9%	30%	78%

Source: EMPAFISH Professional Fishing survey 2005-2006

Tables 1.43 and 1.44 display fishers' opinions concerning benefits expected from MPAs in terms of management: reduction of illegal fishing and of conflicts. On both topics, opinions are balanced. The only case with a clear majority of positive opinions is Cabo de Palos.

Table 1.43. Professional fishing: do you think that MPA reduces illegal fishing?

MPA	fully agree	Rather agree	rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	25%	50%	0%	0%	25%	100%
Columbretes	37%	5%	5%	32%	21%	95%
La Graciosa	14%	14%	14%	50%	7%	100%
Malta	1%	33%	14%	2%	50%	60%
Medes	--	--	--	--	--	0%
Monte da Guia	2%	29%	41%	4%	24%	100%
La Restinga	14%	18%	7%	7%	54%	100%
Sinis	9%	18%	12%	62%	0%	94%
Tuscany	--	--	--	--	--	0%
FULL SAMPLE	7%	26%	18%	15%	34%	74%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.44. Professional fishing: do you think that MPA reduces conflicts among users?

MPA	fully agree	rather agree	rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	50%	0%	25%	0%	25%	100%
Columbretes	100%	0%	0%	0%	0%	5%
La Graciosa	50%	7%	7%	36%	0%	100%
Malta	2%	41%	19%	3%	35%	66%
Medes	--	--	--	--	--	0%
Monte da Guia	0%	26%	29%	0%	45%	100%
La Restinga	0%	11%	14%	0%	75%	100%
Sinis	11%	9%	14%	54%	11%	97%
Tuscany	0%	0%	100%	0%	0%	100%
FULL SAMPLE	6%	28%	20%	11%	36%	72%

Source: EMPAFISH Professional Fishing survey 2005-2006

Tables 1.45 to 1.48 describe fishers' opinions concerning the impact of the MPA on fishing, first at a global level (Table 1.45), and then at an individual level (Table 1.46-1.48).

Concerning the influence of MPA on global fishing activity, opinions of fishers vary greatly according to case studies. Positive opinions form a clear majority in four cases (Cabo de Palos, Columbretes, La Graciosa, and La Restinga). In Monte da Guia, nearly all fishers believe that MPA has no impact on fishing activity, an opinion that is shared by an important number of fishers in Malta and Sinis. Three cases display important groups of fishers with a negative opinion (La Graciosa, Sinis, and Malta).

Table 1.45. Professional fishing: impact of the MPA on fishing activity

MPA	Very positive	rather positive	rather negative	very negative	no impact	Answ. Rate
Cabo de Palos	0%	75%	0%	0%	25%	100%
Columbretes	45%	45%	0%	0%	10%	100%
La Graciosa	7%	57%	14%	21%	0%	100%
Malta	0%	8%	27%	8%	56%	90%
Medes	--	--	--	--	--	0%
Monte da Guia	0%	4%	0%	0%	96%	96%
La Restinga	18%	57%	4%	4%	18%	100%
Sinis	8%	22%	11%	17%	42%	100%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	6%	19%	16%	8%	51%	90%

Source: EMPAFISH Professional Fishing survey 2005-2006

Fishers were also asked about the impact of MPA on their own turnover, fishing effort and way to fish. For these three items, the dominant opinion seems to be that the MPA had no significant influence. However, here again the situation varies according to case studies. As regards turnover for instance, 50% of fishers declared a positive influence in one case (Cabo de Palos), and the same proportion mentioned a negative influence in another case (La Graciosa).

Table 1.46. Professional fishing: how was your turnover influenced by MPA?

MPA	Increased	Decreased	Been stable	Answering Rate
Cabo de Palos	50%	25%	25%	100%
Columbretes	47%	11%	42%	95%
La Graciosa	14%	50%	36%	100%
Malta	--	--	--	0%
Medes	--	--	--	0%
Monte da Guia	0%	0%	100%	100%
La Restinga	29%	4%	68%	100%
Sinis	8%	44%	47%	100%
Tuscany	0%	0%	100%	100%
FULL SAMPLE	16%	18%	67%	43%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.47. Professional fishing: changes in fishing effort since creation of MPA

MPA	It decreased	It increased	Unchanged	Answering Rate
Cabo de Palos	0%	0%	100%	75%
Columbretes	11%	39%	50%	90%
La Graciosa	29%	0%	71%	100%
Malta	--	--	--	0%
Medes	--	--	--	0%
Monte da Guia	0%	0%	100%	100%
La Restinga	7%	21%	71%	100%
Sinis	22%	50%	28%	100%
Tuscany	0%	0%	100%	100%
FULL SAMPLE	11%	21%	69%	43%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.48. Professional fishing: influence of MPA on the way to fish

MPA	Yes	No	Answering Rate
Cabo de Palos	25%	75%	100%
Columbretes	47%	53%	95%
La Graciosa	79%	21%	100%
Malta	31%	69%	86%
Medes	--	--	0%
Monte da Guia	8%	92%	100%
La Restinga	46%	54%	100%
Sinis	47%	53%	100%
Tuscany	0%	100%	100%
FULL SAMPLE	34%	66%	88%

Source: EMPAFISH Professional Fishing survey 2005-2006

Tables 1.49 and 1.50 are dedicated to fishers' opinions concerning the impact of MPAs on tourism and, more generally, on the local economy. The question concerning the impact on tourism was answered only in 4 case studies (Columbretes, Monte da Guia, Sinis and Tuscany). In all these cases, a strong majority of fishers declare the impact of MPA is positive. The answering rate is higher for the question concerning impact on local economy but, in several cases, an important proportion of persons answer they don't know (Malta, La Restinga, and, to a lesser extent, Monte da Guia and Sinis). A clear majority of positive opinions is found in three case-studies (Columbretes, La Graciosa, and Monte da Guia).

Table 1.49. Professional fishing: do you think the MPA helps to attract tourists?

MPA	fully agree	rather agree	rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	--	--	--	--	--	0%
Columbretes	90%	10%	0%	0%	0%	100%
La Graciosa	--	--	--	--	--	0%
Malta	--	--	--	--	--	0%
Medes	--	--	--	--	--	0%
Monte da Guia	10%	61%	6%	0%	24%	100%
La Restinga	--	--	--	--	--	0%
Sinis	63%	29%	0%	6%	3%	97%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	43%	40%	3%	2%	12%	30%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.50. Professional fishing: do you think that MPA is good for local economy?

MPA	fully agree	rather agree	Rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	50%	0%	50%	0%	0%	100%
Columbretes	85%	5%	5%	0%	5%	100%
La Graciosa	64%	0%	7%	29%	0%	100%
Malta	3%	30%	6%	0%	62%	68%
Medes	--	--	--	--	--	0%
Monte da Guia	2%	52%	12%	2%	32%	98%
La Restinga	18%	21%	0%	7%	54%	100%
Sinis	21%	15%	18%	21%	27%	94%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	17%	27%	8%	5%	43%	78%

Source: EMPAFISH Professional Fishing survey 2005-2006

Tables 1.51 to 1.53 display fishers' opinions concerning the distributional consequences of MPAs. Three types of activity were mentioned (professional fishing, recreational fishing and scuba diving), and fishers were asked to indicate which activity (or activities) benefited most from the existence of the MPA.

According to professional fishers' opinion, recreational activities are usually the major beneficiaries of MPAs. La Restinga is the only significant case with a clear majority of answers presenting professional fishers as the major beneficiaries of the MPA.

Table 1.51. Professional fishing: do you think that MPA benefits mainly professional fishing?

MPA	Fully agree	rather agree	Rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	0%	50%	50%	0%	0%	100%
Columbretes	26%	21%	32%	21%	0%	95%
La Graciosa	43%	0%	29%	29%	0%	100%
Malta	--	--	--	--	--	0%
Medes	--	--	--	--	--	0%
Monte da Guia	2%	43%	33%	6%	16%	100%
La Restinga	46%	14%	0%	4%	36%	100%
Sinis	18%	12%	35%	35%	0%	94%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	21%	24%	27%	16%	12%	43%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.52. Professional fishing: do you think that MPA benefits mainly recreational fishing?

MPA	Fully agree	rather agree	rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	0%	0%	50%	50%	0%	100%
Columbretes	--	--	--	--	--	0%
La Graciosa	71%	21%	0%	0%	7%	100%
Malta	--	--	--	--	--	0%
Medes	--	--	--	--	--	0%
Monte da Guia	4%	59%	16%	0%	22%	100%
La Restinga	--	--	--	--	--	0%
Sinis	50%	28%	6%	8%	8%	100%
Tuscany	0%	0%	100%	0%	0%	100%
FULL SAMPLE	28%	41%	12%	5%	14%	30%

Source: EMPAFISH Professional Fishing survey 2005-2006

Table 1.53. Professional fishing: do you think that MPA benefits mainly scuba diving?

MPA	Fully agree	rather agree	rather disagree	fully disagree	don't know	Answ. Rate
Cabo de Palos	100%	0%	0%	0%	0%	100%
Columbretes	70%	25%	5%	0%	0%	100%
La Graciosa	50%	21%	14%	7%	7%	100%
Malta	--	--	--	--	--	0%
Medes	--	--	--	--	--	0%
Monte da Guia	6%	69%	10%	0%	16%	100%
La Restinga	--	--	--	--	--	0%
Sinis	49%	24%	0%	3%	24%	92%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	37%	42%	7%	2%	14%	35%

Source: EMPAFISH Professional Fishing survey 2005-2006

Chapter 2

Recreational Fishing

2.1 Introduction

The recreational fishing survey targeted three different populations: i) individual fishers⁷, ii) charter-fishing operators, and iii) their customers. A specific questionnaire was designed for each population. Individual fishers and charter-fishing operators were surveyed by means of face-to-face interviews. Questionnaires concerning charter-fishing customers were distributed by operators, and were filled by customers without external help. Table 2.1 displays the number of questionnaires filled, by category and by case study. As the size of main population is unknown, it is not possible to present sampling rates.

Table 2.1. Recreational fishing: number of answers

MPA	Individual recreational fishers	Charter fishing	
		Operators	Customers
Bonifacio	10		
Côte Bleue	262		
La Restinga	142		
La Graciosa	184		
Malta	47		
Monte da Guia	56	2	20
Sinis	25		
Total	726	2	20

Source: EMPAFISH Recreational Fishing survey 2005-2006

On the whole, 748 questionnaires covering 7 MPAs were filled (Table 2.1). Most were filled by individual fishers (726 answers). Only one case-study (Monte da Guia) provided information concerning charter-fishing (2 operators, 20 customers). Three case studies account for 80% of the total number answers: Côte Bleue, La Graciosa, and La Restinga.

The two first sections of this chapter describe charter-fishing operators (2.2) and recreational fishers (2.3); the third one is dedicated to opinions of both fishers and operators concerning the choice of a fishing zone and the MPA (2.4). Several questions asked to charter-fishing customers and / or operators were identical to questions asked to individual fishers. In this case, answers are displayed in the same table, and data concerning each type of person are identified with an initial letter: “I” for individual fishers, “C” for charter-fishing customers, and “O” for charter-fishing operator.

2.2 Charter-fishing operators

Tables 2.2 and 2.3 present survey results describing charter-fishing operators and their activity. It should be recalled that only one case study provided information on this type of business, and that only two operators were interviewed. The lack of activity inside MPA

⁷ i.e. all kinds of recreational fishers operating in the areas under survey, except the ones fishing from a charter-fishing boat.

(table 2.44) is due to the specific characteristics of this MPA: fishing is forbidden within the whole area.

Table 2.2. Charter-fishing boats

	Mean	Std Dev.	Answ. Rate	
Number of boats owned by operator	2	1	100%	
Boat characteristics (per boat)	Length (m)	11,3	2,5	100%
	Tonnage (GRT)	9,7	7,0	100%
	Power (Kw)	550	308	100%
	Max number of passengers	8,3	2,9	100%
	Crew size	2,7	0,5	100%
	Year of construction	1 982	16	100%
	Year of purchase	2 003	4	100%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (charter-fishing operators)

Table 2.3. Charter-fishing activity

	Mean	Std Dev.	Answ. Rate
Start of business (year)	2002	3,5	100%
Number of months of activity / year	3,0	0,0	100%
Number of trips at sea / year	49,0	41,0	100%
% of trips in the MPA	0%	0%	100%
Number of customers / year	140,0	130,0	100%
Total fuel consumption (litres / year)	15 100	11 900	100%
Number of jobs (annual full time equivalents)	1,3	0,5	100%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (charter-fishing operators)

2.3 Recreational fishers

2.3.1 Personal data

Tables 2.4 to 2.8 provide information concerning gender, age, size of household, country of residence, income, and professional occupation of recreational fishers.

Table 2.4. Gender and age of recreational fishers

MPA	Gender (frequency)			Age (years)		
	Female	Male	Answ. Rate	Mean	Std Dev.	Answ. Rate
Bonifacio	0%	100%	100%	36,3	6,5	90%
Côte Bleue	8%	92%	99%	48,3	23,5	99%
La Graciosa	7%	93%	100%	41,0	13,4	100%
Malta	--	--	0%	--	--	0%
Monte da Guia (I)	4%	96%	97%	42,6	12,6	100%
Monte da Guia (C)	6%	94%	90%	47,8	15,6	65%
La Restinga	10%	90%	100%	41,2	14,5	100%
Sinis	4%	96%	100%	47,3	16,3	100%
FULL SAMPLE	7%	93%	93%	44,2	18,4	92%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

Table 2.5. Recreational fishing: size of household (number of persons)

MPA	Mean	Standard Deviation	Answering Rate
Bonifacio	2,5	1,2	100%
Côte Bleue	2,8	1,2	98%
La Graciosa	3,6	1,5	100%
Malta	--	--	0%
Monte da Guia (I)	3,2	1,5	98%
Monte da Guia (C)	1,9	0,9	100%
La Restinga	3,5	1,4	100%
Sinis	3,1	0,9	100%
FULL SAMPLE	3,2	1,4	93%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

Data concerning gender and age of fishers, as well as size of their household, are rather similar in most case studies. More than 90% of fishers in the sample are male. Their mean age is 44, ranging from 41 (La Graciosa) to 48 (Côte Bleue), with the exception of Bonifacio (36, but only 9 answers in this case). The size of their household is close to 3 persons on average, ranging from 2.5 persons in Bonifacio to 3.6 persons in La Graciosa, with the exception of charter-fishing customers in Monte da Guia, where it is only 1.9.

Table 2.6. Recreational fishing: country of residence (frequency)

MPA	France	Spain	Malta	Portugal	Italy	USA	Other*	AR
Bonifacio	100%	0%	0%	0%	0%	0%	0%	100%
Côte Bleue	99%	0%	0%	0%	0%	0%	1%	98%
La Graciosa	0%	96%	0%	0%	3%	0%	1%	100%
Malta	0%	0%	100%	0%	0%	0%	0%	96%
Monte da Guia (I)	0%	0%	0%	100%	0%	0%	0%	100%
Monte da Guia (C)	0%	0%	0%	0%	0%	45%	55%	100%
La Restinga	1%	99%	0%	0%	0%	0%	1%	100%
Sinis	0%	0%	0%	0%	100%	0%	0%	100%
FULL SAMPLE	36%	43%	6%	8%	4%	1%	2%	99%

* Argentina, Belgium, Denmark, Germany, Netherlands, United Kingdom

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

In table 2.6, figures concerning countries where MPAs are located have been written in bold character. In most cases, an overwhelming majority of recreational fishers in the sample are resident of the country where the MPA is located. Fishing-charter customers in Monte da Guia are the only exception to this rule: all of them come from foreign countries. Though questionnaires were normally available in several languages, a selection bias leading to an over-representation of fishers belonging to the same country as the MPA (and people in charge of the survey) is suspected.

Table 2.7. Recreational fishing: net household income (euros / month)

MPA	≤ 1200	]1200-2400]	]2400-3600]	]3600-4800]	]4800-6000]	> 6000	AR
Bonifacio	30%	30%	10%	0%	30%	0%	100%
Côte Bleue	15%	43%	25%	7%	5%	5%	92%
La Graciosa	11%	51%	19%	6%	7%	6%	84%
Malta	--	--	--	--	--	--	0%
Monte da Guia (I)	47%	38%	6%	4%	0%	6%	98%
Monte da Guia (C)	0%	0%	11%	26%	21%	42%	95%
La Restinga	35%	54%	1%	1%	0%	0%	100%
Sinis	21%	41%	25%	4%	4%	4%	96%
FULL SAMPLE	21%	47%	16%	5%	5%	5%	87%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

On the whole, two thirds of recreational fishers in the sample do not earn more than 2400 € a month, and only 10% make more than 4800 € a month. However, answers vary according to case studies. The case of fishing-charter customers in Monte da Guia (all of them coming from abroad) is quite specific, with 9 fishers out of 10 earning more than 3600 € per month, an income that is earned by only 15% of fishers in the rest of the sample.

Table 2.8. Recreational fishing: professional occupation (frequency)

MPA	Farmer	Craftsman *	Manager **	School teacher ***	Employee	Blue collar	Student	Retired	Unemployed	Other	AR
Bonifacio	0%	10%	50%	0%	40%	0%	0%	0%	0%	0%	100%
Côte Bleue	0%	10%	12%	3%	17%	23%	6%	28%	0%	0%	97%
La Graciosa	0%	5%	24%	8%	19%	26%	9%	9%	0%	0%	100%
Malta	--	--	--	--	--	--	--	--	--	--	0%
Monte da Guia (I)	11%	4%	27%	0%	23%	2%	2%	14%	4%	15%	100%
La Restinga	1%	0%	16%	2%	58%	0%	9%	10%	4%	0%	100%
Sinis	0%	16%	0%	8%	16%	4%	4%	36%	0%	16%	100%
FULL SAMPLE	1%	6%	18%	4%	27%	16%	7%	18%	1%	2%	92%

* Craftsman, shopkeeper. ** Manager, senior civil servant, doctor, lawyer, professor... *** School teacher, other white collar worker. Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

As regards professional occupation, the major groups in the sample are employees (27%), managers and senior white collars (18%), retired persons (18%) and blue-collar workers (16%). Here again, the situation may vary significantly according to case studies: in La Restinga, 58% of the sample is made of employees, while in Sinis and Côte Bleue, retired persons represent 36% and 28% of the sample respectively; only in Monte da Guia do farmers represent a significant proportion of the sample (11%).

2.3.2 Fishing activity

Tables 2.9 and 2.10 display survey results concerning the nature of fishing activity and gears used. Table 2.9 is about the activity performed at the time of the survey, while table 2.10 is about the various types of gears used during the year.

Table 2.9. Recreational fishing: nature of fishing activity on the day of the survey (frequency)

MPA	Angling from the shore	Fishing from a boat	Spear fishing	Answering rate
Bonifacio	0%	0%	100%	100%
Côte Bleue	65%	24%	11%	100%
La Graciosa	66%	34%	0%	100%
Malta	0%	100%	0%	100%
Monte da Guia (I)	36%	52%	13%	100%
Monte da Guia (C)	0%	100%	0%	100%
La Restinga	100%	0%	0%	100%
Sinis	13%	88%	0%	96%
FULL SAMPLE	61%	33%	6%	100%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

Table 2.10. Recreational fishing: major gears used and types of fishing performed, by order of importance (frequency)

MPA		Hook and line	Nets	Pots	Shellfish gathering	Spear	Other
Bonifacio AR=100%	Rank 1	0,0%	0,0%	0,0%	0,0%	100,0%	0,0%
	Rank 2	40,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	Rank 3	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Côte Bleue AR=99%	Rank 1	88,8%	0,0%	0,0%	0,0%	10,8%	0,4%
	Rank 2	7,7%	0,8%	0,0%	1,5%	5,0%	1,2%
	Rank 3	0,8%	0,0%	0,0%	0,8%	0,0%	0,0%
La Graciosa AR=99%	Rank 1	14,3%	0,0%	0,0%	1,1%	2,2%	82,4%
	Rank 2	13,2%	0,5%	0,0%	8,8%	2,7%	12,6%
	Rank 3	2,7%	0,0%	0,0%	4,4%	0,0%	2,2%
Malta AR=64%	Rank 1	86,7%	0,0%	13,3%	0,0%	0,0%	0,0%
	Rank 2	6,7%	6,7%	0,0%	0,0%	0,0%	0,0%
	Rank 3	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Monte da Guia (I) AR=98%	Rank 1	89,1%	1,8%	0,0%	0,0%	9,1%	0,0%
	Rank 2	3,6%	0,0%	0,0%	5,5%	12,7%	0,0%
	Rank 3	1,8%	0,0%	0,0%	1,8%	0,0%	0,0%
La Restinga AR=100%	Rank 1	98,6%	0,0%	0,0%	0,7%	0,7%	0,0%
	Rank 2	1,4%	0,0%	0,0%	7,7%	4,2%	0,7%
	Rank 3	0,0%	0,0%	0,0%	1,4%	0,0%	0,0%
Sinis AR=100%	Rank 1	96,0%	0,0%	0,0%	0,0%	0,0%	4,0%
	Rank 2	4,0%	4,0%	0,0%	8,0%	12,0%	4,0%
	Rank 3	0,0%	0,0%	0,0%	12,0%	0,0%	0,0%
FULL SAMPLE AR=97%	Rank 1	70,5%	0,1%	0,6%	0,4%	6,8%	21,6%
	Rank 2	7,8%	0,9%	0,0%	5,1%	4,8%	4,0%
	Rank 3	1,1%	0,0%	0,0%	2,3%	0,0%	0,6%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

When surveyed, some 60% of fishers in the sample were angling from the shore, one third were fishing from a boat, and 6% were doing spear fishing (Table 2.9). The distribution varies greatly according to case studies. 100% were angling from the shore in La Restinga, but only 13% in Sinis, and 0% in Bonifacio and Malta. In Malta, 100% were fishing from a boat, in Sinis 88%, in Monte da Guia 64%, but in Bonifacio and La Restinga the figure was 0%. Spear

fishers appear in three case studies only: Bonifacio (100%), Côte Bleue (11%), and Monte da Guia (13% of individual fishers). Some fishers perform different types of fishing during the year (Table 2.10). On the whole, 70% use fishing rod as their major gear. The corresponding proportion is 7% for spear, and 22% for “other gears” (e.g. trolling line, longline). Nearly 1/4 of fishers mention a 2nd gear or type of fishing, and 4% mention a 3rd one.

Table 2.11 describes answers concerning membership in a fishing club. On the whole, only a small minority are concerned. However, the proportion is around 25% in Sinis and Monte da Guia, and reaches 40% in Bonifacio (where all fishers in the sample are spear fishers).

Table 2.11. Recreational fishing: do you belong to a fishing club or association?

MPA	Yes	No	Answering Rate
Bonifacio	40%	60%	100%
Côte Bleue	10%	90%	99%
La Graciosa	13%	87%	98%
Malta	--	--	0%
Monte da Guia (I)	25%	75%	93%
La Restinga	4%	96%	100%
Sinis	24%	76%	100%
FULL SAMPLE	12%	88%	92%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Figures 2.12 to 2.14 describe fishing experience. Nearly 50% of fishers in the sample have experienced fishing for more than 20 years. Individual fishers go fishing some 46 times a year on average. For charter-fishing customers, the average yearly number of fishing trips is 7.

Table 2.12. Recreational fishing: number of years of activity (individual fishers)

MPA	< 1 year	1-5 years	6-10 years	11-20 years	> 20 years	Answ. Rate
Bonifacio	0%	10%	40%	10%	40%	100%
Côte Bleue	5%	11%	18%	12%	54%	98%
La Graciosa	4%	17%	17%	14%	47%	100%
Malta	--	--	--	--	--	0%
Monte da Guia (I)	0%	11%	16%	18%	55%	100%
La Restinga	8%	17%	22%	19%	35%	100%
Sinis	4%	4%	36%	16%	40%	100%
FULL SAMPLE	5%	14%	20%	15%	48%	93%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Table 2.13. Recreational fishing: number of fishing times per year (individual fishers)

MPA	Mean	Standard Deviation	Answering Rate
Bonifacio	56,0	32,9	90%
Côte Bleue	44,6	49,6	99%
La Graciosa	34,0	32,5	99%
Malta	34,4	41,4	68%
Monte da Guia (I)	75,2	69,6	100%
La Restinga	47,7	43,8	100%
Sinis	79,2	58,8	100%
FULL SAMPLE	45,9	48,1	97%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Table 2.14. Charter-fishing customers experience: years of activity and fishing trips

MPA	Year of fishing activity			Number of fishing trips per year		
	Mean	Std Dev.	Answ. Rate	Mean	Std Dev.	Answ. Rate
Monte da Guia (I)	29,1	11,6	95%	7,1	5,5	100%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (charter-fishing customers)

Table 2.15 displays answers of fishers concerning their own estimated level of expertise. For the whole sample, the distribution is symmetrical, approximately 1/4 of fishers describing themselves as “beginners”, one half as “medium”, and 1/4 as “experts”. The proportion of “experts” is significantly higher in Monte da Guia than in the rest of the sample.

Table 2.15. Recreational fishing: estimated level of expertise (frequency)

MPA	Beginner	Medium	Expert	Answ. Rate
Bonifacio	0%	80%	20%	100%
Côte Bleue	21%	60%	19%	97%
La Graciosa	25%	51%	25%	97%
Malta	--	--	--	0%
Monte da Guia (I)	11%	18%	71%	100%
Monte da Guia (C)	5%	40%	55%	100%
La Restinga	28%	51%	21%	100%
Sinis	24%	56%	20%	100%
FULL SAMPLE	22%	52%	26%	92%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

Table 2.16 estimated yearly catches. The overall mean amounts to 75 kg. It varies greatly according to case-studies. But the rate of answers is sometimes low, and the dispersion within each case-study is important.

Table 2.16. Recreational fishing: total estimated catches per year (kg)

MPA	Mean	Standard Deviation	Answering Rate
Bonifacio	92	146	90%
Côte Bleue	22	34	73%
La Graciosa	108	211	97%
Malta	44	48	38%
Monte da Guia (I)	259	831	93%
La Restinga	26	35	78%
Sinis	112	127	40%
FULL SAMPLE	75	289	78%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

2.3.3 Fishing zone

Tables 2.17 to 2.21 present results concerning the zone where fishers operated on the day they participated in the survey.

Table 2.17. Recreational fishing: is the zone where you are fishing today...

MPA	Your usual fishing area	One of your usual fishing areas	Not your usual area	Answering Rate
Bonifacio	0%	80%	20%	100%
Côte Bleue	38%	40%	22%	97%
La Graciosa	23%	64%	13%	98%
Malta	100%	0%	0%	100%
Monte da Guia (I)	22%	53%	25%	98%
La Restinga	34%	39%	27%	100%
Sinis	52%	44%	4%	100%
FULL SAMPLE	36%	45%	19%	98%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Table 2.18. Recr. fishing: annual number of fishing times and % of annual catches coming from this area

MPA	Annual number of fishing times in this area			% of annual catches coming from this area		
	Mean	Std Dev.	AR	Mean	Std Dev.	AR
Bonifacio	28,9	33,1	100%	39,1	24,8	90%
Côte Bleue	21,4	29,3	96%	55,1	37,6	87%
La Graciosa	12,0	22,4	100%	49,7	39,7	100%
Malta	39,8	44,1	13%	100,0	0,0	100%
Monte da Guia (I)	31,7	42,6	96%	45,5	30,2	89%
La Restinga	8,4	10,3	100%	31,1	32,2	89%
Sinis	50,4	48,4	100%	74,2	27,6	96%
FULL SAMPLE	18,3	29,1	92%	52,0	38,6	92%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Table 2.19. Recreational fishing: total travelling time from accommodation to fishing area (minutes)

MPA	Mean	Standard Deviation	Answering Rate
Bonifacio	41,7	23,9	60%
Côte Bleue	30,7	38,6	99%
La Graciosa	43,4	56,6	100%
Malta	--	--	0%
Monte da Guia (I)	30,5	30,0	96%
La Restinga	14,4	10,6	100%
Sinis	41,3	25,8	96%
FULL SAMPLE	30,8	40,4	90%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Table 2.20. Recr. fishing: distance and travelling time from accommodation to fishing area* or harbour**

MPA	Distance (km)			Duration (minutes)			Perception of travelling time			
	Mean	SD	AR	Mean	SD	AR	Leisure time	Loss of time	No opinion	AR
Bonifacio	18,4	13,2	90%	26,1	10,7	90%	22%	33%	44%	90%
Côte Bleue	35,4	71,0	65%	28,2	38,7	98%	66%	5%	29%	98%
La Graciosa	4,4	4,0	30%	23,2	24,8	72%	96%	4%	1%	73%
Malta	--	--	0%	--	--	0%	--	--	--	0%
Monte da Guia (I)	4,0	4,6	93%	9,6	7,8	100%	38%	5%	57%	100%
La Restinga	9,8	17,3	80%	17,6	16,7	100%	--	--	--	0%
Sinis	16,0	12,5	80%	15,4	8,4	96%	59%	0%	41%	88%
FULL SAMPLE	19,2	48,3	58%	22,5	29,4	86%	70%	5%	25%	66%

* Fishers operating from the shore. ** Fishers operating from a boat.

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Table 2.21. Recreational fishing: distance and travelling time from harbour to fishing area*

MPA	Distance (km)			Duration (minutes)			Perception of travelling time			
	Mean	SD	AR	Mean	SD	AR	Leisure time	Loss of time	No opinion	AR
Bonifacio	11,0	9,0	20%	17,5	4,8	60%	100%	0%	0%	70%
Côte Bleue	2,4	3,1	15%	10,4	10,4	26%	80%	0%	20%	28%
La Graciosa	80,8	528,6	30%	83,8	76,1	31%	98%	2%	0%	28%
Malta	6,3	5,3	72%	--	--	0%	--	--	--	0%
Monte da Guia (I)	6,1	3,8	57%	35,9	33,0	57%	100%	0%	0%	57%
La Restinga	--	--	0%	--	--	0%	--	--	--	0%
Sinis	6,1	3,7	80%	28,4	20,9	88%	91%	0%	9%	88%
FULL SAMPLE	28,4	295,3	25%	39,6	54,8	26%	90%	1%	9%	26%

* Fishers operating from a boat. Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

For some 80% of fishers in the sample, the zone where they fished the day they participated in the survey is their usual, or one of their usual fishing zones. They visit it 18 times per year on average, and catch there slightly over 50% of their total annual catches. Total travelling time from their accommodation to this zone takes half an hour on average. However, for the ones that fish from a boat, time at sea from harbour to fishing zone is 40 minutes on average (ranging from 10 minutes in Côte Bleue to almost one hour and a half in La Graciosa). For a majority of fishers in the sample, travelling time between accommodation place and fishing zone is perceived as part of the leisure. Very few regard it as a waste of time.

Table 2.22 characterizes the importance of fishers' activity inside the authorized fishing zone of the MPA, or in the vicinity of the MPA.

Table 2.22. Recreational fishing: fishing inside the MPA or in its vicinity

MPA	Do you fish inside MPA?			If yes, which part of your total fishing time? (%)			If no, how far do you fish from MPA? (nautical miles)		
	Yes	No	AR	Mean	SD	AR	Mean	SD	AR
Bonifacio	78%	22%	90%	51,5	42,0	86%	12,5	2,5	100%
Côte Bleue	99%	1%	96%	80,3	29,5	88%	8,0	7,0	67%
La Graciosa	85%	15%	98%	95,5	14,8	99%	4,7	4,2	85%
Malta	71%	29%	66%	--	--	0%	--	--	0%
Monte da Guia (I)	8%	92%	93%	10,0	11,6	100%	1,0	0,0	4%
La Restinga	94%	6%	99%	73,0	29,6	100%	1,0	0,0	78%
Sinis	100%	0%	100%	54,0	33,3	96%	--	--	0%
FULL SAMPLE	86%	14%	95%	80,8	29,3	91%	4,4	4,7	37%

* Fishers operating from a boat. Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Most fishers in the sample exert at least a large part of their fishing activity inside the MPA. The only exception is Monte da Guia, which may be explained by the particular organisation of this MPA (fishing is forbidden within the whole area). For fishers who do not operate inside MPA, the mean distance between their usual fishing place and the MPA is slightly below 5 nautical miles on average.

2.3.4 Budget

Table 2.23 presents yearly expenditures related to fishing, as estimated by fishers themselves (gears, boat maintenance, fuel, licences, charter fishing fees...). For the whole sample, the mean fishing budget is close to 1 K€/ year, with an important dispersion around the mean (standard deviation is 3.1 K€). Here again, the case of charter-fishing customers (Monte da Guia) is quite specific, with a mean budget almost 10 times as high as the mean budget of the rest of the sample. Mean annual budget in La Restinga looks quite low (only 167 €/year).

Table 2.23. Recreational fishing: expenditures related to fishing (euros / year)

MPA	Mean	Standard Deviation	Answering Rate
Bonifacio	1 154	758	100%
Côte Bleue	610	1 007	97%
La Graciosa	1 511	5 316	97%
Malta	1 242	2 271	91%
Monte da Guia (I)	982	1 163	98%
Monte da Guia (C)	9 866	5 420	65%
La Restinga	167	214	99%
Sinis	1 631	1 445	96%
FULL SAMPLE	1 022	3 177	96%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

A series of questions was dedicated to fishers whose main accommodation is distant from the MPA (these fishers are denominated hereafter as “non-resident” or “tourists”). In this case, it is suspected that accommodation and / or travelling costs form a major expenditure, conditioning their presence, and therefore their fishing activity, inside MPA or close to it. Tables 2.24 to 2.26 present the answers to these questions. Answer rates, which are computed on the basis of the whole sample, are usually low because many fishers in the sample live close to the place where they fish (see above).

Table 2.24. Non-resident recreational fishers: means of transport

MPA	Boat	Plane	Car	Other	AR
Bonifacio	0%	0%	100%	0%	10%
Côte Bleue	5%	0%	79%	16%	7%
La Graciosa	34%	65%	1%	1%	74%
Malta	0%	0%	0%	0%	0%
Monte da Guia (I)	0%	100%	0%	0%	2%
Monte da Guia (C)	0%	95%	5%	0%	100%
La Restinga	87%	8%	5%	0%	100%
Sinis	100%	0%	0%	0%	4%
FULL SAMPLE	53%	38%	8%	1%	43%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

Table 2.25. Non-resident recreational fishers: accommodation

MPA	Hotel	Rented house	Family or relatives	Own property	Camping ground	Other	AR
Bonifacio	0%	0%	100%	0%	0%	0%	10%
Côte Bleue	5%	15%	25%	15%	15%	25%	8%
La Graciosa	0%	68%	9%	7%	10%	6%	91%
Malta	0%	0%	0%	0%	0%	0%	0%
Monte da Guia (I)	0%	0%	100%	0%	0%	0%	100%
Monte da Guia (C)	84%	16%	0%	0%	0%	0%	95%
La Restinga	1%	76%	10%	8%	3%	3%	100%
Sinis	0%	0%	0%	100%	0%	0%	4%
FULL SAMPLE	5%	65%	10%	7%	7%	5%	47%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

Table 2.26. Non-resident recreational fishers: characteristics of stay

MPA	Total cost (euros)			Number of persons with you			Length (days)		
	Mean	SD	AR	Mean	SD	AR	Mean	SD	AR
Bonifacio	0	0	0%	2,0	0,0	10%	21	0	10%
Côte Bleue	1 216	1 289	6%	2,1	1,3	8%	12	10	8%
La Graciosa	908	857	89%	2,8	1,4	88%	9	8	89%
Malta	--	--	0%	--	--	0%	--	--	0%
Monte da Guia (I)	1 000	0	2%	2,0	0,0	2%	15	0	2%
Monte da Guia (C)	8 154	3 207	65%	2,5	1,4	100%	7	2	100%
La Restinga	1 039	572	96%	3,2	1,5	100%	12	12	100%
Sinis	9 000	0	4%	1,0	0,0	4%	90	0	4%
FULL SAMPLE	1 287	1 767	44%	2,9	1,5	47%	11	11	47%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

Recreational fishers described as “tourists” are met mainly in three case studies: Monte da Guia (charter-fishing customers), La Graciosa, and La Restinga. In other places, the majority of fishers may be described as “local”. For “tourist” fishers, the major means of transport are plane and boat, and the major mean of accommodation is a rented house or apartment. The length of stay is 11 days, with a holiday budget of 1.3 k€ on average, usually shared with 2.9 persons. Here again, the case of charter-fishing customers (Monte da Guia) is specific, with a budget of 8.2 k€ for a stay of one week on average (the case of Sinis cannot be considered as significant, since results are based on one answer only).

“Tourists” fishers may have various motivations concerning the stay in the place where they were surveyed. According to Table 2.27 below, one third considered fishing as a major motivation for their stay, and 28% declared that it did not influence their decision. However, these global proportions conceal a great diversity of situations according to case studies. The motivation for fishing is particularly strong for charter-fishing customers (Monte da Guia).

**Table 2.27. Non-resident recreational fishers:
How much was your decision to come here influenced by fishing?**

MPA	Very much	Moderately	No influence	Answering Rate
Bonifacio	100%	0	0%	10%
Côte Bleue	20%	30%	50%	8%
La Graciosa	30%	49%	21%	89%
Malta	--	--	--	0%
Monte da Guia (I)	0%	0%	100%	2%
Monte da Guia (C)	90%	5%	5%	95%
La Restinga	32%	33%	35%	100%
Sinis	100%	0%	0%	4%
FULL SAMPLE	34%	39%	28%	47%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

2.4 Choice of fishing zone and perception of MPA

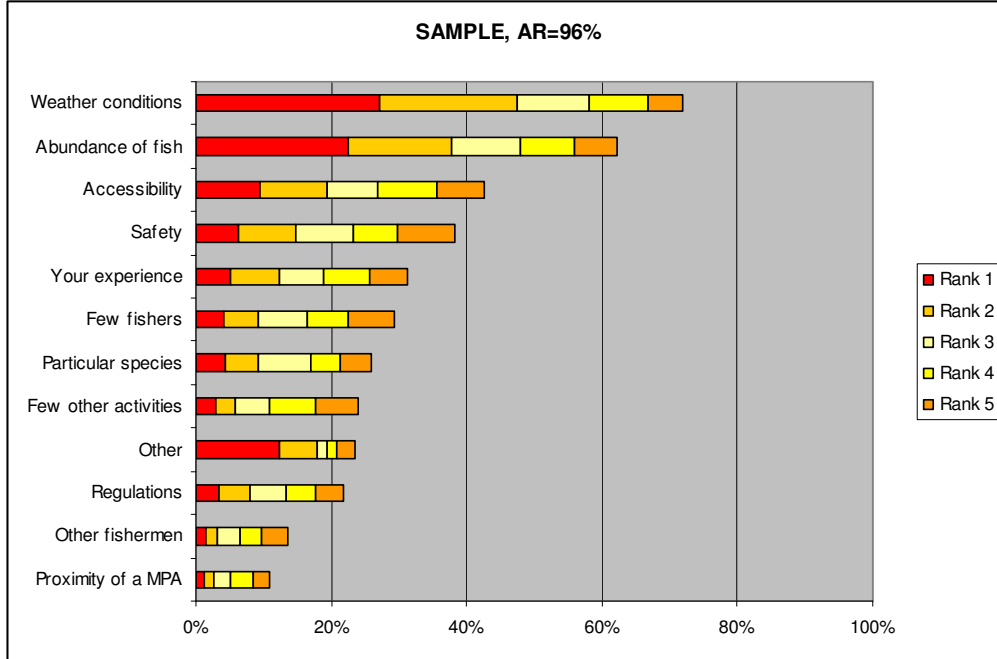
2.4.1 Choice criteria of fishing site

Individual recreational fishers were asked to select, from a list of 12 items, the 5 major factors influencing their choice of a fishing area, and to rank them. The same question was asked to charter-fishing operators and to their customers (in this last case, the choice list had only 11 components, as the item “regulations” was not considered relevant). Figures 2.1-2.8, figure 2.9 and figure 2.10 display results concerning answers of individual fishers, charter-fishing customers, and charter-fishing operators respectively⁸.

As regards individual fishers, figure 2.1 presents the results for the whole sample, and each of the seven following figures is dedicated to a case study.

⁸ Tables containing detailed answers are presented in the appendix of this report.

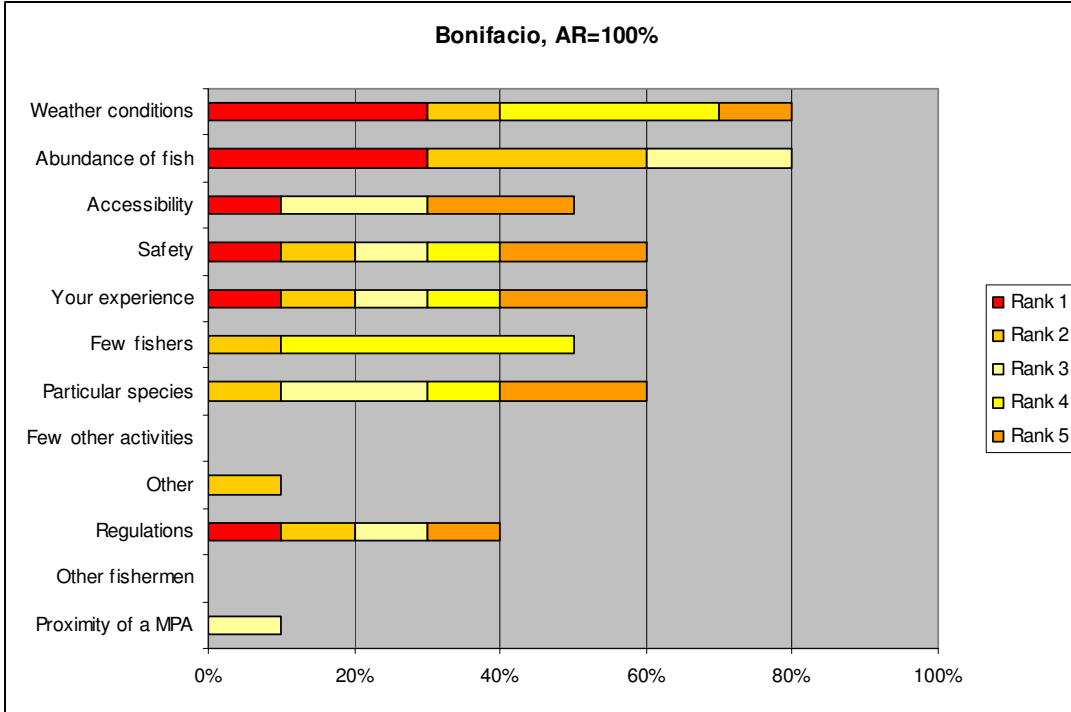
Figure 2.1. Individual recreational fishers’ choice criteria of a fishing site: whole sample



Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

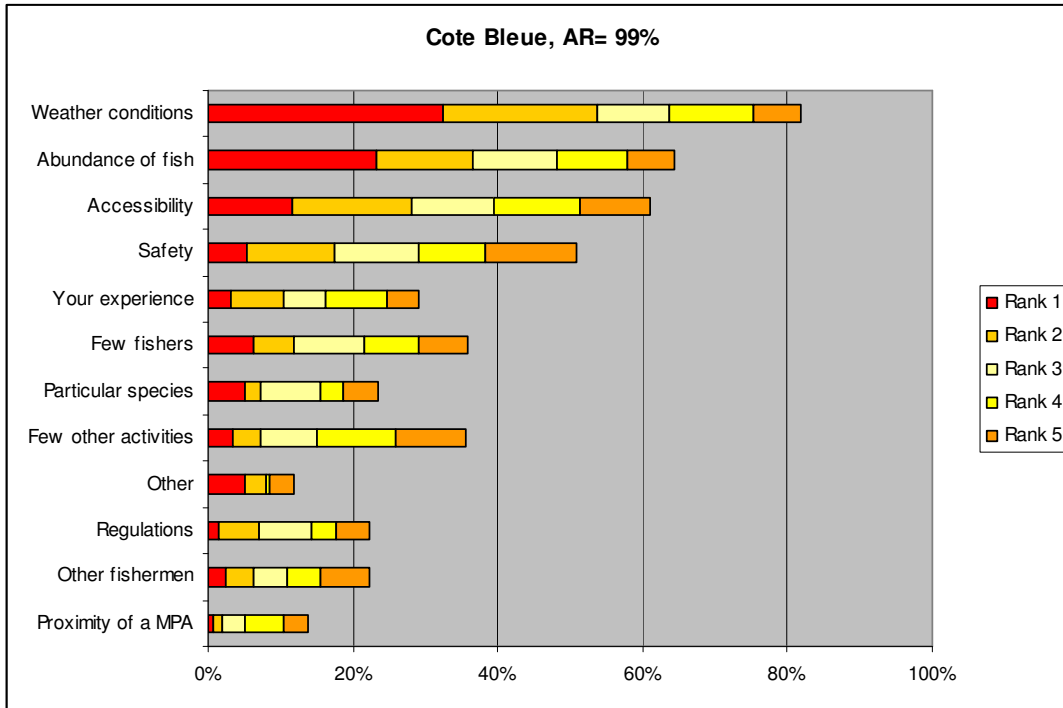
For the whole sample, the two most important factors are the same as the ones that were mentioned by professional fishers (chapter 1, Fig. 1.1.): weather conditions and abundance of fish. In both cases, abundance of fish was mentioned by 60% of fishers approximately. In the case of recreational fishers, weather conditions are considered even more important: 72% mentioned them as one of the five major factors conditioning their choice of a fishing site, and 27% ranked it first. Another common feature between answers of recreational and professional fishers is the low ranking of “proximity of a MPA”. However, in both cases the impact of this factor may have been captured by answers concerning “abundance of fish”.

Figure 2.2. Individual recreational fishers' choice criteria of a fishing site: Bonifacio



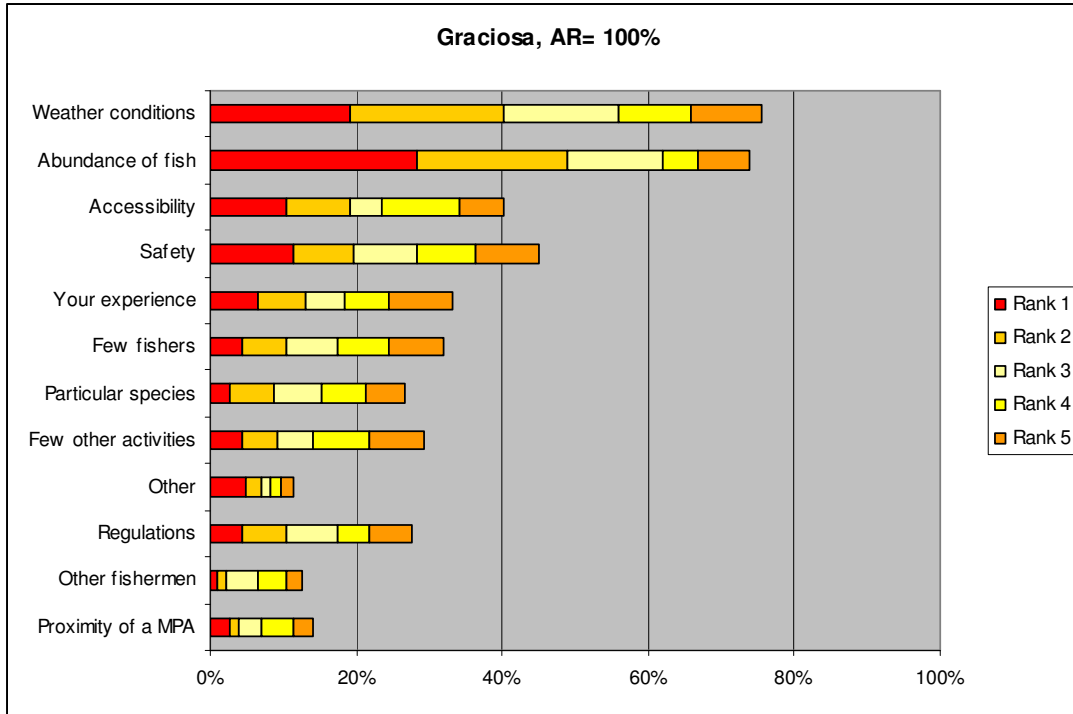
Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Figure 2.3. Individual recreational fishers' choice criteria of a fishing site: Côte Bleue



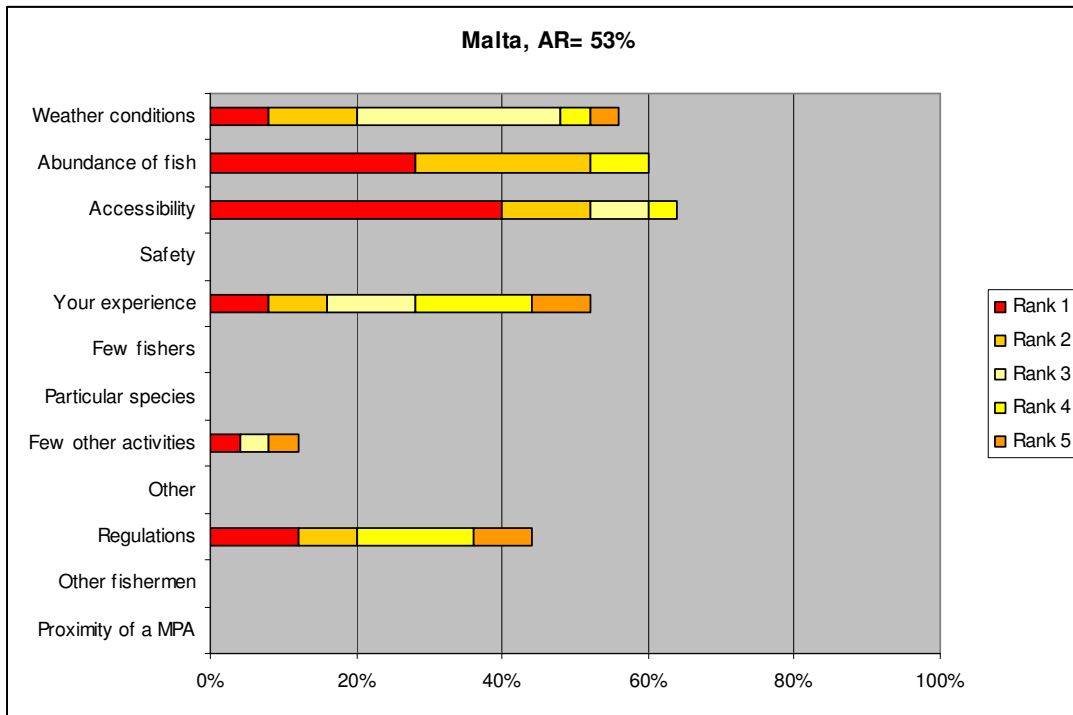
Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Figure 2.4. Individual recreational fishers' choice criteria of a fishing site: La Graciosa



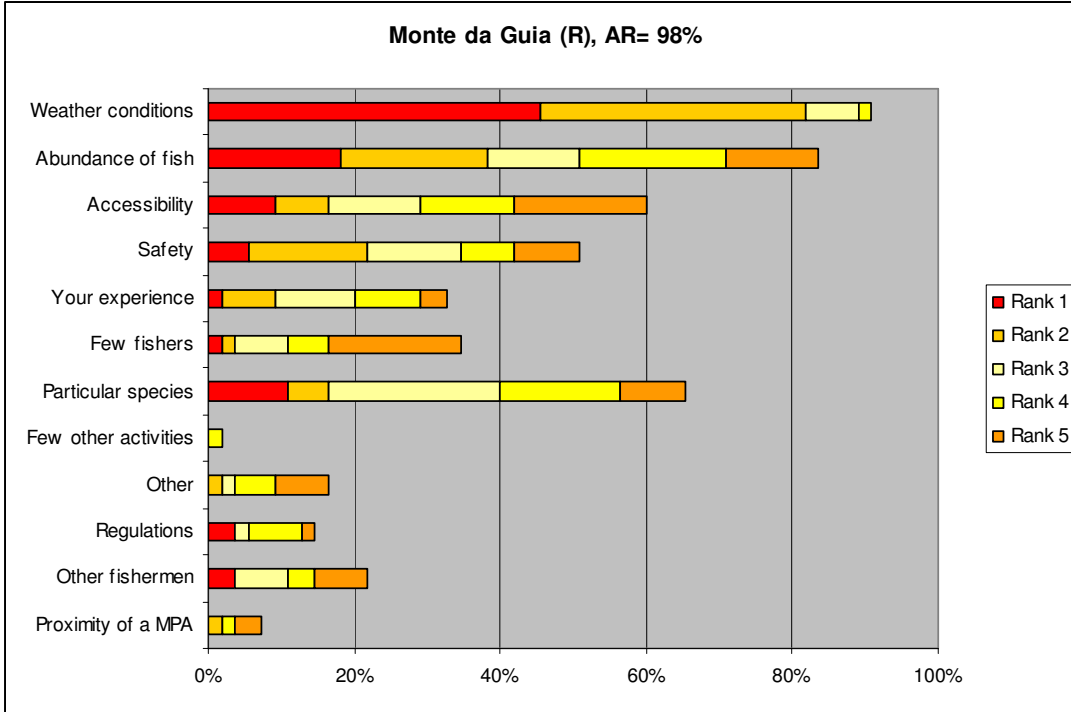
Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Figure 2.5. Individual recreational fishers' choice criteria of a fishing site: Malta



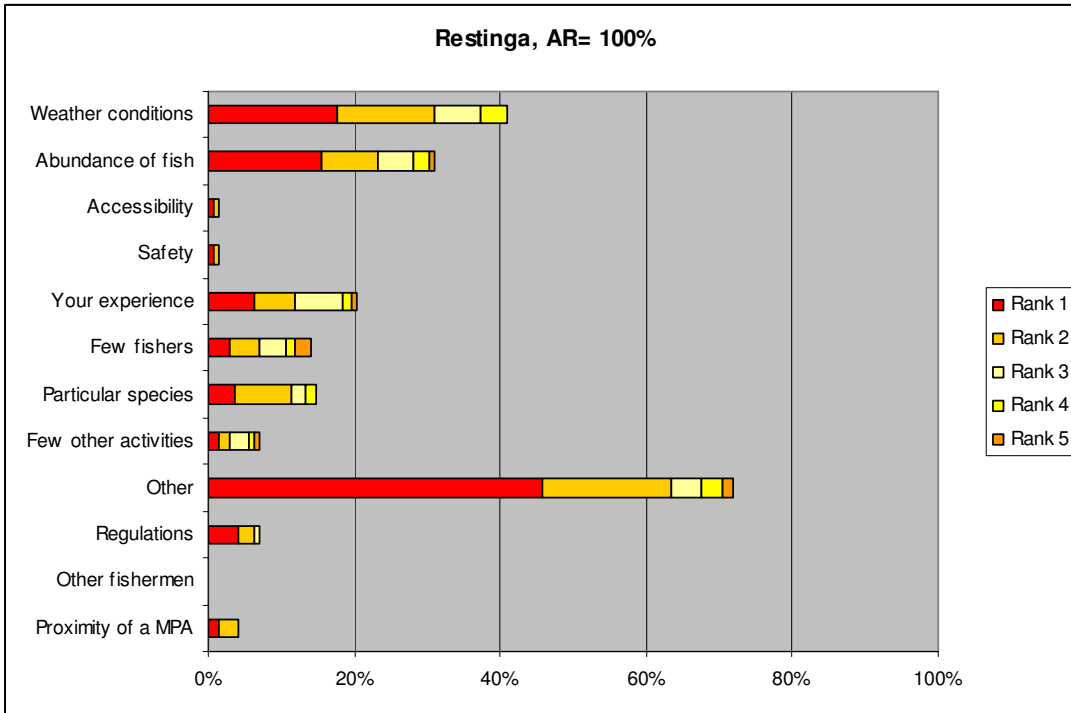
Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Figure 2.6. Individual recreational fishers' choice criteria of a fishing site: Monte da Guia



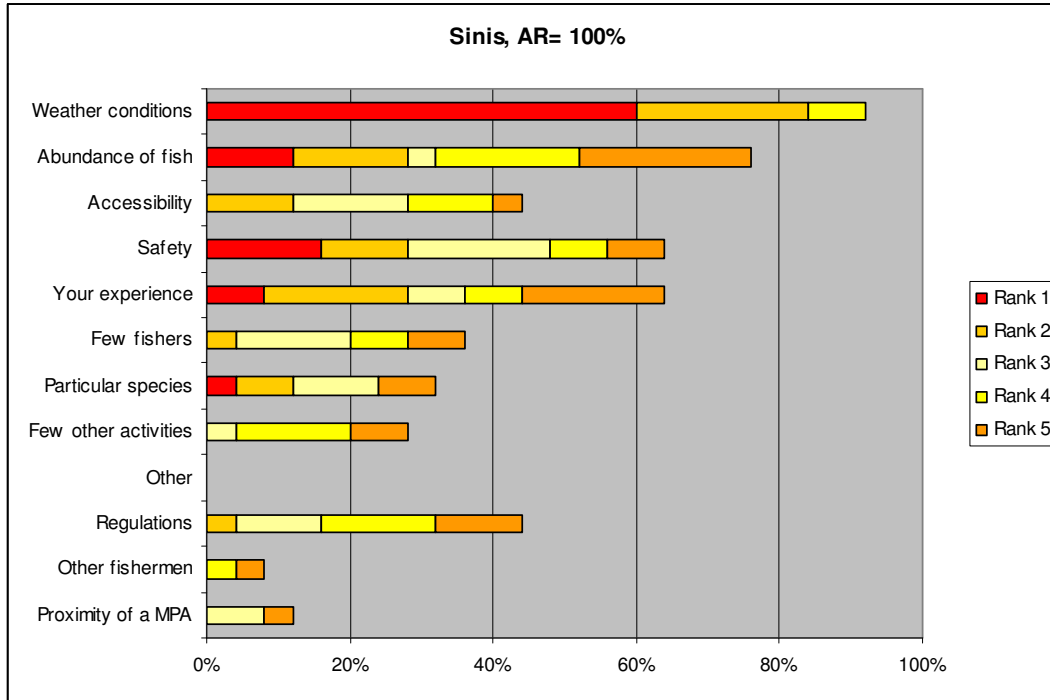
Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Figure 2.7. Individual recreational fishers' choice criteria of a fishing site: La Restinga



Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

Figure 2.8. Individual recreational fishers’ choice criteria of a fishing site: Sinis

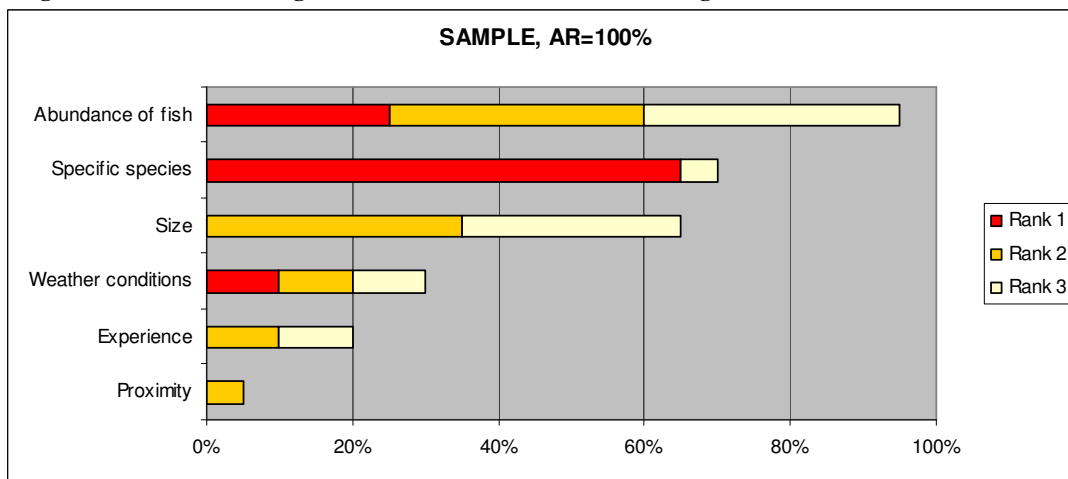


Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

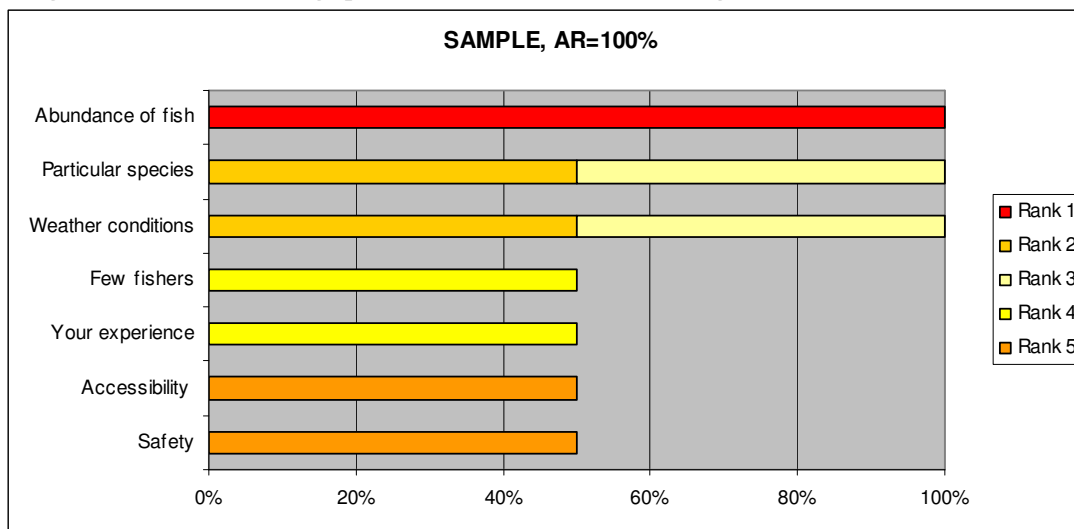
Figures 2.2-2.8 reveal differences between case studies. The factor “presence of particular species”, of special importance in Bonifacio and Monte da Guia, was not considered determinant in Malta, where “accessibility” comes first. In Bonifacio, Malta and Sinis, fishers’ choices look more constrained by regulations than elsewhere. In La Restinga, it seems that important factors influencing fishers’ choice were not in the proposed list.

Figures 2.9 and 2.10 present answers of charter-fishing customers and operators concerning choice criteria of a fishing site (remember that only one site is concerned, and that only 2 operators answered the survey).

Figure 2.9. Charter-fishing customers’ choice criteria of a fishing site: Monte da Guia (20 answers)



Source: EMPAFISH Recreational Fishing survey 2005-2006 (charter-fishing customers)

Figure 2.10. Charter-fishing operators' choice criteria of a fishing site: Monte da Guia (2 answers)

Source: EMPAFISH Recreational Fishing survey 2005-2006 (charter-fishing operators)

2.4.2 Awareness of the MPA

It has been noticed that “proximity of MPA” was rarely mentioned a major choice factor. This might be so because many fishers don’t know the existence of the MPA. However, according to table 2.28, in most cases there is a wide knowledge of this existence among recreational fishers. A specific question investigated the influence of MPA on their decision to fish on the site where they were interviewed (table 2.29). Answers confirm that this influence, if any, operates mainly in an indirect way, through the channel of fish abundance.

Table 2.28. Recreational fishing: knowledge of the existence of the MPA

MPA	Yes	No	Answering Rate
Bonifacio	80%	20%	100%
Côte Bleue	69%	31%	97%
La Graciosa	91%	9%	98%
Malta	--	--	0%
Monte da Guia (I)	93%	7%	100%
Monte da Guia (C)	0%	100%	100%
La Restinga	96%	4%	100%
Sinis	100%	0%	100%
FULL SAMPLE	82%	18%	92%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

Table 2.29. Recr. fishing: did the presence of the MPA influence your decision to come fishing there?

MPA	Highly	Moderately	Not at all	Answering Rate
Bonifacio	20%	50%	30%	100%
Côte Bleue	9%	8%	83%	98%
La Graciosa	19%	21%	60%	97%
Malta	--	--	--	0%
Monte da Guia	5%	3%	92%	97%
La Restinga	8%	13%	80%	100%
Sinis	8%	32%	60%	100%
FULL SAMPLE	11%	15%	75%	92%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing customers)

2.4.3 Relations with other users of the MPA

Possible conflicts in the MPA have been investigated through a series of questions, concerning relations between recreational fishers and other MPA users (Tables 2.30-2.35).

Table 2.30. Recreational fishing: relations with professional fishers

MPA	Conflict	Good cooperation	No contact	Answering Rate
Bonifacio	20%	60%	20%	100%
Côte Bleue	6%	34%	60%	99%
La Graciosa	8%	40%	52%	98%
Malta	0%	100%	0%	2%
Monte da Guia (I)	9%	77%	14%	100%
Monte da Guia (O)	0%	100%	0%	100%
La Restinga	6%	23%	72%	100%
Sinis	20%	36%	44%	100%
FULL SAMPLE	7%	38%	55%	93%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.31. Recreational fishing: relations with other recreational fishers (except spear fishers)

MPA	Conflict	Good cooperation	No contact	Answering Rate
Bonifacio	0%	80%	20%	100%
Côte Bleue	3%	81%	16%	99%
La Graciosa	8%	50%	43%	98%
Malta	0%	92%	8%	53%
Monte da Guia (I)	5%	93%	2%	100%
Monte da Guia (O)	0%	100%	0%	100%
La Restinga	2%	27%	71%	100%
Sinis	0%	84%	16%	100%
FULL SAMPLE	4%	63%	33%	96%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.32. Recreational fishing: relations with spear fishers

MPA	Conflict	Good cooperation	No contact	Answering Rate
Bonifacio	0%	100%	0%	100%
Côte Bleue	32%	42%	27%	99%
La Graciosa	64%	5%	31%	78%
Malta	0%	25%	75%	51%
Monte da Guia (I)	9%	54%	38%	100%
Monte da Guia (O)	0%	50%	50%	100%
La Restinga	0%	0%	100%	100%
Sinis	33%	29%	38%	96%
FULL SAMPLE	28%	26%	46%	91%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.33. Recreational fishing: relations with scuba divers

MPA	Conflict	Good cooperation	No contact	Answering Rate
Bonifacio	20%	50%	30%	100%
Côte Bleue	23%	39%	37%	99%
La Graciosa	11%	28%	62%	98%
Malta	4%	24%	72%	53%
Monte da Guia (I)	9%	52%	39%	100%
Monte da Guia (O)	0%	100%	0%	100%
La Restinga	15%	21%	64%	100%
Sinis	13%	17%	71%	96%
FULL SAMPLE	16%	33%	51%	96%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.34. Recreational fishing: relations with jet-ski users

MPA	Conflict	Good cooperation	No contact	Answering Rate
Bonifacio	67%	11%	22%	90%
Côte Bleue	41%	16%	43%	98%
La Graciosa	52%	4%	44%	70%
Malta	8%	20%	72%	53%
Monte da Guia (I)	18%	23%	59%	100%
Monte da Guia (O)	0%	50%	50%	100%
La Restinga	0%	0%	100%	100%
Sinis	33%	4%	63%	96%
FULL SAMPLE	31%	10%	59%	88%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.35. Recreational fishing: relations with surfers*

MPA	Conflict	Good cooperation	No contact	Answering Rate
Bonifacio	11%	22%	67%	90%
Côte Bleue	12%	23%	64%	99%
La Graciosa	8%	25%	67%	70%
Malta	8%	20%	72%	53%
Monte da Guia (I)	0%	25%	75%	100%
Monte da Guia (O)	0%	50%	50%	100%
La Restinga	0%	0%	100%	100%
Sinis	8%	21%	71%	96%
FULL SAMPLE	7%	18%	74%	89%

* including windsurfers and kite-surfers. Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

On the whole, relations with other recreational fishers (except spear fishers), professional fishers, and surfers seem to raise few conflicts. Bonifacio and Sinis, where 20% of recreational fishers mention conflictual relations with professional fishers, are exceptions. Relations seem to be more conflictual with spear fishers, scuba divers, and jet-ski users. As regards spear fishers, three case studies (La Graciosa, Sinis and Côte bleue) are responsible for the bulk of the high overall conflict declaration rate. The frequency of conflicts with scuba divers seems to be highest in Côte Bleue and Bonifacio. Concerning conflicts with jet-ski users, particularly high rates are met in Bonifacio, Côte Bleue and La Graciosa. Some specificities concerning the Bonifacio case may be explained by the fact that, in this case-study, the sample is wholly composed of spear fishers (see above, table 2.9).

2.4.4 Perception of benefits provided by MPA

A series of questions aimed at assessing the perceived impacts of the MPA on environment, on fishing and on the local economy. In each case, an assertion was presented to the interviewed person, who was asked to formulate an opinion concerning this assertion.

Tables 2.36 to 2.38 describe opinions of recreational fishers on the biological effects of MPAs. Recreational fishers seem to be more convinced than professional fishers (see above, chapter 1, table 1.40) that MPAs help to protect biodiversity, and to enhance fish abundance.

Table 2.36. Recreational fishing: do you think that MPA helps to protect biodiversity?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Bonifacio	78%	22%	0%	0%	0%	90%
Côte Bleue	85%	13%	0%	1%	1%	99%
La Graciosa	89%	7%	1%	2%	2%	100%
Malta	26%	37%	11%	4%	22%	57%
Monte da Guia (I)	25%	69%	4%	0%	2%	98%
Monte da Guia (C)	60%	--	--	25%	15%	100%
Monte da Guia (O)	100%	0%	0%	0%	0%	100%
La Restinga	80%	12%	1%	0%	7%	100%
Sinis	40%	40%	12%	0%	8%	100%
FULL SAMPLE	76%	17%	2%	2%	4%	97%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers, charter-fishing customers and operators)

Table 2.37. Recr. fishing: do you think that MPA helps to enhance fish abundance inside protected area?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Bonifacio	89%	11%	0%	0%	0%	90%
Côte Bleue	82%	13%	3%	0%	3%	99%
La Graciosa	86%	7%	2%	3%	2%	100%
Malta	19%	41%	30%	4%	7%	57%
Monte da Guia (I)	9%	56%	25%	0%	9%	98%
Monte da Guia (O)	100%	0%	0%	0%	0%	100%
La Restinga	75%	14%	0%	0%	11%	100%
Sinis	40%	48%	8%	0%	4%	100%
FULL SAMPLE	72%	17%	5%	1%	5%	94%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.38. Recr. fishing: do you think that MPA helps to enhance fish abundance outside protected area?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Bonifacio	67%	22%	11%	0%	0%	90%
Côte Bleue	45%	27%	16%	3%	10%	99%
La Graciosa	56%	14%	3%	11%	16%	100%
Malta	22%	44%	22%	4%	7%	57%
Monte da Guia (I)	5%	60%	27%	0%	7%	98%
Monte da Guia (O)	100%	0%	0%	0%	0%	100%
La Restinga	62%	14%	6%	0%	18%	100%
Sinis	12%	44%	12%	16%	16%	100%
FULL SAMPLE	47%	24%	12%	5%	13%	94%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Tables 2.39 and 2.40 display recreational fishers' opinions concerning benefits expected from MPAs in terms of management: reduction of illegal fishing and of conflicts. On these topics, opinions of recreational fishers, like opinions of professional fishers (see chapter 1, figures 1.43 and 1.44), are more balanced. In Sinis and in Bonifacio, a majority of the sample consider that the MPA does not help to reduce use conflicts.

Table 2.39. Recreational fishing: do you think that MPA reduces illegal fishing?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering rate
Bonifacio	0%	56%	33%	11%	0%	90%
Côte Bleue	25%	27%	16%	25%	7%	99%
La Graciosa	48%	13%	7%	23%	9%	100%
Malta	7%	41%	41%	4%	7%	57%
Monte da Guia (I)	2%	47%	47%	0%	4%	98%
Monte da Guia (O)	0%	50%	50%	0%	0%	100%
La Restinga	25%	23%	11%	3%	39%	100%
Sinis	21%	17%	17%	33%	13%	96%
FULL SAMPLE	28%	25%	16%	17%	14%	96%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.40. Recreational fishing: do you think MPA reduces conflicts among users?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering rate
Bonifacio	0%	0%	44%	11%	44%	90%
Côte Bleue	16%	33%	23%	8%	20%	78%
La Graciosa	37%	17%	5%	20%	21%	99%
Malta	15%	48%	19%	4%	15%	57%
Monte da Guia (I)	2%	42%	45%	2%	9%	98%
Monte da Guia (O)	50%	0%	0%	0%	50%	100%
La Restinga	20%	20%	9%	1%	50%	100%
Sinis	9%	13%	35%	26%	17%	92%
FULL SAMPLE	21%	26%	17%	10%	26%	89%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.41 displays fishers' opinions concerning the impact of the MPA on their own activity. Few negative opinions are expressed, except in Malta. In Bonifacio, Côte Bleue and La

Graciosa, a majority consider that this impact is positive. In Monte da Guia, La Restinga and Sinis, a majority consider that the MPA has no significant impact on their activity.

Table 2.41. Recreational fishing: impact of MPA on your fishing activity

MPA	Very positive	Rather positive	No impact	Rather negative	Very negative	Answering rate
Bonifacio	20%	60%	20%	0%	0%	100%
Côte Bleue	14%	55%	25%	4%	1%	98%
La Graciosa	46%	30%	18%	5%	1%	99%
Malta	0%	0%	67%	33%	0%	19%
Monte da Guia (I)	7%	26%	61%	6%	0%	96%
Monte da Guia (O)	50%	0%	50%	0%	0%	100%
La Restinga	8%	29%	63%	0%	0%	100%
Sinis	0%	32%	56%	8%	4%	100%
FULL SAMPLE	21%	39%	36%	4%	1%	94%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.42 is dedicated to recreational fishers' opinions concerning the impact of MPA on local economy. Here again, few negative opinions are expressed, except in the case of Sinis. On the whole, a majority of answers consider the impact as positive, except in Malta, where the answering rate is low (57%), and 59% of answering persons declare they don't know.

Table 2.42. Recreational fishing: do you think that MPA is good for local economy?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering rate
Bonifacio	44%	44%	11%	0%	0%	90%
Côte Bleue	22%	37%	7%	7%	28%	98%
La Graciosa	74%	9%	5%	8%	5%	72%
Malta	4%	26%	7%	4%	59%	57%
Monte da Guia (I)	5%	75%	13%	0%	7%	98%
Monte da Guia (O)	100%	0%	0%	0%	0%	100%
La Restinga	29%	18%	6%	0%	48%	100%
Sinis	28%	28%	8%	24%	12%	100%
FULL SAMPLE	33%	29%	7%	6%	26%	89%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Tables 2.43 to 2.45 display recreational fishers' opinions concerning the distributional consequences of MPAs. Three types of activity were mentioned (professional fishing, recreational fishing and scuba diving), and recreational fishers were asked to indicate which activity (or activities) benefited most from the existence of the MPA. According to recreational fishers' opinion, scuba-diving is usually the major beneficiary of MPAs.

Table 2.43. Recreational fishing: do you think that MPA benefits mainly professional fishing?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering rate
Bonifacio	33%	33%	11%	0%	22%	90%
Côte Bleue	16%	25%	28%	20%	12%	99%
La Graciosa	56%	18%	6%	15%	5%	71%
Malta	0%	0%	0%	0%	0%	0%
Monte da Guia (I)	0%	60%	29%	0%	11%	98%
Monte da Guia (O)	50%	0%	0%	0%	50%	100%
La Restinga	36%	18%	11%	1%	35%	100%
Sinis	36%	28%	12%	12%	12%	100%
FULL SAMPLE	29%	25%	19%	12%	16%	86%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.44. Recreational fishing: do you think that MPA benefits mainly recreational fishing?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering rate
Bonifacio	0%	33%	33%	11%	22%	90%
Côte Bleue	10%	34%	29%	20%	8%	99%
La Graciosa	43%	27%	13%	15%	2%	71%
Malta	--	--	--	--	--	0%
Monte da Guia (I)	2%	71%	22%	0%	5%	98%
Monte da Guia (O)	100%	0%	0%	0%	0%	100%
La Restinga	30%	29%	8%	4%	29%	100%
Sinis	8%	20%	24%	40%	8%	100%
FULL SAMPLE	21%	34%	20%	14%	11%	86%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Table 2.45. Recreational fishing: do you think that MPA benefits mainly scuba diving?

MPA	Fully agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering rate
Bonifacio	33%	44%	11%	0%	11%	90%
Côte Bleue	20%	40%	13%	15%	12%	99%
La Graciosa	63%	14%	2%	10%	12%	71%
Malta	--	--	--	--	--	0%
Monte da Guia (I)	4%	73%	15%	0%	9%	98%
Monte da Guia (O)	100%	0%	0%	0%	0%	50%
La Restinga	38%	22%	5%	1%	35%	100%
Sinis	54%	21%	8%	0%	17%	96%
FULL SAMPLE	33%	33%	9%	9%	17%	85%

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers and charter-fishing operators)

Chapter 3

Scuba diving

3.1 Introduction

The scuba diving survey targeted two different populations: i) scuba diving operators, and ii) divers. A specific questionnaire was designed for each population. Operators were surveyed by means of face-to-face interviews. In most cases, questionnaires concerning divers were distributed by operators, and were filled by divers without external help. Table 3.1 displays the number of questionnaires filled, by category and by case study.

Table 3.1. Scuba diving: number of answers

MPA	Operators			Divers
	Commercial	Non profit	Total	
Banyuls	8	3	11	82
Benidorm	6	0	6	307
Bonifacio	6	0	6	108
Cabo de Palos	4	0	4	132
Columbretes	5	3	8	257
Côte Bleue	3	14	17	689
Malta	26	4	30	250
Medes	6	0	6	147
Monte da Guia	3	0	3	57
La Restinga	0	0	0	159
Sinis	1	2	3	34
Tabarca	1	0	1	108
Tuscany	1	0	1	63
FULL SAMPLE	70	26	96	2393

Source: EMPAFISH Scuba diving survey 2005-2006

On the whole, 2489 questionnaires covering 13 MPAs were filled (Table 3.1). Nearly 2400 questionnaires were filled by divers, and nearly 100 by operators. Two categories of operators were surveyed: commercial firms (70 questionnaires filled), and non-profit organisations (26 questionnaires filled). More than half of non-profit of operators in the sample are met in one case study (Côte Bleue), where they represent more than 80% of the total number of interviewed operators. Four case-studies (Côte Bleue, Benidorm, Columbretes, and Malta) account for 63% of the total number of answers.

The two first sections of this chapter describe scuba-diving operators (3.2) and divers (3.3). The third one is dedicated to answers of both operators and divers concerning the choice of a diving zone, and the MPA (3.4).

3.2 Diving operators

Information concerning diving operators are presented for each case study (except La Restinga, where no questionnaire was filled), and, at the aggregated level (full sample), with a distinction between commercial firms and non-profit organisations.

3.2.1 Boats, equipments and jobs

This section presents answers of operators concerning their production factors (capital, labour). Table 3.2 describes the number of boats they use. On average, this number is 1,4, ranging from 0,9⁹ in Banyuls to 3 in Tabarca and Tuscany. Tables 3.3 to 3.7 describe the characteristics of these boats, with a distinction between 1st boat and 2nd boat (when applying).

Table 3.2. Scuba diving operators: number of boats per operator

MPA	Mean	Standard Deviation	Answering Rate
Banyuls	0,9	0,9	100%
Benidorm	1,7	0,5	100%
Bonifacio	1,6	0,5	100%
Cabo de Palos	1,5	0,5	100%
Columbretes	1,6	1,0	100%
Côte Bleue	1,2	0,8	100%
Malta	1,4	0,6	57%
Medes	1,7	0,5	100%
Monte da Guia	1,3	0,5	100%
Sinis	2,0	0,0	100%
Tabarca	3,0	0,0	100%
Tuscany	3,0	0,0	100%
FULL SAMPLE	1,4	0,8	87%
<i>of</i> Commercial operators	1,6	0,7	84%
<i>which</i> Non-profit operators	1,0	0,7	92%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.3. Scuba diving operators: boat length

MPA	First boat			Second boat		
	Mean	Std Dev.	AR	Mean	Std Dev.	AR
Banyuls	10,3	2,5	64%	9,0	0,0	18%
Benidorm	8,2	0,9	100%	7,3	0,4	67%
Bonifacio	8,1	1,6	100%	6,8	0,5	43%
Cabo de Palos	8,5	0,5	100%	8,0	1,0	50%
Columbretes	11,9	5,7	88%	10,5	3,8	50%
Côte Bleue	9,3	2,7	82%	6,1	1,1	29%
Malta	8,7	2,7	50%	8,3	3,3	20%
Medes	11,0	3,5	100%	9,5	1,7	67%
Monte da Guia	8,3	1,2	100%	5,0	0,0	33%
Sinis	6,6	0,6	100%	6,3	0,8	100%
Tabarca	7,0	0,0	100%	8,0	0,0	100%
Tuscany	9,0	0,0	100%	9,0	0,0	100%
FULL SAMPLE	9,2	3,1	76%	7,9	2,5	37%
<i>of</i> Commercial operators	9,4	3,2	81%	8,5	2,5	41%
<i>which</i> Non-profit operators	8,9	2,9	62%	5,3	0,8	23%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

⁹ In some cases, several operators share the same boat.

Table 3.4. Scuba diving operators: boat engine power (Kw)

MPA	First boat			Second boat		
	Mean	Std Dev.	AR	Mean	Std Dev.	AR
Banyuls	277,7	111,0	64%	187,5	12,5	18%
Benidorm	184,2	33,0	100%	187,5	64,6	67%
Bonifacio	205,0	96,4	71%	127,0	42,0	29%
Cabo de Palos	216,7	23,6	75%	150,0	0,0	25%
Columbretes	229,6	160,8	88%	341,0	169,9	50%
Côte Bleue	110,1	42,9	82%	112,0	49,5	24%
Malta	221,9	145,5	37%	106,8	54,1	13%
Medes	432,5	132,2	67%	155,0	75,7	67%
Monte da Guia	167,3	142,6	100%	50,0	0,0	33%
Sinis	110,7	27,5	100%	106,0	47,9	100%
Tabarca	147,0	0,0	100%	123,0	0,0	100%
Tuscany	261,0	0,0	100%	221,0	0,0	100%
FULL SAMPLE	204,4	131,9	67%	164,5	109,4	32%
<i>of</i> Commercial operators	237,8	136,8	69%	186,5	110,5	36%
<i>which</i> Non-profit operators	107,8	41	62%	70,4	24,3	19%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.5. Scuba diving operators: year of boat construction

MPA	First boat			Second boat		
	Mean	Std Dev.	AR	Mean	Std Dev.	AR
Banyuls	1994	15,6	55%	2000	0,0	9%
Benidorm	2003	2,3	100%	2001	4,2	67%
Bonifacio	2001	5,0	86%	2000	4,5	29%
Cabo de Palos	2001	1,5	100%	2001	2,5	50%
Columbretes	1991	13,8	75%	1988	15,2	50%
Côte Bleue	1976	23,3	76%	2000	4,3	24%
Malta	1997	5,7	33%	1994	6,4	13%
Medes	1994	7,1	83%	1983	12,3	50%
Monte da Guia	2004	0,9	100%	2001	0,0	33%
Sinis	1998	5,7	100%	1990	6,1	100%
Tabarca	2004	0,0	100%	2003	0,0	100%
Tuscany	1999	0,0	100%	2003	0,0	100%
FULL SAMPLE	1993	15,9	66%	1995	10,2	31%
<i>of</i> Commercial operators	1997	10,0	71%	1995	10,8	34%
<i>which</i> Non-profit operators	1977	23,0	50%	1994	6,7	19%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.6. Scuba diving operators: crew size

MPA	First boat			Second boat		
	Mean	Std Dev.	AR	Mean	Std Dev.	AR
Banyuls	1,4	0,5	45%	1,0	0,0	9%
Benidorm	1,5	0,8	100%	1,3	0,4	67%
Bonifacio	1,8	0,4	71%	2,0	0,0	29%
Cabo de Palos	1,0	0,0	75%	1,0	0,0	50%
Columbretes	1,3	0,5	88%	1,3	0,4	50%
Côte Bleue	1,3	0,6	71%	1,0	0,0	24%
Malta	1,5	0,5	50%	1,2	0,4	20%
Medes	--	--	0%	--	--	0%
Monte da Guia	2,0	0,0	100%	2,0	0,0	33%
Sinis	1,3	0,5	100%	1,3	0,5	100%
Tabarca	1,0	0,0	100%	1,0	0,0	100%
Tuscany	2,0	0,0	100%	2,0	0,0	100%
FULL SAMPLE	1,4	0,6	63%	1,3	0,4	30%
<i>of</i> Commercial operators	1,5	0,5	66%	1,3	0,5	33%
<i>which</i> Non-profit operators	1,4	0,6	54%	1,0	0,0	19%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.7. Scuba diving operators: maximum number of passengers per boat

MPA	First boat			Second boat		
	Mean	Std Dev.	AR	Mean	Std Dev.	AR
Banyuls	28,6	10,5	64%	21,5	2,5	18%
Benidorm	11,7	0,5	100%	10,3	2,5	67%
Bonifacio	17,1	6,3	100%	12,0	4,9	43%
Cabo de Palos	11,5	0,5	100%	12,0	0,0	50%
Columbretes	11,6	0,5	88%	10,8	1,6	50%
Côte Bleue	21,0	9,0	71%	15,5	5,6	24%
Malta	19,2	10,7	50%	14,4	7,1	17%
Medes	27,5	16,9	100%	21,3	4,7	50%
Monte da Guia	12,0	0,0	100%	8,0	0,0	33%
Sinis	15,0	5,1	100%	13,3	6,2	100%
Tabarca	11,0	0,0	100%	11,0	0,0	100%
Tuscany	16,0	0,0	100%	16,0	0,0	100%
FULL SAMPLE	18,5	10,4	74%	13,9	5,8	34%
<i>of</i> Commercial operators	18,5	10,7	81%	15,0	5,9	39%
<i>which</i> Non-profit operators	18,6	9,6	54%	9,8	1,6	19%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.8. Scuba diving operators: yearly number of boat operating hours

MPA	First boat			Second boat		
	Mean	Std Dev.	AR	Mean	Std Dev.	AR
Banyuls	621	544	45%	500	0	9%
Benidorm	528	311	83%	390	90	33%
Bonifacio	250	48	57%	300	0	14%
Cabo de Palos	80	0	25%	500	0	25%
Columbretes	394	292	75%	273	164	50%
Côte Bleue	459	414	65%	375	365	24%
Malta	190	124	13%	243	156	10%
Medes	4500	0	17%	1720	280	33%
Monte da Guia	467	47	100%	500	0	33%
Sinis	87	19	100%	70	22	100%
Tabarca	300	0	100%	300	0	100%
Tuscany	250	0	100%	250	0	100%
FULL SAMPLE	482	699	46%	421	452	25%
<i>of</i> Commercial operators	543	774	47%	508	470	27%
<i>which</i> Non-profit operators	316	385	46%	88	39	19%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

According to operators answers, the boat (or first boat) used by scuba diving operators in the sample is 9,2 metres long on average, ranging from 6,6 metres in Sinis to 11,9 metres in Tuscany. Its engine power is 204 Kw, with a minimum of 110 Kw in Côte Bleue and a maximum of 432 Kw in Medes. Its age is 13 years (minimum: 3 years, in Benidorm; maximum: 30 years, in Côte Bleue), and its carrying capacity is 18,5 passengers (minimum: 11,5 in Cabo de palos; maximum: 27,5 in Medes). It is operated by a crew of 1,4 sailors on average (minimum: 1,0 in Tabarca; maximum: 2,0 in Monte da Guia), during 482 hours a year (minimum: 80 hours in Cabo de Palos; maximum: 4500 hours in Medes).

Table 3.9 presents answers of operators concerning the estimated value of their boat(s) and diving equipment. The mean estimated value is 149 K€ per operator, ranging from 44 K€ in Côte Bleue to 682 K€ in Medes.

Table 3.9. Scuba diving operators: estimated value of boats and diving equipment (K€)

MPA	Mean	Standard Deviation	Answering Rate
Banyuls	101,3	104,0	91%
Benidorm	351,0	434,1	83%
Bonifacio	113,3	66,0	43%
Cabo de Palos	56,7	45,0	75%
Columbretes	226,9	120,6	88%
Côte Bleue	44,1	40,3	82%
Malta	58,3	79,2	53%
Medes	682,0	310,4	83%
Monte da Guia	113,3	62,5	100%
Sinis	56,7	27,2	100%
Tabarca	66,0	0,0	100%
Tuscany	130,0	0,0	100%
FULL SAMPLE	148,4	232,3	73%
<i>of</i> Commercial operators	181,5	254,3	77%
<i>which</i> Non-profit operators	43,1	72,8	65%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.10 presents answers of operators concerning the use of premises dedicated to customers and to equipments storage. In both cases, a little more than 6 operators out of 10 declared using this type of premises.

Table 3.10. Scuba diving operators: premises for customers and equipments

MPA	Premises for customers			Premises for equipments		
	Yes	No	AR	Yes	No	AR
Banyuls	73%	27%	100%	73%	27%	100%
Benidorm	83%	17%	100%	100%	0%	100%
Bonifacio	86%	14%	100%	86%	14%	100%
Cabo de Palos	100%	0%	100%	100%	0%	100%
Columbretes	37%	63%	100%	50%	50%	100%
Côte Bleue	56%	44%	94%	80%	20%	88%
Malta	37%	63%	80%	25%	75%	80%
Medes	100%	0%	100%	83%	17%	100%
Monte da Guia	33%	67%	100%	67%	33%	100%
Sinis	67%	33%	100%	67%	33%	100%
Tabarca	100%	0%	100%	100%	0%	100%
Tuscany	--	--	0%	--	--	0%
FULL SAMPLE	61%	39%	92%	64%	36%	91%
<i>of</i> Commercial operators	68%	32%	90%	70%	30%	90%
<i>which</i> Non-profit operators	40%	60%	96%	46%	54%	92%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.11 is dedicated to the number of jobs employed by diving operators. Data are expressed in annual full time equivalents (AFTE), and divided into permanent jobs and seasonal jobs. On the whole, the mean number of jobs (AFTE) employed by operators in the sample is 1,7, ranging from 0,6 (Bonifacio) to 3,8 (Medes). A significant share of this manpower is seasonal (35% on average, in AFTE terms).

Table 3.11. Scuba diving operators: number of jobs (yearly full time equivalents)

MPA	Permanent			Seasonal			Total		
	Mean	SD	AR	Mean	SD	AR	Mean	SD	AR
Banyuls	0,9	0,9	100%	0,4	0,3	100%	1,3	1,2	100%
Benidorm	1,5	0,8	100%	0,4	0,4	100%	1,9	1,1	100%
Bonifacio	0,1	0,3	100%	0,5	0,8	100%	0,6	0,8	100%
Cabo de Palos	2,5	0,6	100%	0,3	0,3	100%	2,7	0,8	100%
Columbretes	0,8	1,0	100%	0,1	0,1	100%	0,9	1,0	100%
Côte Bleue	0,5	1,0	100%	0,2	0,4	100%	0,7	1,2	100%
Malta	1,7	1,1	100%	0,7	0,7	100%	2,4	1,4	100%
Medes	1,7	1,4	100%	2,1	2,2	100%	3,8	2,1	100%
Monte da Guia	0,0	0,0	100%	1,5	0,0	100%	1,5	0,0	100%
Sinis	0,3	0,5	100%	0,6	0,3	100%	1,0	0,4	100%
Tabarca	2,0	0,0	100%	1,6	0,0	100%	3,6	0,0	100%
Tuscany	0,0	0,0	100%	0,0	0,0	100%	0,0	0,0	100%
FULL SAMPLE	1,1	1,2	100%	0,6	0,9	100%	1,7	1,6	100%
<i>of</i> Commercial operators	1,5	1,1	100%	0,8	1,0	100%	2,3	1,4	100%
<i>which</i> Non-profit operators	0,1	0,3	100%	0,1	0,3	100%	0,2	0,5	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

3.2.2 Activity

This section describes answers of diving operators concerning their activity, in terms of duration, seasonality, location, volume, prices, costs, and typology of customers.

On the average, diving operators in the sample started their business 12 years ago, with a standard deviation of 10 years (Table 3.12).

Table 3.12. Scuba diving operators: when did you start your business? (year)

MPA	Mean	Standard Deviation	Answering Rate
Banyuls	2000	7,9	100%
Benidorm	1991	8,3	100%
Bonifacio	1998	8,0	86%
Cabo de Palos	1997	4,1	100%
Columbretes	1997	6,5	100%
Côte Bleue	1994	12,1	100%
Malta	1993	10,5	100%
Medes	1989	6,4	83%
Monte da Guia	1993	8,8	100%
Sinis	1998	2,7	100%
Tabarca	1996	0,0	100%
Tuscany	--	--	0%
FULL SAMPLE	1994	9,8	97%
<i>of</i> Commercial operators	1993	9,0	96%
<i>which</i> Non-profit operators	1997	11,3	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

On average, operators are active during 9 months per year, with a minimum of 6 months in Monte da Guia, and a maximum of 11,3 months in Cabo de Palos (Table 3.13).

Table 3.13. Scuba diving operators: how many months of activity per year?

MPA	Mean	Standard Deviation	Answering Rate
Banyuls	8,6	2,7	91%
Benidorm	8,8	2,4	100%
Bonifacio	6,1	2,7	100%
Cabo de Palos	11,3	0,8	100%
Columbretes	7,8	2,6	100%
Côte Bleue	9,9	2,5	100%
Malta	9,8	3,0	100%
Medes	9,2	2,7	83%
Monte da Guia	6,0	0,0	100%
Sinis	6,7	3,9	100%
Tabarca	11,0	0,0	100%
Tuscany	8,0	0,0	100%
FULL SAMPLE	9,0	3,0	98%
<i>of</i> Commercial operators	8,7	3,0	99%
<i>which</i> Non-profit operators	9,8	2,9	96%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

For the full sample, the proportion of regular diving sites that is located inside MPA is approximately 1/3 (Table 3.14). It is close to 100% in Benidorm and Tuscany, and over 50% in Bonifacio and Côte de Bleue. The average distance from port is 8 nautical miles (NM) for sites inside MPA, and 5,8 NM for sites located outside MPA. As regards sites located inside MPA, it ranges from 1 NM and under (Medes, Monte da Guia) to 30 miles (Columbretes).

Table 3.14. Scuba diving operators: diving sites

	MPA	Number of sites regularly visited			Average one-way travelling time (mn)			Average one-way distance (NM)		
		Mean	SD	AR	Mean	SD	AR	Mean	SD	AR
Inside MPA	Banyuls	3,5	1,0	91%	31,8	21,0	100%	8,6	6,2	91%
	Benidorm	24,3	34,2	100%	30,8	9,3	100%	9,2	9,8	100%
	Bonifacio	14,7	5,6	86%	21,7	6,9	86%	4,0	1,1	71%
	Cabo de Palos	5,0	1,0	50%	17,5	2,5	100%	3,0	1,7	100%
	Columbretes	9,0	2,4	100%	131,3	44,2	100%	30,0	0,0	100%
	Côte Bleue	14,0	7,2	88%	24,8	19,5	94%	3,3	2,1	94%
	Malta	1,9	0,9	47%	61,8	30,4	47%	7,0	2,3	13%
	Medes	8,2	0,4	100%	11,0	4,3	100%	1,0	0,6	100%
	Monte da Guia	5,7	1,9	100%	11,7	4,7	100%	0,7	0,9	100%
	Sinis	11,0	3,7	100%	25,0	7,1	100%	8,0	3,3	100%
	Tabarca	5,0	0,0	100%	20,0	0,0	100%	7,0	0,0	100%
	Tuscany	9,0	0,0	100%	10,0	0,0	100%	3,0	0,0	100%
	FULL SAMPLE	9,3	12,2	77%	41,2	40,9	81%	8,0	9,5	69%
Outside MPA	Banyuls	10,8	5,8	91%	21,4	7,4	100%	4,5	2,7	91%
	Benidorm	1,2	2,6	100%	3,3	7,5	100%	0,5	1,1	100%
	Bonifacio	12,7	12,4	43%	45,0	12,2	43%	11,3	2,6	43%
	Cabo de Palos	5,5	2,5	50%	12,5	4,3	100%	2,0	1,4	75%
	Columbretes	35,5	38,5	100%	29,2	27,8	75%	6,2	8,4	75%
	Côte Bleue	11,6	11,0	65%	54,5	44,3	65%	7,6	4,4	65%
	Malta	27,7	15,8	97%	32,3	14,2	93%	14,5	15,0	13%
	Medes	38,2	63,7	100%	28,8	14,5	100%	4,5	2,1	100%
	Monte da Guia	16,0	8,6	100%	23,3	9,4	100%	3,3	2,4	100%
	Sinis	11,0	5,7	100%	21,7	2,4	100%	6,3	0,9	100%
	Tabarca	6,0	0,0	100%	20,0	0,0	100%	7,0	0,0	100%
	Tuscany	1,0	0,0	100%	3,0	0,0	100%	1,0	0,0	100%
	FULL SAMPLE	20,4	26,1	86%	29,5	24,5	86%	5,8	6,5	59%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Tables 3.15 and 3.16 display operators' answers concerning the volume of their activity, in terms of number of dives, and its distribution between sites located inside and outside MPA.

Table 3.15. Scuba diving operators: dives (all types)

MPA	Total number / year			Of which: % inside MPA		
	Mean	Std Dev.	AR	Mean	AR	
Banyuls	2 996	2 837	100%	32%	100%	
Benidorm	3 533	977	100%	100%	100%	
Bonifacio	1 567	1 625	86%	81%	57%	
Cabo de Palos	140	0,0	25%	--	0%	
Columbretes	1 883	1 638	100%	55%	100%	
Côte Bleue	4 149	6 745	76%	84%	76%	
Malta	3 303	3 252	83%	--	0%	
Medes	4 600	3 841	67%	69%	67%	
Monte da Guia	1 067	330	100%	47%	100%	
Sinis	583	272	100%	46%	100%	
Tabarca	8 250	0	100%	30%	100%	
Tuscany	3 500	0	100%	95%	100%	
FULL SAMPLE	3 054	3 770	85%	68%	56%	
of	Commercial operators	3 884	4 111	84%	66%	50%
which	Non-profit operators	960	1 013	85%	79%	70%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.16. Scuba diving operators: annual number of dives, according to type and place

	MPA	Beginner courses			Advanced courses			Other dives		
		Mean	SD	AR	Mean	SD	AR	Mean	SD	AR
Inside	Banyuls	150	203	36%	237	156	36%	260	199	45%
MPA	Benidorm	209	84	83%	53	36	83%	3092	1011	100%
	Bonifacio	44	10	71%	34	14	71%	200	0	14%
	Cabo de Palos	--	--	0%	--	--	0%	230	0	25%
	Columbretes	--	--	0%	--	--	0%	1323	1083	50%
	Côte Bleue	233	165	18%	683	487	18%	1780	980	12%
	Malta	0	0	20%	0	0	17%	32	67	37%
	Medes	--	--	0%	--	--	0%	--	--	0%
	Monte da Guia	--	--	0%	--	--	0%	30	0	33%
	Sinis	121	52	100%	--	--	0%	--	--	0%
	Tabarca	0,0	0	100%	0	0	100%	2400	0	100%
	Tuscany	--	--	0%	--	--	0%	--	--	0%
	FULL SAMPLE	108	136	28%	149	291	24%	997	1347	33%
Outside	Banyuls	674	747	45%	1413	922	36%	1116	468	45%
MPA	Benidorm	0	0	83%	0	0	83%	83	186	100%
	Bonifacio	13	19	43%	17	13	43%	--	--	0%
	Cabo de Palos	--	--	0%	--	--	0%	230	0	25%
	Columbretes	350	50	25%	90	10	25%	1107	661	38%
	Côte Bleue	50	0	6%	0	0	6%	445	245	12%
	Malta	558	580	40%	445	327	37%	1408	856	70%
	Medes	--	--	0%	--	--	0%	--	--	0%
	Monte da Guia	--	--	0%	--	--	0%	30	0	33%
	Sinis	46	39	100%	--	--	0%	--	--	0%
	Tabarca	0	0	100%	0	0	100%	6800	0	100%
	Tuscany	--	--	0%	--	--	0%	--	--	0%
	FULL SAMPLE	344	540	33%	399	622	28%	1173	1238	41%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

For the whole sample, the mean number of dives per operator is close to 3000 (Table 3.15). Leaving aside case studies with only one answer (Cabo de Palos, Sinis, Tabarca), this mean number ranges from 1049 per operator in Monte da Guia to 4600 in Medes. The proportion of dives realised inside MPA is 68% on average. It is over 80% in Benidorm, Bonifacio, Côte Bleue and Tuscany, but it is under 1/3 in Banyuls and Tabarca. Dives are distributed by category (beginner courses, advanced courses, other) in Table 3.16. Data in this table are not easy to compare with the more global ones in the table before, because answering rates are significantly lower.

Tables 3.17 and 3.18 present operators' answers concerning prices and costs of their activity. According to results presented in Table 3.17, the mean price of a dive is approximately 35 € in case of a course, and 30 € for other dives. Annual costs are close to 45K€ on average, ranging from 22-24 K€ (Banyuls, Sinis) to nearly 140-160 K€ (Tabarca, Tuscany). Approximately 1/3 of these costs are variable, on average (Table 3.18)..

Table 3.17. Scuba diving operators: standard prices per dive (€)

MPA	Beginner courses			Advanced courses			Other dives			
	Mean	SD	AR	Mean	SD	AR	Mean	SD	AR	
Inside										
Banyuls	36,5	0,9	36%	31,2	5,7	45%	28,0	5,1	64%	
MPA										
Benidorm	33,4	5,2	83%	33,4	5,2	83%	36,8	1,9	100%	
Bonifacio	41,6	5,4	100%	39,9	7,9	100%	42,2	11,2	71%	
Cabo de Palos	--	--	0%	35,8	1,8	50%	26,5	3,5	50%	
Columbretes	--	--	0%	--	--	0%	44,6	2,6	63%	
Côte Bleue	32,2	11,2	59%	31,4	9,1	59%	22,1	3,4	59%	
Malta	--	--	0%	42,0	0,0	3%	28,2	12,3	43%	
Medes	--	--	0%	--	--	0%	26,8	2,3	83%	
Monte da Guia	58,0	0,0	33%	28,0	0,0	33%	30,0	0,0	33%	
Sinis	36,7	9,4	100%	43,3	9,4	100%	41,7	8,5	100%	
Tabarca	--	--	0%	--	--	0%	30,0	0,0	100%	
Tuscany	38,0	0,0	100%	38,0	0,0	100%	38,0	0,0	100%	
FULL SAMPLE	36,5	9,4	32%	35,0	8,5	36%	31,3	10,5	61%	
Outside										
MPA										
Banyuls	36,6	6,3	73%	29,4	6,5	45%	29,0	5,5	73%	
Benidorm	38,0	0,0	17%	38,0	0,0	17%	38,0	0,0	17%	
Bonifacio	37,8	3,6	57%	33,3	2,3	57%	52,3	20,3	43%	
Cabo de Palos	51,4	6,9	100%	37,2	5,7	75%	21,5	1,5	50%	
Columbretes	59,3	5,8	38%	41,3	3,8	38%	21,2	8,6	63%	
Côte Bleue	33,7	9,8	18%	30,3	6,6	18%	20,6	5,2	35%	
Malta	27,3	6,1	47%	31,8	6,9	40%	25,8	8,3	93%	
Medes	--	--	0%	--	--	0%	26,8	2,3	83%	
Monte da Guia	--	--	0%	--	--	0%	30,0	0,0	33%	
Sinis	36,7	9,4	100%	43,3	9,4	100%	41,7	8,5	100%	
Tabarca	--	--	0%	--	--	0%	25,0	0,0	100%	
Tuscany	38,0	0,0	100%	38,0	0,0	100%	38,0	0,0	100%	
FULL SAMPLE	36,5	11,5	42%	34,1	7,6	36%	27,7	10,8	66%	

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.18. Scuba diving operators: costs (€ / year)

MPA	Fixed costs*			Variable costs**			Total costs		
	Mean	SD	AR	Mean	SD	AR	Mean	SD	AR
Banyuls	18 179	25 755	64%	4 975	1 596	45%	21 732	27 711	64%
Benidorm	30 658	15 611	83%	16 034	15 372	83%	46 692	19 835	83%
Bonifacio	24 400	20 277	71%	5 248	2 950	57%	28 598	23 504	71%
Cabo de Palos	33 167	10 911	75%	9 171	2 986	75%	42 337	8 341	75%
Columbretes	35 304	58 253	100%	15 981	9 266	88%	56 329	59 406	88%
Côte Bleue	29 671	63 782	94%	12 563	15 882	88%	41 449	77 793	94%
Malta	23 039	23 698	70%	21 905	24 859	70%	41 035	44 815	77%
Medes	69 800	79 188	83%	48 549	0	17%	79 510	75 307	83%
Monte da Guia	40 967	28 118	100%	6 815	3 275	100%	47 781	28 024	100%
Sinis	12 900	9 731	100%	10 933	5 796	100%	23 833	14 942	100%
Tabarca	130 300	0	100%	26 040	0	100%	156 340	0	100%
Tuscany	106 000	0	100%	32 950	0	100%	138 950	0	100%
FULL SAMPLE	31 922	47 154	80%	15 575	18 112	71%	45 121	55 643	81%
<i>of which</i>									
Commercial	41 192	51 989	81%	18 827	19 521	73%	57 036	60 107	83%
Non-profit	6 760	7 472	81%	6 361	7 930	69%	12 212	13 928	81%

* Boat, diving equipment, labour costs of permanent staff and other fixed costs.

** Other labour costs, compressor running costs, fuel and lubricant and other variable costs.

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.19 presents operators' answers concerning the estimated number of their customers, and its distribution by geographical origin. According to these answers, the mean annual

number of customers is 1415 per operator, with an average number of 2,1 dives per customer. On the whole, 22% of these customers are residents, and 78% are tourists. The proportion of foreign tourists is 31% for the whole sample. It reaches 87% in Medes, but it is only 8% in Côte Bleue, 7% in Banyuls, and 1% in Tuscany (only one answer in this last case). The proportion of residents is highest in Sinis (56%) and in Côte Bleue (47%), and lowest in Bonifacio (6%), Malta (7%), Medes (8%), Monte da Guia (8%), and Tuscany (0%).

Table 3.19. Scuba diving operators: description of customers

MPA	Yearly number			Number of dives per customer			Geographical origin				
	Mean	SD	AR	Mean	SD	AR	Residents	Tourists		AR	
								National	Foreign		
Banyuls	1 410	2 277	91%	2,1	6,6	91%	19%	73%	7%	91%	
Benidorm	3 066	1 247	100%	1,2	0,1	100%	28%	54%	18%	100%	
Bonifacio	750	600	71%	1,2	0,1	71%	6%	76%	19%	86%	
Cabo de Palos	--	--	0%	--	--	0%	--	--	--	0%	
Columbretes	872	1 015	100%	2,2	1,0	100%	23%	65%	12%	88%	
Côte Bleue	1 758	2 929	76%	2,1	3,0	71%	47%	45%	8%	71%	
Malta	654	666	77%	5,1	2,3	83%	7%	3%	90%	77%	
Medes	5 850	5 150	33%	1,3	1,3	33%	8%	5%	87%	33%	
Monte da Guia	433	272	100%	2,5	7,5	100%	8%	41%	52%	100%	
Sinis	157	42	100%	3,7	6,5	100%	56%	28%	16%	100%	
Tabarca	8 000	0	100%	1,0	0,0	100%	10%	75%	15%	100%	
Tuscany	3 500	0	100%	1,0	0,0	100%	0%	99%	1%	100%	
FULL SAMPLE	1 415	2 241	77%	2,1	3,9	76%	22%	46%	31%	77%	
<i>of</i>	Commercial	1942	2494	74%	2,09	3,08	74%	21%	46%	33%	21%
<i>which</i>	Non-profit	228	509	85%	3,23	18,20	81%	52%	45%	2%	52%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

3.3 Divers

3.3.1 Personal data

Tables 3.20 and 3.21 provide information concerning gender, age, and size of household of scuba divers in the sample.

Table 3.20. Divers: gender and age

MPA	Gender (frequency)			Age (years)		
	Female	Male	Answ. Rate	Mean	Std Dev.	Answ. Rate
Banyuls	18,3%	81,7%	100%	36,6	13,2	100%
Benidorm	28,3%	71,7%	100%	36,5	10,3	99%
Bonifacio	23,8%	76,2%	97%	37,3	10,6	99%
Cabo de Palos	26,5%	73,5%	100%	35,3	6,3	98%
Columbretes	24,9%	75,1%	98%	37,2	8,2	98%
Côte Bleue	27,1%	72,9%	100%	37,7	11,1	98%
Malta	23,0%	77,0%	97%	38,0	11,2	96%
Medes	28,6%	71,4%	100%	39,7	11,7	96%
Monte da Guia	35,1%	64,9%	100%	37,4	8,1	100%
La Restinga	34,6%	65,4%	100%	34,4	6,8	99%
Sinis	12,1%	87,9%	97%	33,2	9,1	97%
Tabarca	30,2%	69,8%	98%	36,4	8,6	99%
Tuscany	38,7%	61,3%	98%	39,7	9,7	100%
FULL SAMPLE	27,1%	72,9%	99%	37,1	10,2	98%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Table 3.21. Divers: size of household (number of persons)

MPA	Mean	Standard Deviation	Answering Rate
Banyuls	2,3	1,1	96%
Benidorm	2,9	1,4	98%
Bonifacio	3,3	1,2	81%
Cabo de Palos	2,6	1,4	98%
Columbretes	2,5	1,3	96%
Côte Bleue	2,1	1,2	95%
Malta	2,5	1,4	97%
Medes	2,1	1,0	92%
Monte da Guia	2,3	1,1	98%
La Restinga	1,7	1,1	98%
Sinis	3,8	1,6	82%
Tabarca	3,0	1,3	99%
Tuscany	2,5	1,2	98%
FULL SAMPLE	2,4	1,3	96%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Women represent 27% of the whole sample (Table 3.20), a proportion significantly higher than the one noticed for recreational fishers (7% - see above, Chapter 2, Table 2.4). It is over 1/3 in Monte da Guia, La Restinga and Tuscany, but only 12% in Sinis. The mean age of divers is 37 (Table 3.20), and the mean size of their household is 2,4 persons (Table 3.21). In the case of recreational fishers, the corresponding figures were 44 and 3,2 (Chapter 2, Table 2.4 and 2.5).

Table 3.22. Divers: country of residence (frequency)

	Austria	Belgium	France	Germany	Italy	Malta	NL	Portugal	Spain	Switz	UK	Other	AR
Banyuls	-	1%	92%	1%	-	-	1%	-	-	1%	-	4%	98%
Benidorm	-	1%	2%	2%	ε	-	2%	1%	86%	1%	ε	4%	100%
Bonifacio	-	3%	61%	-	33%	-	2%	-	-	-	-	1%	100%
Cabo de Palos	-	-	-	-	-	-	-	-	96%	-	4%	-	100%
Columbretes	-	ε	ε	ε	-	-	ε	-	98%	-	-	-	99%
Côte Bleue	-	ε	99%	ε	-	-	-	-	-	-	-	ε	100%
Malta	5%	4%	1%	4%	-	46%	5%	-	ε	2%	30%	2%	98%
Medes	-	11%	29%	10%	2%	-	4%	2%	36%	1%	1%	4%	100%
Monte da Guia	-	3%	2%	7%	3%	-	4%	65%	5%	4%	5%	2%	100%
La Restinga	-	-	-	-	-	-	-	1%	98%	-	-	1%	99%
Sinis	-	-	-	-	97%	-	-	-	-	-	-	3%	100%
Tabarca	-	-	3%	1%	-	-	-	-	91%	-	5%	-	99%
Tuscany	-	-	-	-	90%	-	-	-	-	-	-	10%	100%
FULL SAMPLE	ε	1%	37%	2%	5%	5%	1%	2%	40%	1%	4%	2%	99%

ε = under 0,5%. Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

According to table 3.22, more than 75% of all divers in the sample come from two countries: Spain (40%) and France (37%). A closer look at table 3.21 indicates that, in most cases, an overwhelming majority of divers in the sample belong to the country where the MPA is located (exceptions to this rule are Medes, Malta and, to a lesser degree, Bonifacio). Comparison with information provided by operators (see above, table 3.19) suggests the existence of a selection bias, possibly due to the language of the questionnaires.

Table 3.23. Divers: net household income (euros / month)

MPA	≤ 1200	]1200-2400]	]2400-3600]	]3600-4800]	]4800-6000]	> 6000	AR
Banyuls	9%	42%	22%	11%	6%	10%	78%
Benidorm	5%	16%	31%	5%	23%	20%	83%
Bonifacio	5%	16%	20%	14%	23%	22%	85%
Cabo de Palos	5%	37%	33%	8%	8%	9%	89%
Columbretes	0%	24%	35%	0%	19%	22%	73%
Côte Bleue	7%	35%	26%	15%	10%	7%	90%
Malta	18%	51%	12%	1%	9%	9%	74%
Medes	3%	39%	15%	6%	15%	22%	69%
Monte da Guia	8%	30%	21%	13%	15%	13%	93%
La Restinga	0%	24%	1%	48%	0%	27%	85%
Sinis	10%	45%	10%	10%	10%	15%	59%
Tabarca	18%	10%	19%	10%	26%	17%	82%
Tuscany	3%	81%	3%	0%	0%	13%	51%
FULL SAMPLE	7%	32%	23%	11%	13%	14%	82%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Comparing Table 3.23 and the corresponding table in the chapter devoted to recreational fishing (Table 2.7, Chapter 2) suggests that, on average, divers earn higher incomes than recreational fishers: the proportion of divers in the sample with monthly incomes over 4800 € is 27%, against 10% only for fishers; on the other hand, the proportion of divers with monthly incomes under 1200 € is 7%, against 21% for fishers. However, it was noticed that some particular groups of recreational fishers (customers of charter-fishing operators) earned

especially high incomes, a feature that does not appear so clearly with divers. Concerning divers, a dual distribution of incomes appears in several case studies, with a major summit around 1800 €, and a secondary one over 4800 €.

Table 3.24 provides describes how many divers are also spear fishers. On the whole, the proportion is 7%, ranging from 3% in La restinga and Tuscany to 24% in Sinis.

Table 3.24. Divers: are you a spear fisher?

MPA	Yes	Answering Rate
Banyuls	12%	99%
Benidorm	5%	97%
Bonifacio	8%	95%
Cabo de Palos	6%	99%
Columbretes	6%	95%
Côte Bleue	8%	99%
Malta	6%	95%
Medes	4%	95%
Monte da Guia	9%	98%
La Restinga	3%	99%
Sinis	24%	97%
Tabarca	5%	93%
Tuscany	3%	95%
FULL SAMPLE	7%	97%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

3.3.2 Diving activity

Table 3.25 describes answers of divers in the sample concerning their most usual way of diving. According to these answers, half of them usually dive with a commercial operator, 35% with a non-profit operator, and 14% on their own. This last proportion may underscore reality, since most divers were surveyed on the occasion of a dive with a diving operator.

Table 3.25. Divers: do you normally dive on your own or with a diving club?

MPA	With a diving club		On my own	Answering Rate
	Commercial	Non-profit		
Banyuls	39%	49%	13%	98%
Benidorm	77%	13%	11%	96%
Bonifacio	56%	37%	7%	97%
Cabo de Palos	71%	13%	17%	100%
Columbretes	51%	24%	25%	86%
Côte Bleue	24%	68%	8%	98%
Malta	45%	27%	28%	98%
Medes	45%	39%	16%	95%
Monte da Guia	84%	6%	11%	96%
La Restinga	64%	13%	24%	94%
Sinis	74%	16%	10%	91%
Tabarca	91%	4%	5%	97%
Tuscany	78%	10%	13%	100%
FULL SAMPLE	51%	35%	14%	96%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Table 3.26 displays answers of divers concerning their diving experience, as measured by the number of years they have been diving, and their annual number of dives. For the full sample, the mean number of years of diving is 8,3, ranging from 3,8 in Sinis to 14,2 in Medes. The annual number of dives is 35 on average, ranging from 16 in Sinis to 52 in Malta.

Table 3.26. Divers: diving experience

MPA	Number of years of activity			Number of dives per year		
	Mean	Std Dev.	Answ. Rate	Mean	Std Dev.	Answ. Rate
Banyuls	10,3	10,4	98%	38,5	41,2	87%
Benidorm	6,9	7,8	99%	22,9	27,3	93%
Bonifacio	8,6	7,7	99%	17,0	10,9	94%
Cabo de Palos	6,0	5,8	97%	44,7	45,2	92%
Columbretes	6,7	6,9	95%	28,6	34,9	95%
Côte Bleue	9,0	9,0	100%	40,2	48,5	95%
Malta	9,4	9,0	96%	56,9	51,9	88%
Medes	14,2	11,8	97%	43,9	25,2	90%
Monte da Guia	7,3	6,8	96%	16,0	16,5	96%
La Restinga	5,9	5,9	100%	30,4	33,5	92%
Sinis	3,8	4,3	94%	15,9	10,4	100%
Tabarca	5,9	6,2	100%	20,6	27,4	93%
Tuscany	10,0	8,9	97%	39,5	23,7	95%
FULL SAMPLE	8,3	8,6	98%	35,2	40,7	93%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Table 3.27 displays answers of divers concerning their own estimated level of expertise. Setting apart first divers (3% of the whole sample), the distribution is symmetrical, 28% of the divers defining themselves as “beginners”, “39% as “intermediate”, and 30% as “experts”. The proportion of “experts” is over 40% in Banyuls, Côte Bleue, Tuscany, and under 20% in Benidorm, Bonifacio, Monte da Guia, La Restinga, Sinis and Tabarca.

Table 3.27. Divers: level of diving expertise

MPA	First dive	Beginner	Intermediate	Expert	Answ. Rate
Banyuls	4%	24%	28%	44%	100%
Benidorm	5%	35%	44%	16%	100%
Bonifacio	0%	28%	59%	13%	100%
Cabo de Palos	1%	21%	51%	27%	100%
Columbretes	0%	24%	55%	21%	98%
Côte Bleue	3%	28%	27%	42%	100%
Malta	1%	12%	47%	40%	99%
Medes	4%	33%	27%	36%	100%
Monte da Guia	0%	38%	51%	11%	96%
La Restinga	9%	39%	36%	16%	99%
Sinis	0%	26%	59%	15%	100%
Tabarca	6%	38%	40%	16%	100%
Tuscany	0%	13%	46%	41%	100%
FULL SAMPLE	3%	28%	39%	30%	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Table 3.28 presents answers to a question investigating the opinion of divers about the environmental impact of their activity. On the whole, a majority of divers in the sample (56%) acknowledge damages caused by diving, and two thirds of these persons impute them to the inappropriate behaviour of some divers. The proportion of divers acknowledging damages caused by diving is highest in Medes (72%), and lowest in Sinis (15%) and Tuscany (18%). Among divers admitting negative impacts of diving, the proportion of those who impute it to overfrequentation is highest in Medes (44%) and Côte Bleue (41%). In Banyuls, Bonifacio and Columbretes, an important number consider this factor as at least partly responsible.

Table 3.28. Divers: do you think diving damages the marine environment in some areas?

MPA	Diving damages environment				If it does, why?			
	Yes	No	Don't know	Answ. Rate	Behaviour of some divers	Too many divers	Both	Answ. Rate
Banyuls	66%	28%	6%	100%	33%	22%	44%	100%
Benidorm	59%	32%	9%	99%	88%	12%	0%	99%
Bonifacio	57%	38%	5%	99%	47%	29%	24%	95%
Cabo de Palos	51%	42%	7%	98%	91%	9%	0%	97%
Columbretes	39%	55%	5%	95%	48%	14%	38%	99%
Côte Bleue	64%	32%	4%	98%	59%	41%	0%	93%
Malta	65%	28%	7%	98%	82%	18%	0%	98%
Medes	72%	24%	4%	92%	56%	44%	0%	100%
Monte da Guia	39%	60%	2%	100%	62%	10%	29%	95%
La Restinga	53%	40%	8%	99%	71%	29%	0%	99%
Sinis	15%	82%	3%	100%	80%	20%	0%	100%
Tabarca	46%	45%	9%	99%	76%	24%	0%	94%
Tuscany	18%	77%	5%	95%	73%	27%	0%	100%
FULL SAMPLE	56%	38%	6%	98%	66%	27%	6%	97%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Budget

Table 3.29 presents yearly expenditures related to diving, as estimated by divers themselves (diving equipments, licence, courses, diving holidays...). For the whole sample, the mean diving budget is 1,3K € (30% higher than the mean fishing budget of recreational fishers, but with a lower dispersion - see Chapter 2, Table 2.23). It ranges from 669 € in Banyuls to 2414 € in Tuscany.

Table 3.29. Divers: expenditures related to diving (euros / year)

MPA	Mean	Standard Deviation	Answering Rate
Banyuls	669	693	76%
Benidorm	1 007	1 074	89%
Bonifacio	1 001	669	94%
Cabo de Palos	1 645	1 240	84%
Columbretes	1 574	1 298	81%
Côte Bleue	1 163	1 248	94%
Malta	1 695	1 573	84%
Medes	1 557	1 337	93%
Monte da Guia	1 500	1 369	96%
La Restinga	1 379	1 215	91%
Sinis	1 203	891	62%
Tabarca	913	1 226	96%
Tuscany	2 414	1 394	84%
FULL SAMPLE	1 307	1 283	89%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

A set of questions was dedicated to divers whose main accommodation is distant from the MPA (these divers are denominated hereafter as “non-resident” or “tourists”). In this case, it is suspected that accommodation and / or travelling costs form a major expenditure, conditioning their presence, and therefore their diving activity, in the MPA or close to it.

Table 3.30. Non-resident divers: means of transport

MPA	Boat	Plane	Car	Other	AR
Banyuls	0%	1%	86%	13%	88%
Benidorm	0%	8%	91%	1%	82%
Bonifacio	80%	17%	3%	0%	89%
Cabo de Palos	0%	5%	93%	2%	87%
Columbretes	0%	2%	98%	0%	64%
Côte Bleue	0%	1%	72%	26%	49%
Malta	1%	98%	2%	0%	53%
Medes	0%	2%	90%	8%	89%
Monte da Guia	0%	93%	0%	7%	98%
La Restinga	19%	66%	14%	1%	99%
Sinis	48%	8%	36%	8%	74%
Tabarca	4%	10%	85%	2%	78%
Tuscany	34%	0%	66%	0%	94%
FULL SAMPLE	9%	21%	63%	7%	68%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Table 3.31. Non-resident divers: accommodation

MPA	Hotel	Rented house	Family or relatives	Own property	Camping ground	Other	AR
Banyuls	19%	36%	16%	1%	21%	6%	82%
Benidorm	18%	16%	16%	50%	0%	0%	79%
Bonifacio	27%	31%	3%	6%	33%	1%	94%
Cabo de Palos	35%	16%	17%	15%	11%	5%	84%
Columbretes	38%	13%	11%	10%	1%	27%	53%
Côte Bleue	21%	8%	13%	2%	31%	25%	39%
Malta	52%	36%	3%	7%	1%	1%	50%
Medes	54%	15%	11%	6%	12%	2%	89%
Monte da Guia	29%	48%	11%	4%	2%	7%	98%
La Restinga	9%	80%	3%	3%	2%	3%	99%
Sinis	4%	35%	12%	31%	4%	15%	76%
Tabarca	5%	8%	27%	60%	0%	0%	77%
Tuscany	4%	18%	5%	7%	2%	64%	87%
FULL SAMPLE	26%	25%	11%	16%	11%	11%	65%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Table 3.32. Non-resident divers: characteristics of stay

MPA	Total cost (euros)			Number of persons with you			Length (days)		
	Mean	SD	AR	Mean	SD	AR	Mean	SD	AR
Banyuls	890	1 118	65%	2,3	1,5	77%	7,8	6,2	85%
Benidorm	1 226	1 033	60%	2,3	1,4	77%	10,6	10,7	76%
Bonifacio	2 766	2 144	81%	2,6	1,9	86%	18,4	10,4	93%
Cabo de Palos	783	944	73%	1,8	1,6	86%	6,6	10,5	84%
Columbretes	663	779	48%	2,1	1,9	55%	3,8	4,9	59%
Côte Bleue	521	694	42%	1,4	2,0	48%	6,1	8,9	47%
Malta	1 910	1 638	45%	1,7	1,7	48%	13,1	15,6	52%
Medes	678	769	61%	2,1	2,8	74%	4,3	4,1	84%
Monte da Guia	2 036	1 392	91%	0,8	1,0	98%	12,2	7,4	98%
La Restinga	1 708	1 267	86%	2,0	1,9	99%	8,6	5,9	93%
Sinis	1 368	964	41%	3,1	2,0	65%	16,9	11,7	62%
Tabarca	1 485	1 482	64%	2,1	1,8	78%	15,0	9,7	77%
Tuscany	1 988	1 474	76%	5,5	4,7	81%	7,4	16,7	86%
FULL SAMPLE	1 220	1 359	57%	2,0	2,2	66%	8,9	10,5	67%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

At the scale of the whole sample, car is the major means of transport used by “tourist” divers (63%), followed by plane (21%), and ferry-boat (9%). Half of these divers stay in hotels or rented houses. The mean length of their stay is 9 days, with a holiday budget of 1,2 K€ on average, usually shared with 2 persons. These global patterns may vary substantially according to each case study.

“Tourists” divers may have various motivations concerning the stay in the place where they were surveyed. According to Table 3.33 below, nearly two thirds considered diving as a major motivation for their stay, and only 16% declared that it did not influence their decision. However, these global proportions conceal a great diversity of situations according to case

studies. The motivation for diving appears particularly strong in Cabo de Palos, Medes, La Restinga and Tuscany. It is weakest in Bonifacio, Sinis and Tabarca.

Table 3.33. Non-resident divers: how much was your decision to come here influenced by diving?

MPA	Very much	Moderately	No influence	Answering Rate
Banyuls	65%	21%	15%	83%
Benidorm	48%	23%	28%	84%
Bonifacio	27%	49%	24%	99%
Cabo de Palos	84%	11%	5%	89%
Columbretes	60%	28%	12%	61%
Côte Bleue	75%	12%	13%	48%
Malta	76%	20%	4%	51%
Medes	81%	12%	7%	84%
Monte da Guia	43%	34%	23%	98%
La Restinga	86%	8%	6%	100%
Sinis	31%	46%	23%	76%
Tabarca	11%	33%	56%	75%
Tuscany	95%	2%	4%	89%
FULL SAMPLE	64%	20%	16%	70%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

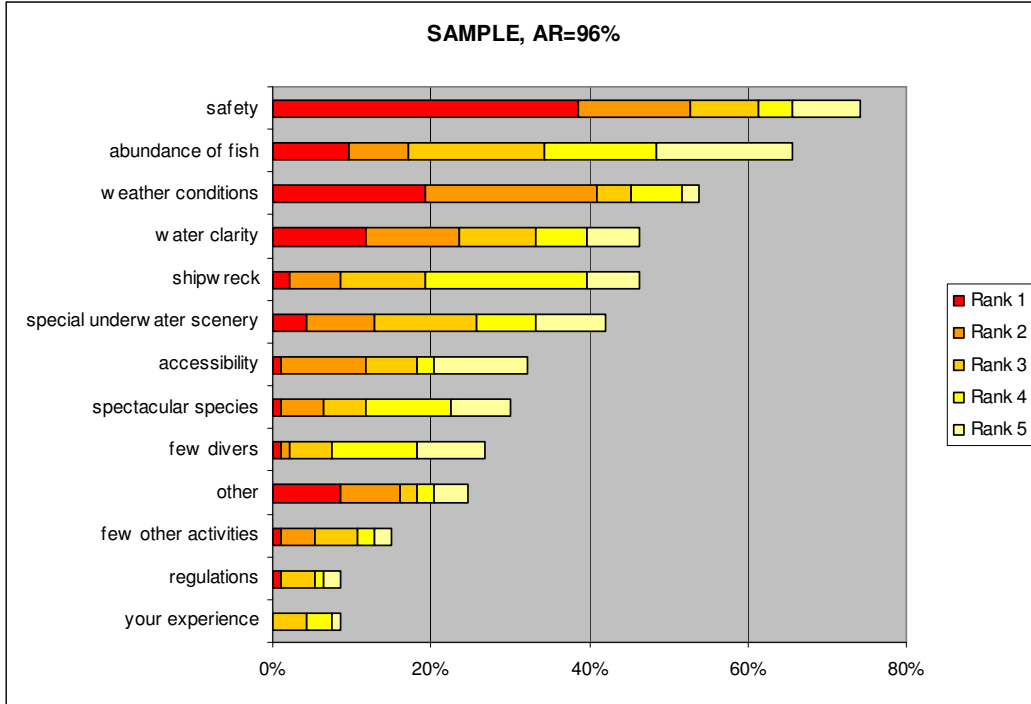
3.4 Choice of diving site and perception of MPAs

3.4.1 Choice criteria of a diving site

Diving operators were asked to select, from a list of 12 items, the 5 major factors influencing their choice of a diving site, and to rank them. A similar question was asked to divers, but the list contained only 11 factors, from which they were asked to select the 3 major ones. Figure 3.1 presents answers of operators, and figures 3.2-3.15 present answers of divers¹⁰.

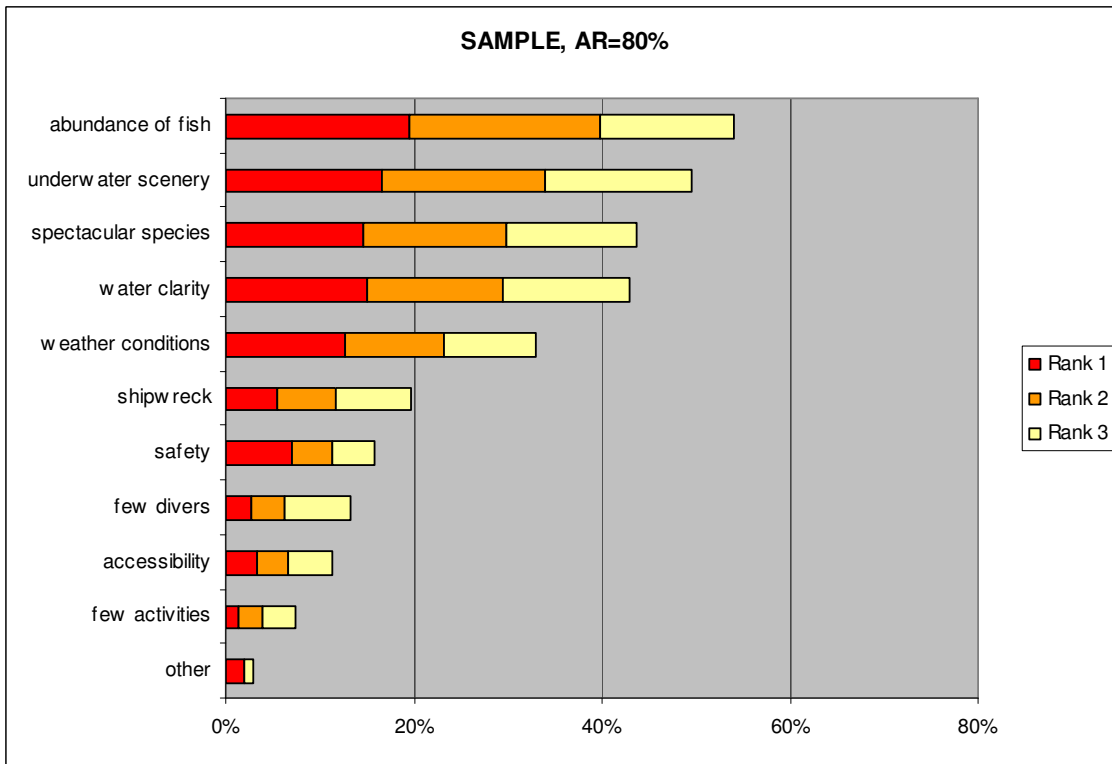
¹⁰ Tables containing detailed answers are presented in the appendix of this report.

Figure 3.1. Diving operators' choice criteria of a diving site: whole sample



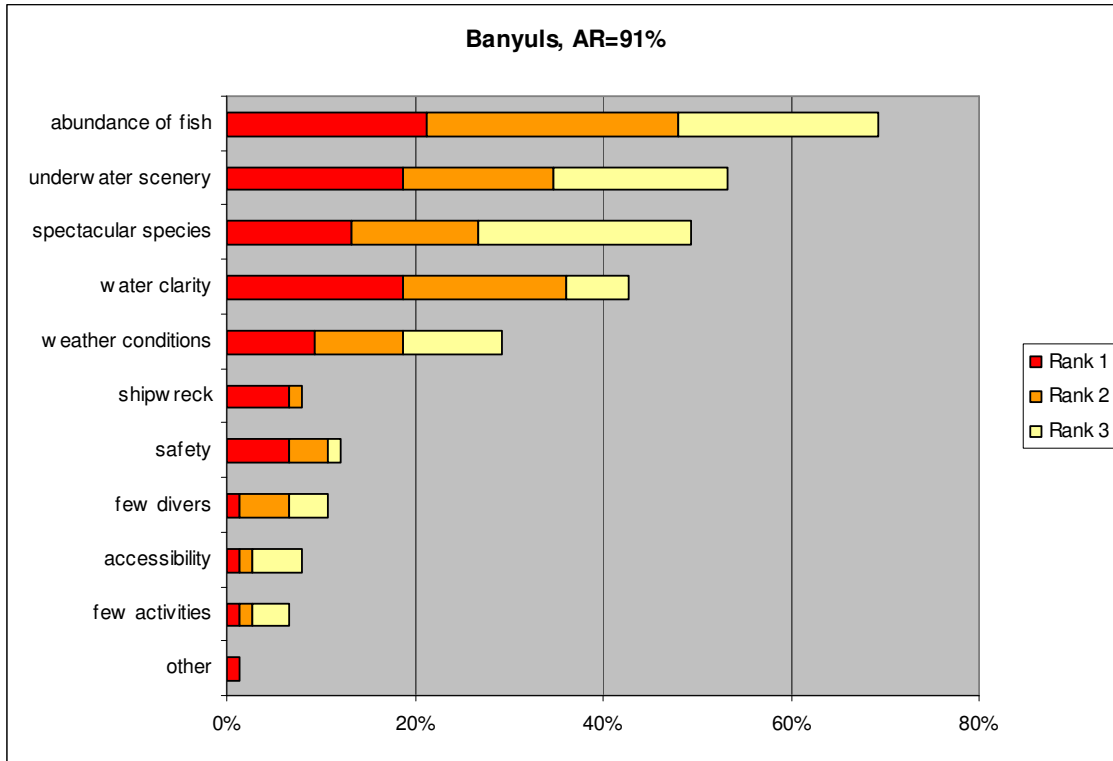
Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Figure 3.2. Divers' choice criteria of a diving site: whole sample



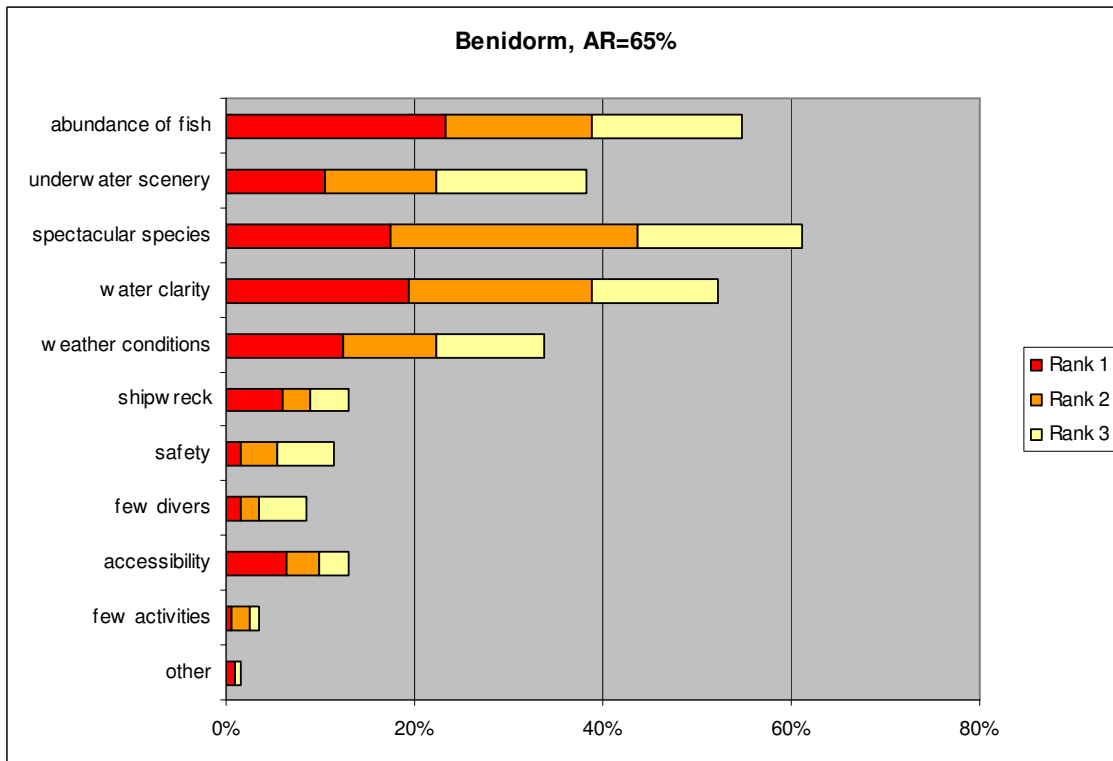
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.3. Divers' choice criteria of a diving site: Banyuls



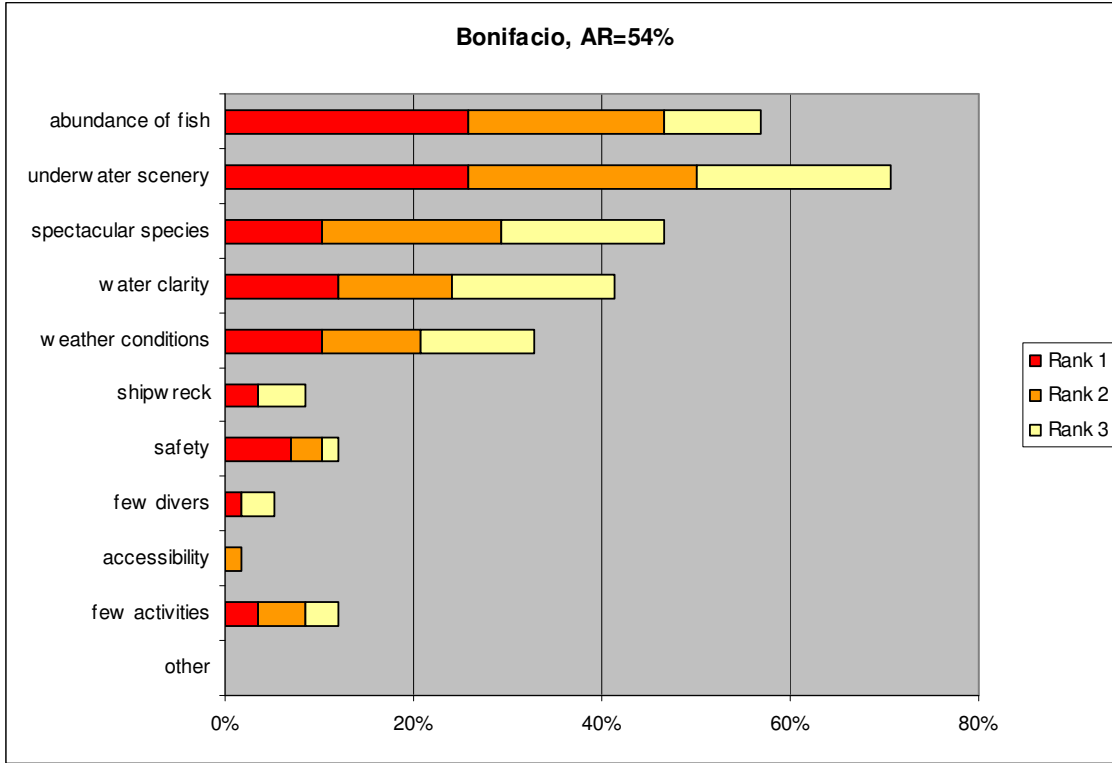
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.4. Divers' choice criteria of a diving site: Benidorm



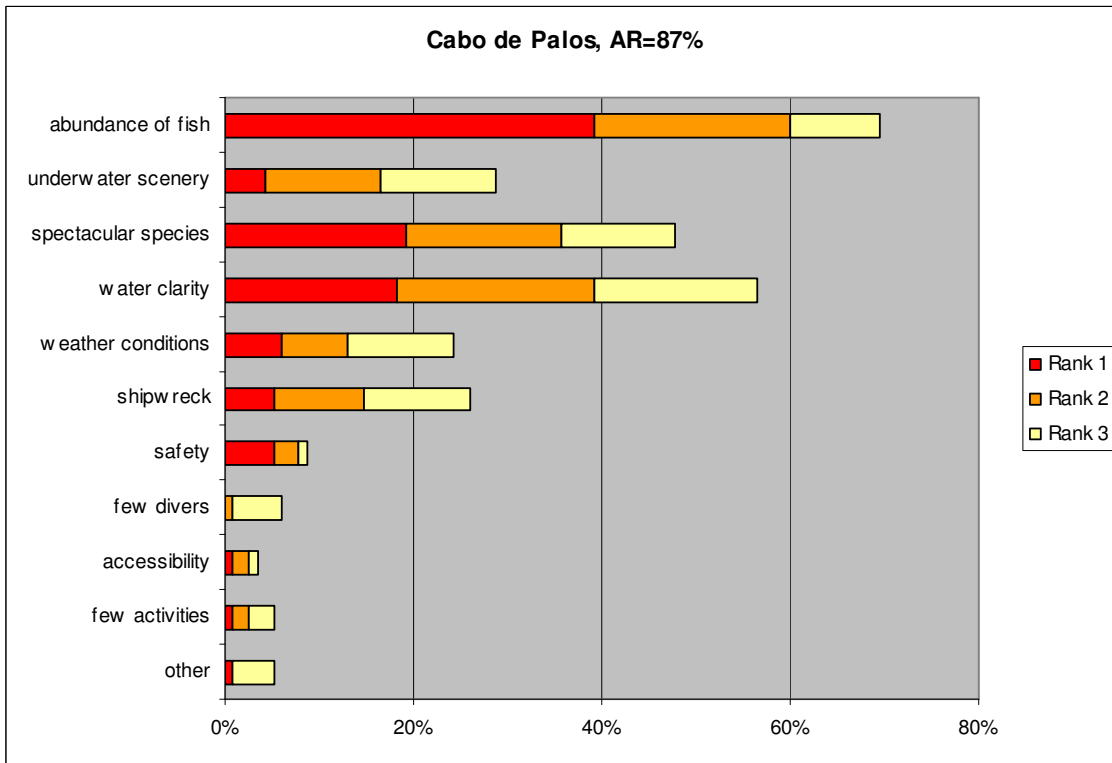
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.5. Divers' choice criteria of a diving site: Bonifacio



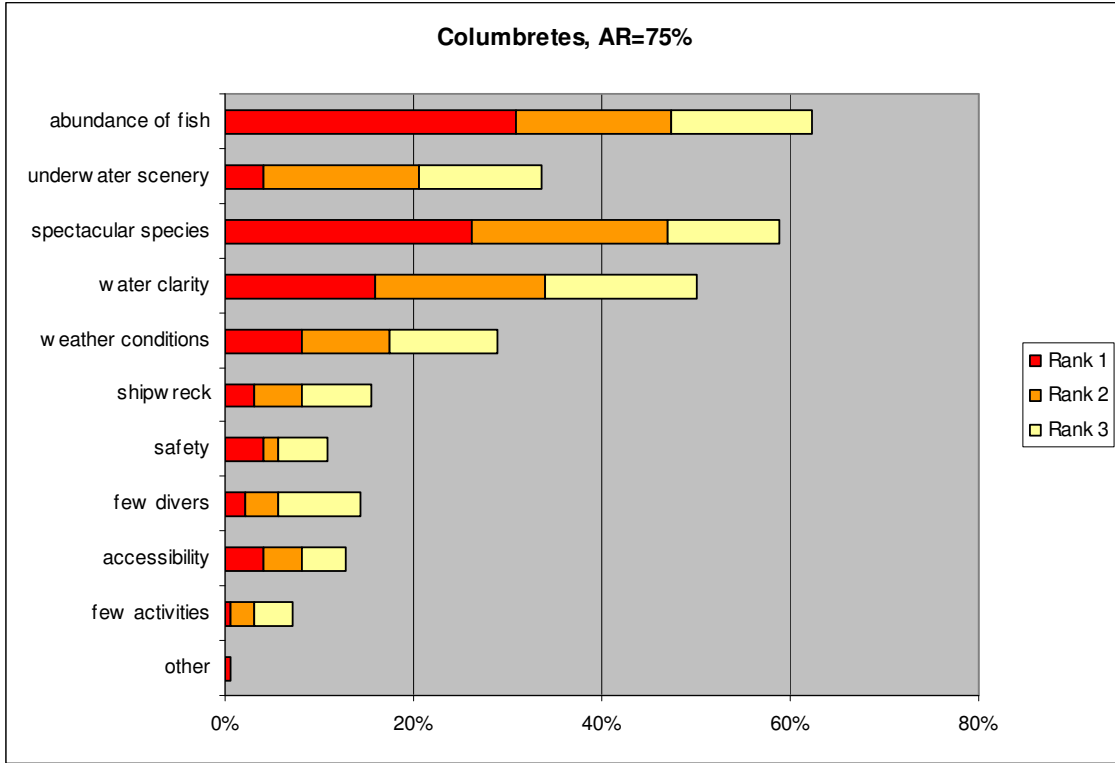
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.6. Divers' choice criteria of a diving site: Cabo de Palos



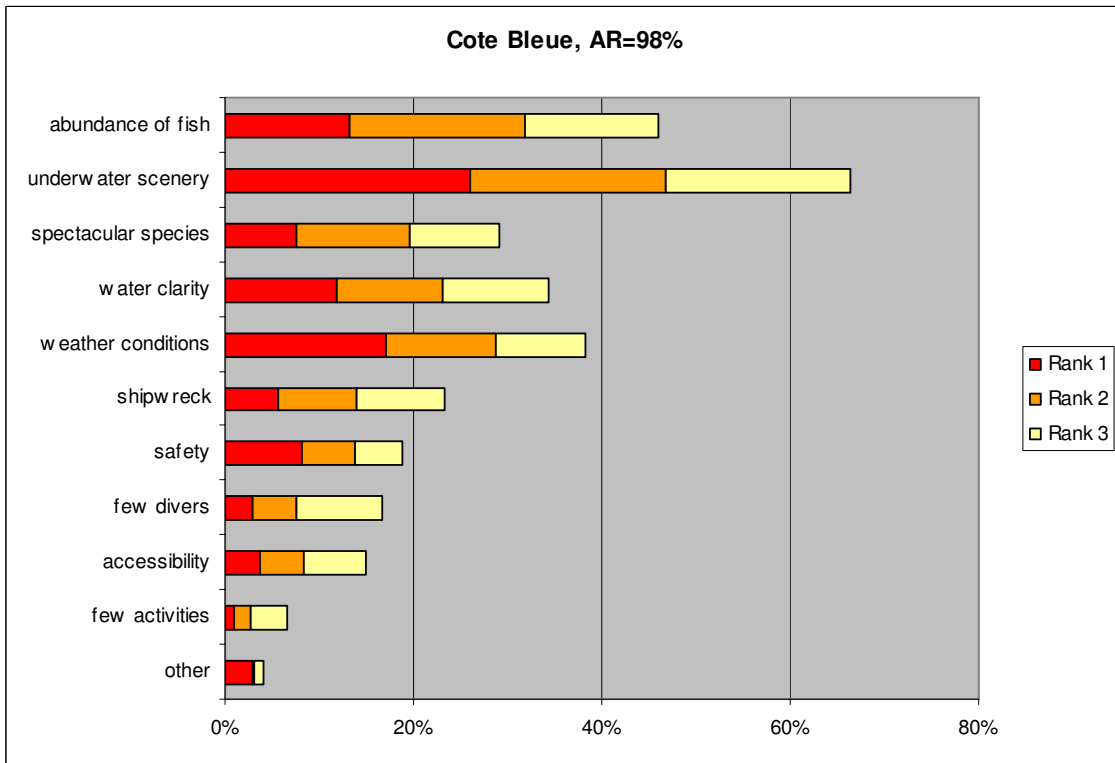
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.7. Divers' choice criteria of a diving site: Columbretes



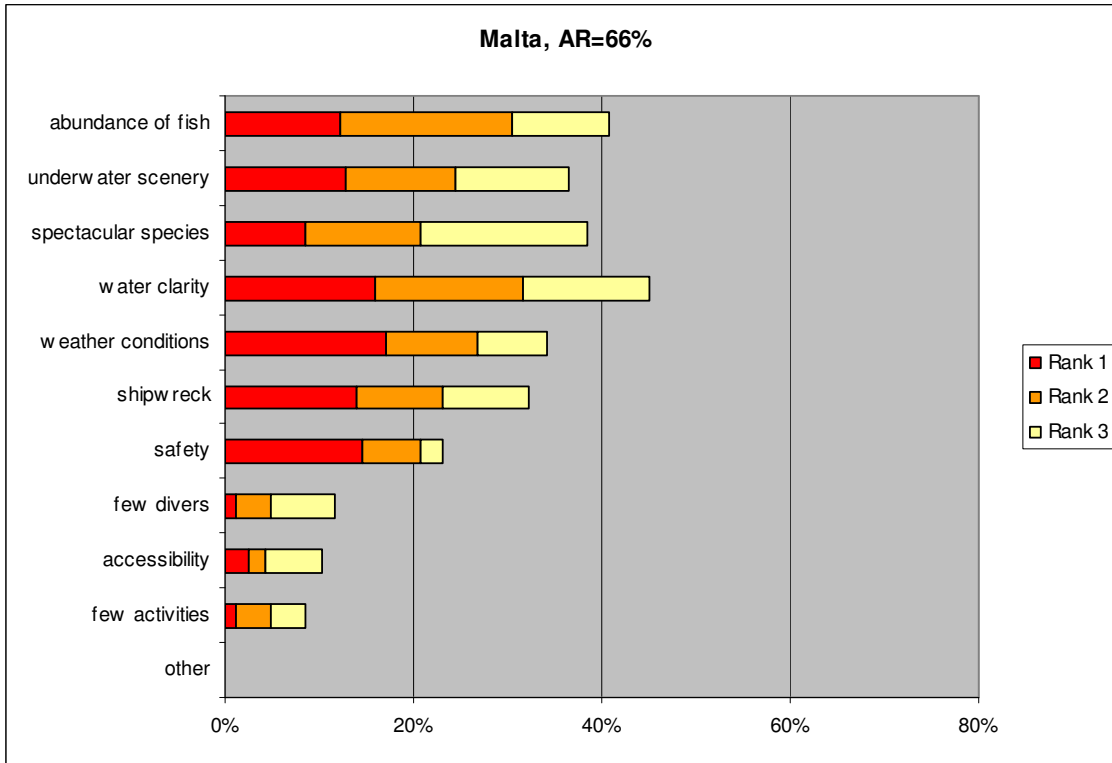
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.8. Divers' choice criteria of a diving site: Côte Bleue



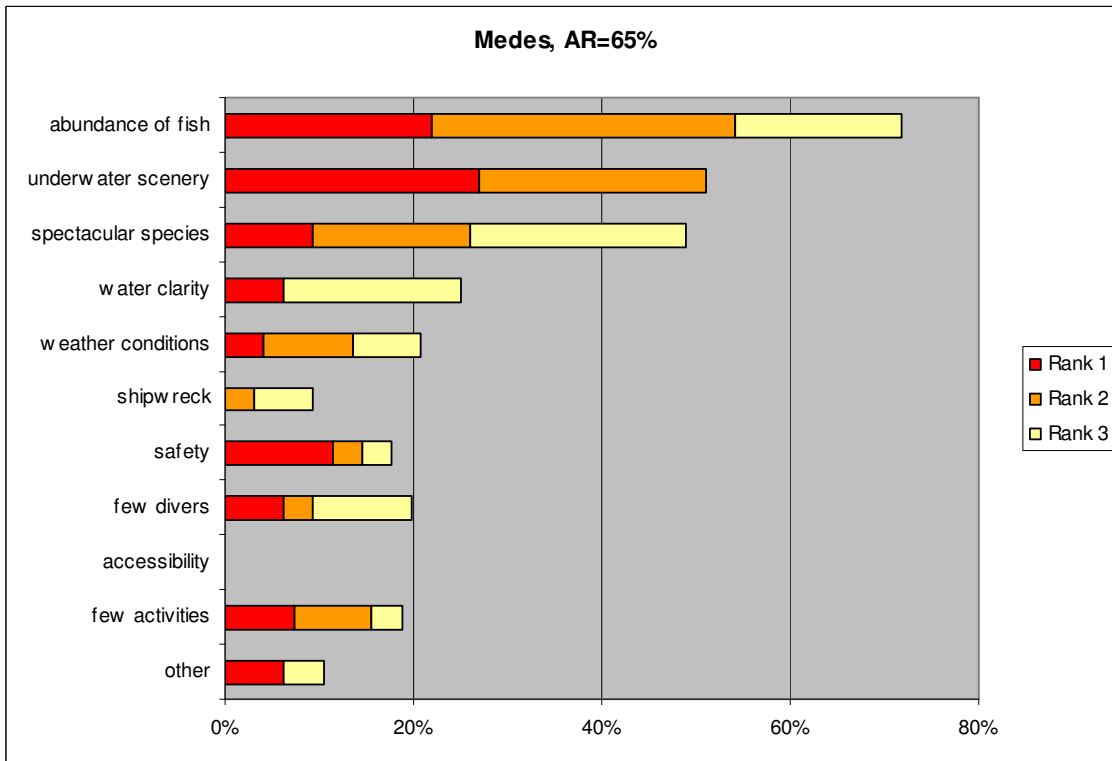
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.9. Divers' choice criteria of a diving site: Malta



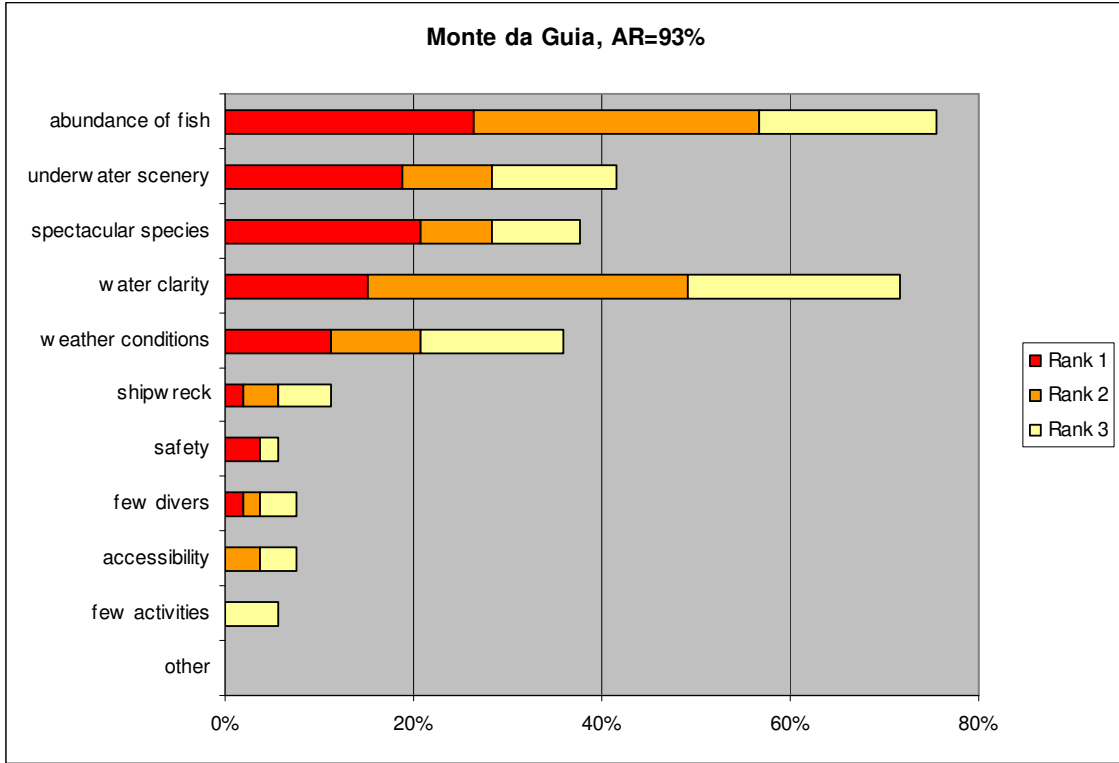
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.10. Divers' choice criteria of a diving site: Medes



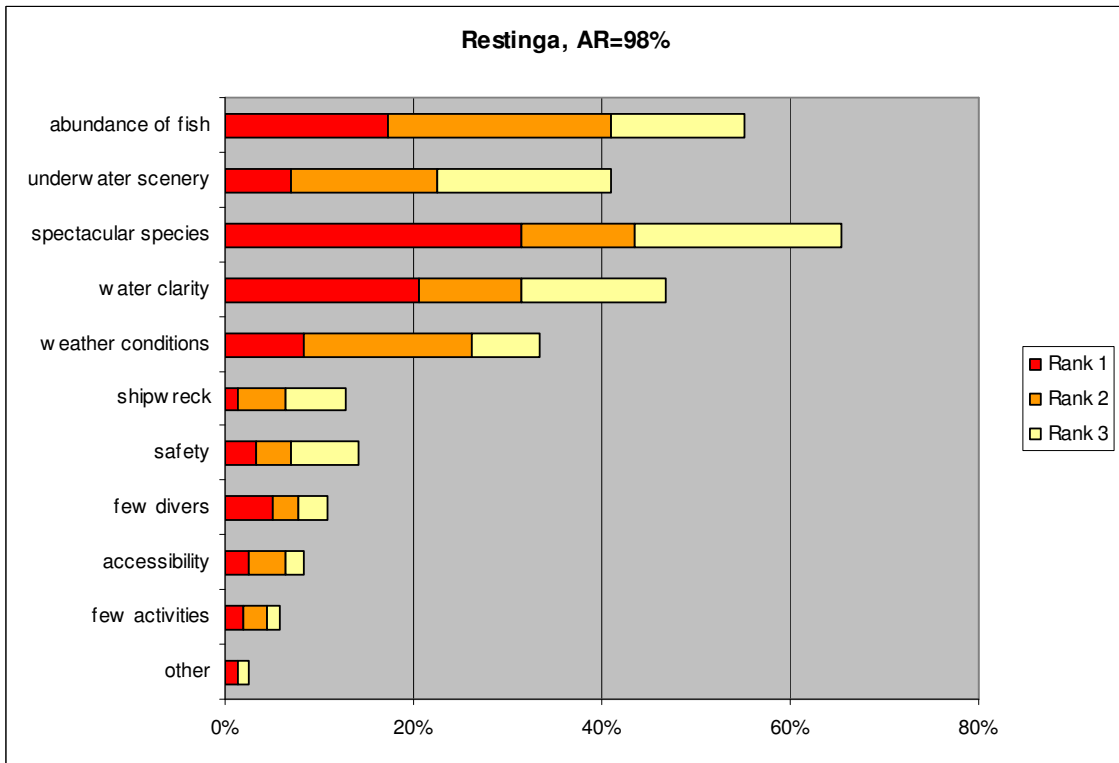
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.11. Divers' choice criteria of a diving site: Monte da Guia



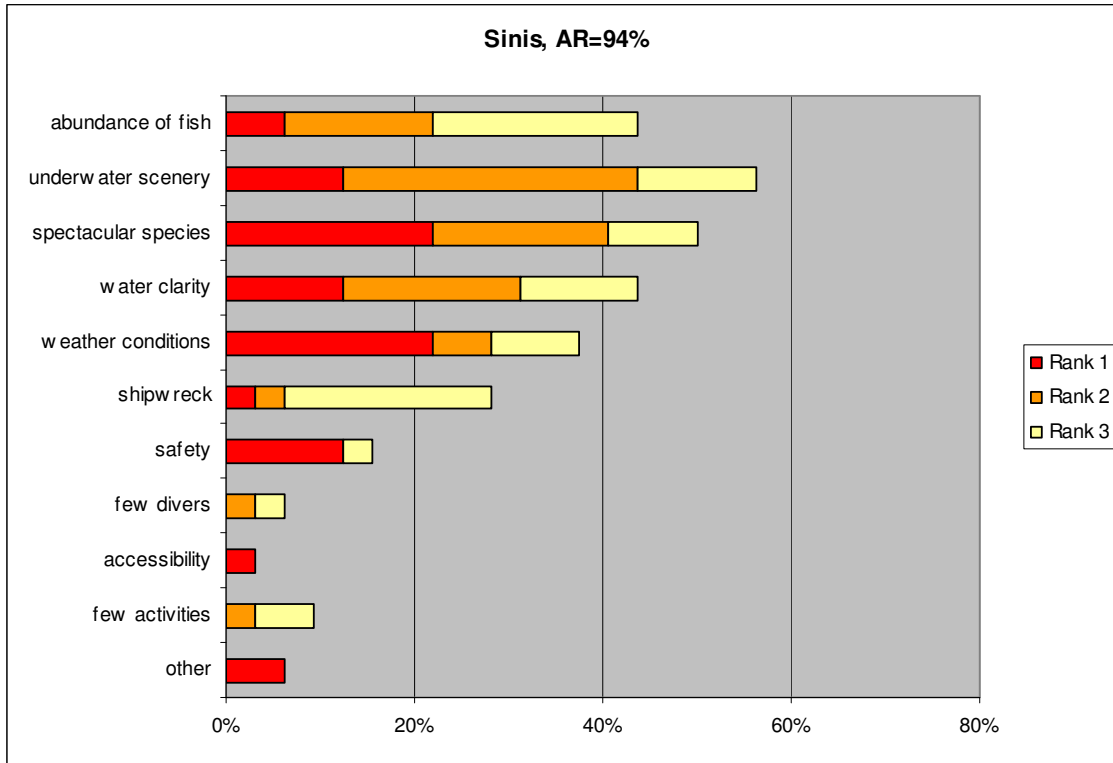
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.12. Divers' choice criteria of a diving site: La Restinga



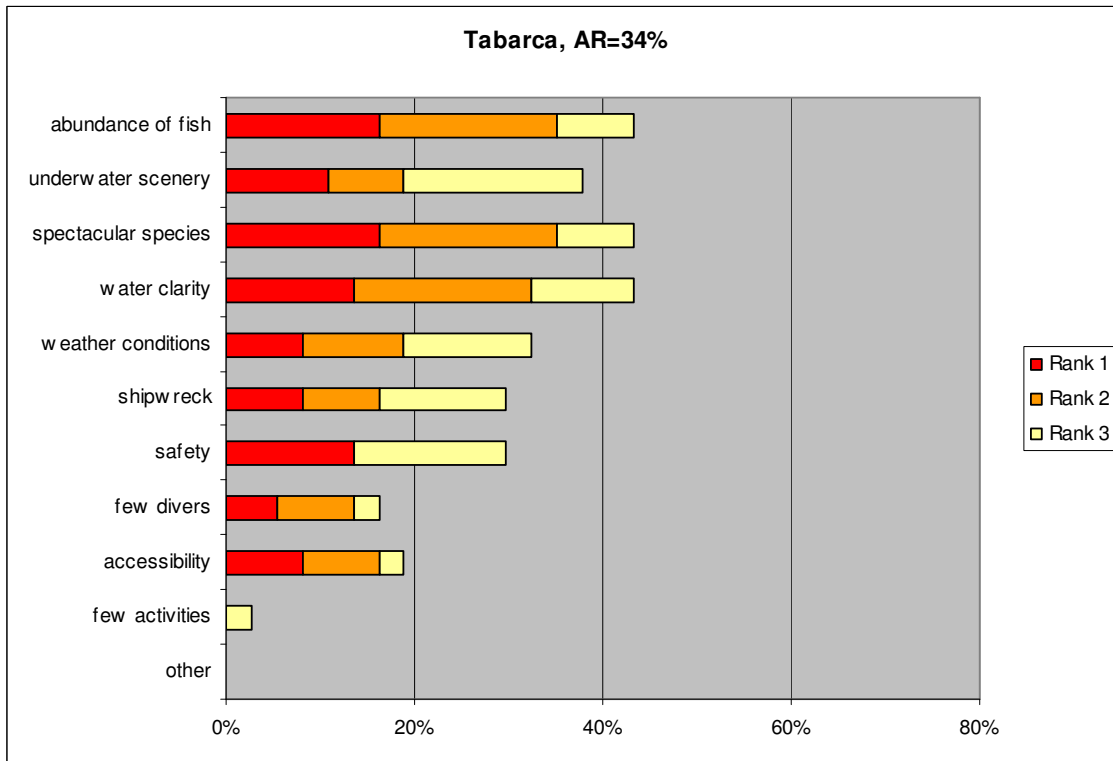
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.13. Divers' choice criteria of a diving site: Sinis



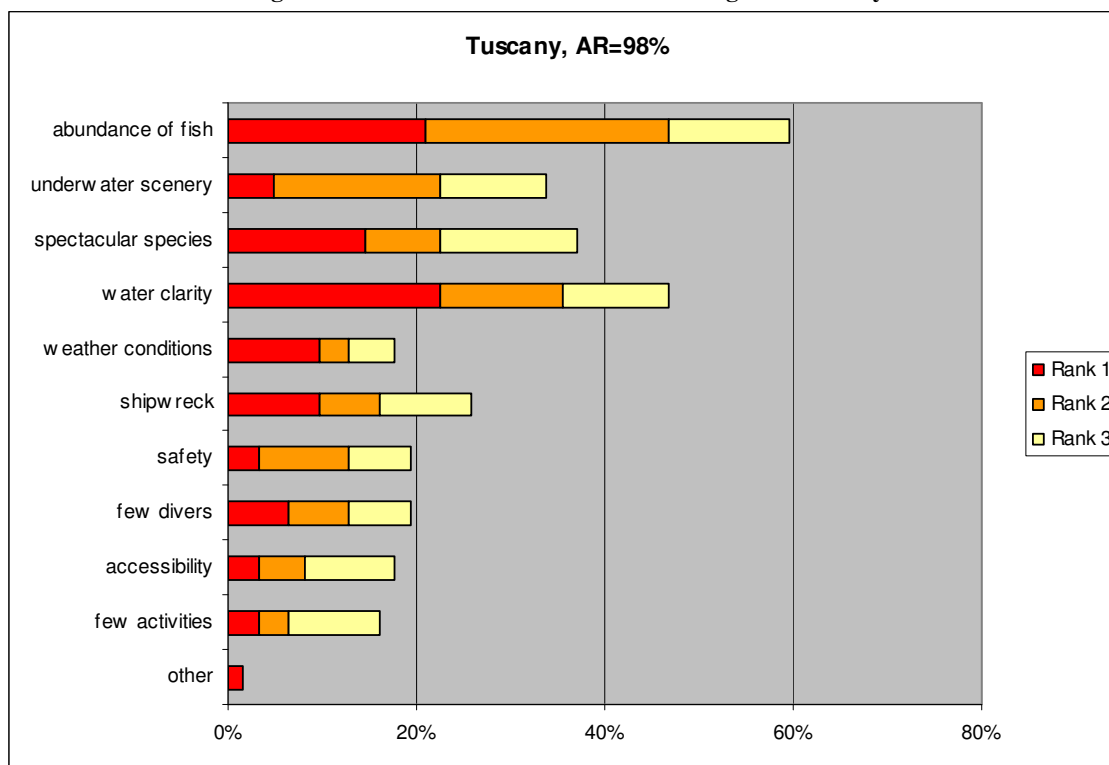
Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.14. Divers' choice criteria of a diving site: Tabarca



Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Figure 3.15. Divers' choice criteria of a diving site: Tuscany



Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

According to results presented in Figure 3.1, safety is the major choice criterion for diving operators, followed by abundance of fish, weather conditions and water clarity. Weather conditions and water clarity are more often ranked 1st or 2nd than abundance of fish. These answers suggest that choices operated by operators are largely dominated by “technical” criteria. These criteria are less critical for divers, who are mainly sensitive to abundance of fish and underwater scenery (Figure 3.2). The presence of spectacular species appears to be of special importance in Benidorm, Columbretes, La Restinga. The same remark applies to water clarity in Cabo de Palos, Columbretes, Malta, Monte da Guia, and Tuscany.

3.4.2 Divers' awareness of MPAs

Table 3.34 to 3.36 display answers of divers to questions investigating their familiarity with MPAs, and their influence on their diving behaviour.

Table 3.34. Divers: before today, were you aware of the existence of the marine reserve?

MPA	Yes	No	Answering Rate
Banyuls	86%	14%	99%
Benidorm	65%	35%	99%
Bonifacio	72%	28%	100%
Cabo de Palos	75%	25%	100%
Columbretes	88%	12%	99%
Côte Bleue	67%	33%	100%
Malta	35%	65%	96%
Medes	94%	6%	98%
Monte da Guia	44%	56%	100%
La Restinga	70%	30%	99%
Sinis	79%	21%	100%
Tabarca	94%	6%	99%
Tuscany	90%	10%	98%
FULL SAMPLE	70%	30%	99%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Table 3.35. Divers: have you previously dived in other marine reserves?

MPA	Yes	No	Answering Rate
Banyuls	62%	38%	100%
Benidorm	68%	32%	99%
Bonifacio	71%	29%	89%
Cabo de Palos	69%	31%	99%
Columbretes	71%	29%	97%
Côte Bleue	68%	32%	99%
Malta	62%	38%	97%
Medes	74%	26%	98%
Monte da Guia	86%	14%	100%
La Restinga	53%	47%	99%
Sinis	53%	47%	100%
Tabarca	57%	43%	99%
Tuscany	83%	17%	100%
FULL SAMPLE	67%	33%	98%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Table 3.36. Divers: did the existence of the marine reserve influence your decision to dive here?

MPA	Yes a lot	Yes a little	No	Answering Rate
Banyuls	27%	33%	40%	99%
Benidorm	30%	19%	52%	97%
Bonifacio	38%	32%	30%	98%
Cabo de Palos	71%	10%	19%	98%
Columbretes	85%	11%	4%	98%
Côte Bleue	8%	18%	75%	99%
Malta	8%	14%	78%	89%
Medes	56%	31%	13%	97%
Monte da Guia	5%	12%	82%	100%
La Restinga	43%	22%	35%	99%
Sinis	25%	22%	53%	94%
Tabarca	37%	15%	48%	99%
Tuscany	37%	27%	35%	98%
FULL SAMPLE	32%	19%	49%	97%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

According to results presented in Tables 3.34 and 3.35, 70% of divers in the sample were aware of the existence of the MPA before diving, and half of them declared that it influenced their decision (this proportion is considerably higher in Cabo de Palos, Columbretes, Medes). Two thirds of divers in the sample declared they had previously dived in other MPAs.

3.4.3 Relations with other MPA users

Possible conflicts in the MPA have been investigated through a series of questions, concerning relations between diving operators and other MPA users (Tables 3.37-3.42). On the whole, relations with professional fishers, other diving operators and surfers seem to raise few conflicts. Relations seem to be more conflictual with recreational fishers (including spear fishers) and jet-ski users.

Table 3.37. Diving operators: relations with professional fishers

MPA	Conflict	Good cooperation	No contact	Answering Rate
Banyuls	0%	55%	45%	100%
Benidorm	0%	33%	67%	100%
Bonifacio	0%	71%	29%	100%
Cabo de Palos	0%	75%	25%	100%
Columbretes	0%	38%	63%	100%
Côte Bleue	0%	59%	41%	100%
Malta	10%	33%	57%	100%
Medes	0%	50%	50%	100%
Monte da Guia	0%	67%	33%	100%
Sinis	0%	67%	33%	100%
Tabarca	100%	0%	0%	100%
Tuscany	0%	100%	0%	100%
FULL SAMPLE	4%	48%	47%	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.38. Diving operators: relations with recreational fishers (except spear fishers)

MPA	Conflict	Good cooperation	No contact	Answering Rate
Banyuls	45%	18%	36%	100%
Benidorm	50%	0%	50%	100%
Bonifacio	0%	43%	57%	100%
Cabo de Palos	25%	0%	75%	100%
Columbretes	13%	38%	50%	100%
Côte Bleue	18%	47%	35%	100%
Malta	40%	33%	27%	100%
Medes	0%	17%	83%	100%
Monte da Guia	0%	67%	33%	100%
Sinis	0%	33%	67%	100%
Tabarca	100%	0%	0%	100%
Tuscany	0%	0%	100%	100%
FULL SAMPLE	27%	31%	42%	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.39. Diving operators: relations with spear fishers

MPA	Conflict	Good cooperation	No contact	Answering Rate
Banyuls	9%	45%	45%	100%
Benidorm	67%	0%	33%	100%
Bonifacio	14%	29%	57%	100%
Cabo de Palos	25%	25%	50%	100%
Columbretes	13%	38%	50%	100%
Côte Bleue	12%	65%	24%	100%
Malta	63%	13%	23%	100%
Medes	33%	0%	67%	100%
Monte da Guia	33%	33%	33%	100%
Sinis	0%	33%	67%	100%
Tabarca	100%	0%	0%	100%
Tuscany	100%	0%	0%	100%
FULL SAMPLE	35%	29%	36%	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.40. Diving operators: relations with other diving operators

MPA	Conflict	Good cooperation	No contact	Answering Rate
Banyuls	0%	100%	0%	100%
Benidorm	0%	100%	0%	100%
Bonifacio	0%	86%	14%	100%
Cabo de Palos	0%	100%	0%	100%
Columbretes	0%	88%	13%	100%
Côte Bleue	12%	71%	18%	100%
Malta	0%	100%	0%	100%
Medes	0%	100%	0%	100%
Monte da Guia	0%	100%	0%	100%
Sinis	0%	67%	33%	100%
Tabarca	0%	100%	0%	100%
Tuscany	0%	0%	100%	100%
FULL SAMPLE	2%	91%	7%	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.41. Diving operators: relations with jet-ski users

MPA	Conflict	Good cooperation	No contact	Answering Rate
Banyuls	55%	18%	27%	100%
Benidorm	50%	0%	50%	100%
Bonifacio	29%	29%	43%	100%
Cabo de Palos	0%	0%	100%	100%
Columbretes	29%	0%	71%	88%
Côte Bleue	41%	12%	47%	100%
Malta	60%	0%	40%	100%
Medes	50%	17%	33%	100%
Monte da Guia	67%	0%	33%	100%
Sinis	0%	33%	67%	100%
Tabarca	0%	0%	100%	100%
Tuscany	0%	0%	100%	100%
FULL SAMPLE	45%	8%	47%	99%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.42. Diving operators: relations with surfers*

MPA	Conflict	Good cooperation	No contact	Answering Rate
Banyuls	0%	27%	73%	100%
Benidorm	0%	17%	83%	100%
Bonifacio	14%	43%	43%	100%
Cabo de Palos	0%	0%	100%	100%
Columbretes	14%	0%	86%	88%
Côte Bleue	6%	31%	63%	94%
Malta	13%	3%	83%	100%
Medes	0%	17%	83%	100%
Monte da Guia	0%	67%	33%	100%
Sinis	0%	33%	67%	100%
Tabarca	0%	0%	100%	100%
Tuscany	0%	0%	100%	100%
FULL SAMPLE	7%	18%	75%	98%

* including windsurfers and kite-surfers. Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

3.4.4 Perception of benefits provided by MPA

A set of questions aimed at assessing the opinion of divers and diving operators concerning possible impacts of MPAs on environment, uses of the marine ecosystem, and the local economy. In each case, an assertion was presented to the interviewed person, who was asked to formulate an opinion concerning this assertion.

Due to the organisation of each survey, the number of questions that were asked to divers was more limited than the number of questions asked to diving operators. As regards possible impacts of marine reserves, the only question that was asked to divers concerned marine environment (Table 3.43). In every case study, an overwhelming majority of divers were convinced that MPAs have a favourable impact on the marine environment. This result suggests that MPAs attract divers indirectly, through the channel of their perceived impact on marine ecosystems (see above Tables 3.2 to 3.15, concerning divers' criteria for the choice of a diving site).

Table 3.43. Divers: do you think that marine reserves have a positive impact on the marine environment?

MPA	Yes	No	Don't know	Answering Rate
Banyuls	98%	0%	2%	100%
Benidorm	93%	0%	7%	98%
Bonifacio	94%	3%	3%	99%
Cabo de Palos	90%	4%	6%	100%
Columbretes	98%	1%	2%	99%
Côte Bleue	93%	1%	6%	100%
Malta	89%	2%	9%	97%
Medes	94%	2%	4%	98%
Monte da Guia	96%	0%	4%	100%
La Restinga	88%	1%	11%	99%
Sinis	91%	3%	6%	100%
Tabarca	92%	1%	7%	100%
Tuscany	90%	6%	3%	98%
FULL SAMPLE	93%	2%	6%	99%

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

Tables 3.44 to 3.55 are dedicated to diving operators answers concerning the alleged benefits of MPAs. As mentioned before, operators were asked more detailed questions than divers on this topic.

Table 3.44. Diving operators: do you think that MPA helps to protect biodiversity?

MPA	Fully Agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	82%	9%	0%	9%	0%	100%
Benidorm	83%	17%	0%	0%	0%	100%
Bonifacio	71%	29%	0%	0%	0%	100%
Cabo de Palos	50%	50%	0%	0%	0%	100%
Columbretes	88%	13%	0%	0%	0%	100%
Côte Bleue	100%	0%	0%	0%	0%	100%
Malta	83%	13%	0%	0%	3%	100%
Medes	50%	33%	0%	17%	0%	100%
Monte da Guia	100%	0%	0%	0%	0%	100%
Sinis	100%	0%	0%	0%	0%	100%
Tabarca	100%	0%	0%	0%	0%	100%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	84%	13%	0%	2%	1%	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

As regards the consequences of MPAs on biodiversity, operators, just like divers, massively express positive opinions. Only two operators formulated an opposite view.

Table 3.45 and 3.46 display diving operators' opinions concerning the impact of MPAs on fish abundance and control of fishing activities. Except in Tuscany (only one answer in this case) and, to a lesser degree, in Cabo de Palos, a majority of operators seem convinced that MPAs help to enhance fish abundance in the protected zone (Table 3.45). The same opinion is expressed, though with some restrictions, about the alleged spillover effects of MPAs (Table

3.46), and their role in reducing illegal fishing (Table 3.47). Scepticism concerning this last point is highest in Côte Bleue, Monte da Guia, Tabarca, and Tuscany.

Table 3.45. Diving operators: do you think MPA helps to enhance fish abundance inside protected area?

MPA	Fully Agree	Rather Agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	45%	45%	0%	0%	9%	100%
Benidorm	100%	0%	0%	0%	0%	100%
Bonifacio	57%	43%	0%	0%	0%	100%
Cabo de Palos	0%	25%	25%	0%	50%	100%
Columbretes	100%	0%	0%	0%	0%	100%
Côte Bleue	88%	12%	0%	0%	0%	100%
Malta	93%	3%	0%	0%	3%	100%
Medes	67%	33%	0%	0%	0%	100%
Monte da Guia	67%	33%	0%	0%	0%	100%
Sinis	67%	33%	0%	0%	0%	100%
Tabarca	100%	0%	0%	0%	0%	100%
Tuscany	0%	0%	100%	0%	0%	100%
FULL SAMPLE	77%	16%	2%	0%	4%	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.46. Diving operators: do you think MPA helps to enhance fish abundance outside protected area?

MPA	Fully agree	Rather Agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	27%	45%	9%	0%	18%	100%
Benidorm	83%	0%	0%	17%	0%	100%
Bonifacio	17%	83%	0%	0%	0%	86%
Cabo de Palos	0%	33%	67%	0%	0%	75%
Columbretes	88%	0%	0%	0%	13%	100%
Côte Bleue	59%	41%	0%	0%	0%	100%
Malta	73%	10%	7%	3%	7%	100%
Medes	0%	50%	33%	17%	0%	100%
Monte da Guia	67%	33%	0%	0%	0%	100%
Sinis	67%	33%	0%	0%	0%	100%
Tabarca	100%	0%	0%	0%	0%	100%
Tuscany	0%	0%	100%	0%	0%	100%
FULL SAMPLE	56%	27%	8%	3%	5%	98%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.47. Diving operators: do you think that MPA helps to reduce illegal fishing?

MPA	Fully Agree	Rather Agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	18%	9%	18%	27%	27%	100%
Benidorm	100%	0%	0%	0%	0%	100%
Bonifacio	29%	43%	14%	14%	0%	100%
Cabo de Palos	25%	25%	50%	0%	0%	100%
Columbretes	75%	0%	25%	0%	0%	100%
Côte Bleue	12%	29%	6%	41%	12%	100%
Malta	55%	10%	0%	34%	0%	97%
Medes	17%	67%	0%	0%	17%	100%
Monte da Guia	33%	0%	67%	0%	0%	100%
Sinis	33%	67%	0%	0%	0%	100%
Tabarca	0%	0%	100%	0%	0%	100%
Tuscany	0%	0%	0%	100%	0%	100%
FULL SAMPLE	40%	20%	11%	23%	6%	99%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Tables 3.48 and 3.49 present operators' opinions concerning the impact of MPA on diving. A large majority of operators consider that they help to improve the quality of diving, though with some restrictions, especially in Medes (Table 3.48). From a more personal point of view, 71% of operators in the sample consider that the existence of the MPA has a positive impact on their own business. Very few operators expressed negative opinions. Important proportions of operators considering that the MPA has no impact on their business are met in Malta, Monte da Guia and Sinis.

Table 3.48. Diving operators: do you think that MPA helps to improve the quality of diving?

MPA	Fully Agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	55%	36%	0%	9%	0%	100%
Benidorm	100%	0%	0%	0%	0%	100%
Bonifacio	33%	50%	0%	17%	0%	86%
Cabo de Palos	50%	50%	0%	0%	0%	100%
Columbretes	75%	0%	13%	0%	13%	100%
Côte Bleue	--	--	--	--	--	0%
Malta	62%	17%	7%	14%	0%	97%
Medes	17%	33%	17%	17%	17%	100%
Monte da Guia	67%	0%	33%	0%	0%	100%
Sinis	67%	33%	0%	0%	0%	100%
Tabarca	0%	100%	0%	0%	0%	100%
Tuscany	0%	100%	0%	0%	0%	100%
FULL SAMPLE	58%	24%	6%	9%	3%	80%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.49. Diving operators: on the whole, what is the impact of the MPA on your diving activity?

MPA	Very Positive	Rather positive	No impact	Rather negative	Very negative	Answering Rate
Banyuls	55%	36%	9%	0%	0%	100%
Benidorm	50%	50%	0%	0%	0%	100%
Bonifacio	17%	83%	0%	0%	0%	86%
Cabo de Palos	25%	75%	0%	0%	0%	100%
Columbretes	75%	13%	13%	0%	0%	100%
Côte Bleue	41%	41%	18%	0%	0%	100%
Malta	28%	3%	66%	3%	0%	97%
Medes	50%	33%	0%	17%	0%	100%
Monte da Guia	33%	33%	33%	0%	0%	100%
Sinis	33%	33%	33%	0%	0%	100%
Tabarca	0%	100%	0%	0%	0%	100%
Tuscany	0%	100%	0%	0%	0%	100%
FULL SAMPLE	39%	32%	27%	2%	0%	98%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Tables 3.50 to 3.52 display operators' opinions concerning impacts of MPAs on relations between users, and on local economy.

Table 3.50. Diving operators: do you think that MPA reduces conflicts among users?

MPA	Fully Agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	36%	18%	9%	27%	9%	100%
Benidorm	100%	0%	0%	0%	0%	100%
Bonifacio	14%	43%	29%	0%	14%	100%
Cabo de Palos	0%	25%	25%	0%	50%	100%
Columbretes	50%	25%	0%	0%	25%	50%
Côte Bleue	0%	17%	17%	0%	67%	35%
Malta	48%	14%	10%	17%	10%	97%
Medes	40%	0%	40%	20%	0%	83%
Monte da Guia	0%	0%	100%	0%	0%	100%
Sinis	33%	0%	67%	0%	0%	100%
Tabarca	0%	0%	0%	100%	0%	100%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	39%	15%	19%	13%	15%	82%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

According to table 3.50, 55% of the operators in the sample believe that MPA help reducing conflicts among users, and 24% express the opposite view. However, this negative view is held by a majority of interviewed operators in Medes, Monte da Guia, Sinis and Tabarca. In the case of Côte Bleue, a majority of operators did not answer, or answered that they did not know.

Table 3.51. Diving operators: do you think that tourists come here mainly because of the MPA?

MPA	Fully Agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	9%	45%	9%	27%	9%	100%
Benidorm	33%	0%	17%	50%	0%	100%
Bonifacio	14%	57%	14%	0%	14%	100%
Cabo de Palos	75%	25%	0%	0%	0%	100%
Columbretes	75%	25%	0%	0%	0%	100%
Côte Bleue	6%	12%	24%	35%	24%	100%
Malta	0%	7%	3%	87%	3%	100%
Medes	33%	50%	17%	0%	0%	100%
Monte da Guia	0%	0%	67%	33%	0%	100%
Sinis	0%	33%	33%	33%	0%	100%
Tabarca	0%	100%	0%	0%	0%	100%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	18%	22%	12%	41%	7%	100%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Case studies are located in regions visited by many tourists. In each case, diving operators were asked if the existence of the MPA was the major motivation for tourists visiting the site. According to results presented in Table 3.51, 40% of operators agree with this view, with restrictions. Answers vary significantly according to case study.

Table 3.52. Diving operators: do you think that MPA is good for local economy?

MPA	Fully Agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	36%	55%	0%	0%	9%	100%
Benidorm	100%	0%	0%	0%	0%	100%
Bonifacio	43%	57%	0%	0%	0%	100%
Cabo de Palos	75%	25%	0%	0%	0%	100%
Columbretes	88%	13%	0%	0%	0%	100%
Côte Bleue	24%	18%	24%	24%	12%	100%
Malta	44%	15%	15%	26%	0%	90%
Medes	67%	17%	17%	0%	0%	100%
Monte da Guia	67%	0%	33%	0%	0%	100%
Sinis	67%	0%	33%	0%	0%	100%
Tabarca	100%	0%	0%	0%	0%	100%
Tuscany	0%	100%	0%	0%	0%	100%
FULL SAMPLE	51%	22%	12%	12%	3%	97%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.52 is dedicated to operators' opinions concerning the impact of the MPA on local economy. On the whole, 73% of the opinions on this subject are positive. However, important percentages of negative opinions are met in Côte Bleue (48%), Malta (41%), Monte da Guia (33%) and Sinis (33%).

Tables 3.53 to 3.55 display diving operators' opinions concerning the distributional consequences of MPAs. Three types of activities were mentioned (professional fishing, recreational fishing, scuba-diving), and diving operators were asked to indicate which activity

(or activities) benefited most from the existence of the MPA. Opinions are rather balanced on this subject. Excepted in Côte Bleue and Monte da Guia, a majority of diving operators consider that scuba diving is the major beneficiary of MPAs. A similar opinion was also expressed by professional and recreational fishers (see above, Chapters 1 and 2).

Table 3.53. Diving operators: do you think that MPA benefits mainly professional fishing?

MPA	Fully Agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	9%	18%	9%	36%	27%	100%
Benidorm	67%	0%	0%	33%	0%	100%
Bonifacio	17%	17%	50%	17%	0%	86%
Cabo de Palos	25%	50%	0%	0%	25%	100%
Columbretes	13%	50%	13%	0%	25%	100%
Côte Bleue	6%	35%	12%	24%	24%	100%
Malta	17%	13%	27%	37%	7%	100%
Medes	0%	17%	33%	50%	0%	100%
Monte da Guia	0%	33%	67%	0%	0%	100%
Sinis	33%	0%	67%	0%	0%	100%
Tabarca	100%	0%	0%	0%	0%	100%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	18%	22%	22%	26%	13%	99%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.54. Diving operators: do you think that MPA benefits mainly recreational fishing?

MPA	Fully Agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	9%	36%	18%	9%	27%	100%
Benidorm	50%	0%	0%	17%	33%	100%
Bonifacio	0%	17%	50%	33%	0%	86%
Cabo de Palos	0%	0%	25%	25%	50%	100%
Columbretes	0%	0%	0%	0%	0%	0%
Côte Bleue	0%	65%	12%	18%	6%	100%
Malta	27%	13%	27%	27%	7%	100%
Medes	0%	0%	17%	50%	33%	100%
Monte da Guia	0%	33%	67%	0%	0%	100%
Sinis	0%	0%	33%	67%	0%	100%
Tabarca	100%	0%	0%	0%	0%	100%
Tuscany	0%	0%	100%	0%	0%	100%
FULL SAMPLE	15%	24%	24%	24%	14%	91%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Table 3.55. Diving operators: do you think that MPA benefits mainly scuba diving?

MPA	Fully Agree	Rather agree	Rather disagree	Fully disagree	Don't know	Answering Rate
Banyuls	18%	73%	0%	0%	9%	100%
Benidorm	100%	0%	0%	0%	0%	100%
Bonifacio	33%	33%	17%	17%	0%	86%
Cabo de Palos	0%	75%	25%	0%	0%	100%
Columbretes	38%	50%	0%	0%	13%	100%
Côte Bleue	0%	35%	47%	12%	6%	100%
Malta	43%	23%	20%	7%	7%	100%
Medes	67%	17%	17%	0%	0%	100%
Monte da Guia	33%	0%	33%	33%	0%	100%
Sinis	0%	67%	0%	33%	0%	100%
Tabarca	0%	100%	0%	0%	0%	100%
Tuscany	100%	0%	0%	0%	0%	100%
FULL SAMPLE	33%	35%	19%	7%	5%	99%

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

Chapter 4

Snorkelling (submarine trail visitors)

4.1 Introduction

Snorkelling is a popular activity in the MPAs covered by the project. Due to material constraints, it was not possible to organise a field-survey fully covering this activity. As a second best, it was decided to restrict the scope of the snorkelling survey to visitors of the submarine trails that are organised in some MPAs. This specific population is not necessarily representative of the wider population of snorkellers, if only because submarine trails are organised in a limited number of MPAs. Only three case studies of the project, all of them located in the same country, are concerned: Banyuls, Bonifacio, and Côte Bleue. Table 4.1 displays the number of questionnaires filled by visitors in each case. It should be noted that in Bonifacio, the number of answers is very limited (17).

Table 4.1. Submarine trail visitors: number of answers

Banyuls	164
Bonifacio	17
Côte Bleue	311
Total	492

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

This chapter contains two sections: the first one describes submarine trail visitors and their relation to the trail, and the second one presents their perception of marine environment and MPAs.

4.2 Submarine trail visitors

4.2.1 Personal data

Tables 4.2 and 4.3 provide information concerning gender, age, and size of household of visitors in the sample.

Table 4.2. Submarine trail visitors: gender and age

MPA	Gender (frequency)			Age (years)		
	Female	Male	Answ. Rate	Mean	Std Dev.	Answ. Rate
Banyuls	43%	57%	98%	33,3	10,8	97%
Bonifacio	41%	59%	100%	38,1	11,6	100%
Côte Bleue	47%	53%	100%	39,5	9,3	100%
FULL SAMPLE	45%	55%	99%	36,6	11,5	99%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Table 4.3. Submarine trail visitors: size of household (number of persons)

MPA	Mean	Standard Deviation	Answering Rate
Banyuls	2,8	1,4	88%
Bonifacio	3,6	1,0	100%
Côte Bleue	2,6	1,4	92%
FULL SAMPLE	2,7	1,4	91%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Women represent 45% of the whole sample (Table 4.2), a proportion significantly higher than the one noticed for other recreational activities (see Chapters 2 and 3). The mean age of submarine trail visitors is 37 (Table 4.2), and the mean size of their household is 2,7 persons (Table 4.3). These data are close to those concerning scuba divers (see Chapter 3).

Table 4.4. Submarine trail visitors: geographical origin (frequency)

MPA	Residents	Tourists		Answering Rate
		National	Foreign	
Banyuls	22%	75%	3%	92%
Bonifacio	0%	100%	0%	100%
Côte Bleue	59%	40%	1%	99%
FULL SAMPLE	45%	53%	2%	97%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

According to Table 4.4, most visitors are French. This result could underestimate the proportion of foreign visitors, due to the language of the questionnaire used. In Banyuls and Bonifacio, non-resident visitors (tourists) prevail, while in Côte Bleue, the majority of visitors are residents.

Table 4.5. Submarine trail visitors: net household income (euros / month)

MPA	≤ 1200	]1200-2400]	]2400-3600]	]3600-4800]	]4800-6000]	> 6000	AR
Banyuls	15%	29%	25%	20%	7%	2%	75%
Bonifacio	6%	24%	18%	41%	12%	0%	100%
Côte Bleue	9%	36%	22%	18%	10%	4%	82%
FULL SAMPLE	11%	34%	23%	20%	9%	4%	80%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

The proportion of visitors with monthly incomes over 4800€ is 13%, while those earning less than 2400€ per month represent 45% of the sample. This distribution is intermediate between the one characterising recreational fishers (Chapter 2) and the one characterising scuba divers (Chapter 3).

Table 4.6. Submarine trail visitors: which types of underwater activities do you practice usually?

MPA	Free diving	Scuba diving	Spear fishing	Answering Rate
Banyuls	19%	37%	10%	51%
Bonifacio	10%	60%	10%	59%
Côte Bleue	42%	15%	8%	59%
FULL SAMPLE	34%	24%	8%	56%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Table 4.6 presents answers to a question concerning the various underwater activities usually performed by submarine trail visitors. The answering rates concerning this question are low (56% on average), suggesting that an important proportion of visitors do not perform regularly underwater activities. As regards those who answered the question, the most frequently mentioned activity is scuba diving in Banyuls and Bonifacio, and free diving (snorkelling) in Côte Bleue. In the three cases, 8 to 10% of those who answered declared that they were spear-fishers.

4.2.2 Visit of the trail

Table 4.7 displays answers to a set of questions concerning the degree of familiarity of visitors with the trail. On the whole, 71% of interviewed persons were visiting the trail for the first time. This proportion is highest in Bonifacio (94%), and lowest in Côte Bleue, where nearly one third of people in the sample already had visited the trail in the past. Many of these people are highly accustomed to the trail, with 10 visits per year on average, according to their answers.

4.7. Submarine trail visitors: familiarity with the trail

MPA	Was it your 1 st visit to the trail ?			If it was not...					
	Yes	No	AR	Year of your 1 st visit ?			How many visits / year ?		
				Mean	SD	AR	Mean	SD	AR
Banyuls	75%	25%	100%	2 002	4,7	24%	3,8	5,3	90%
Bonifacio	94%	6%	100%	--	--	0%	--	--	0%
Côte Bleue	68%	32%	100%	1 999	6,1	29%	10,0	8,4	68%
FULL SAMPLE	71%	29%	100%	2 000	5,9	26%	7,8	8,0	22%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

In the three case studies, only a minority of visitors in the sample have previously visited other submarine trails. In the case of Banyuls, the frequency is only 1%.

Table 4.8. Submarine trail visitors: have you previously visited other submarine trails?

MPA	Yes	No	Answering Rate
Banyuls	1%	99%	100%
Bonifacio	18%	82%	100%
Côte Bleue	23%	77%	100%
FULL SAMPLE	16%	84%	100%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Visiting the trail is, in the majority of cases, a family entertainment (Table 4.9). Very few people visit the trail alone.

Table 4.9. Submarine trail visitors: did you visit the trail alone, or with other people?

MPA	Alone	With family	With friends	Answering Rate
Banyuls	8%	61%	32%	96%
Bonifacio	0%	88%	12%	100%
Côte Bleue	10%	62%	28%	98%
FULL SAMPLE	9%	62%	29%	98%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

The existence of educational tools proposed along the trail generally influenced the decision to visit it. This influence seems to be more moderate in Banyuls than in Bonifacio or Côte Bleue.

**Table 4.10. Submarine trail visitors:
Influence of the educational tools proposed along the trail on your decision to snorkel here?**

MPA	Decisive	Moderate	Low	Answering Rate
Banyuls	19%	51%	30%	96%
Bonifacio	56%	38%	6%	94%
Côte Bleue	63%	22%	15%	69%
FULL SAMPLE	45%	34%	21%	79%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

The overall rate of satisfaction with the visit is high, 64% of visitors in the sample declaring they were very satisfied, and 30% declaring they were satisfied. Here again, the rate of satisfaction seems to be more moderate in Banyuls than in the two other cas-studies.

Table 4.11. Submarine trail visitors: are you satisfied with your visit of the trail?

MPA	Very satisfied	Satisfied	Rather satisfied	Not satisfied	Answering Rate
Banyuls	46%	44%	8%	2%	100%
Bonifacio	100%	0%	0%	0%	100%
Côte Bleue	72%	24%	4%	0%	98%
FULL SAMPLE	64%	30%	5%	1%	99%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

4.2.3 Tourists visiting the trail

A set of questions was dedicated to non-resident visitors of the trail (“tourists”). In this case, it is suspected that accommodation and / or travelling costs form a major expenditure, conditioning their presence in the area, and therefore their visit of the trail.

Table 4.12. Non-resident visitors: means of transport

MPA	Boat	Plane	Car	Other	Answ. Rate
Banyuls	0%	0%	91%	9%	73%
Bonifacio	82%	18%	0%	0%	100%
Côte Bleue	0%	1%	94%	5%	52%
FULL SAMPLE	5%	1%	88%	6%	61%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Table 4.13. Non-resident visitors: accommodation

MPA	Hotel	Rented house*	Family or relatives	Own property	Camping ground	Other	AR
Banyuls	6%	44%	16%	5%	23%	6%	77%
Bonifacio	0%	6%	6%	0%	65%	24%	100%
Côte Bleue	2%	24%	35%	11%	15%	12%	40%
FULL SAMPLE	4%	33%	24%	8%	22%	10%	54%

* or rented apartment. Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Table 4.14. Non-resident visitors: characteristics of stay

MPA	Total cost (euros)			Number of persons with you			Length (days)		
	Mean	SD	AR	Mean	SD	AR	Mean	SD	AR
Banyuls	904	773	44%	2,5	1,7	71%	15,2	16,4	73%
Bonifacio	1 913	551	47%	3,5	1,1	100%	20,2	10,5	100%
Côte Bleue	1 048	1 028	23%	2,9	1,7	41%	11,1	10,2	39%
FULL SAMPLE	1 025	921	31%	2,8	1,7	53%	13,6	13,7	53%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Table 4.15. Non-resident visitors: how much was your decision to come here influenced by snorkelling?

MPA	Very much	Moderately	No influence	Answering Rate
Banyuls	23%	40%	37%	76%
Bonifacio	19%	44%	38%	94%
Côte Bleue	59%	26%	15%	44%
FULL SAMPLE	40%	34%	26%	57%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

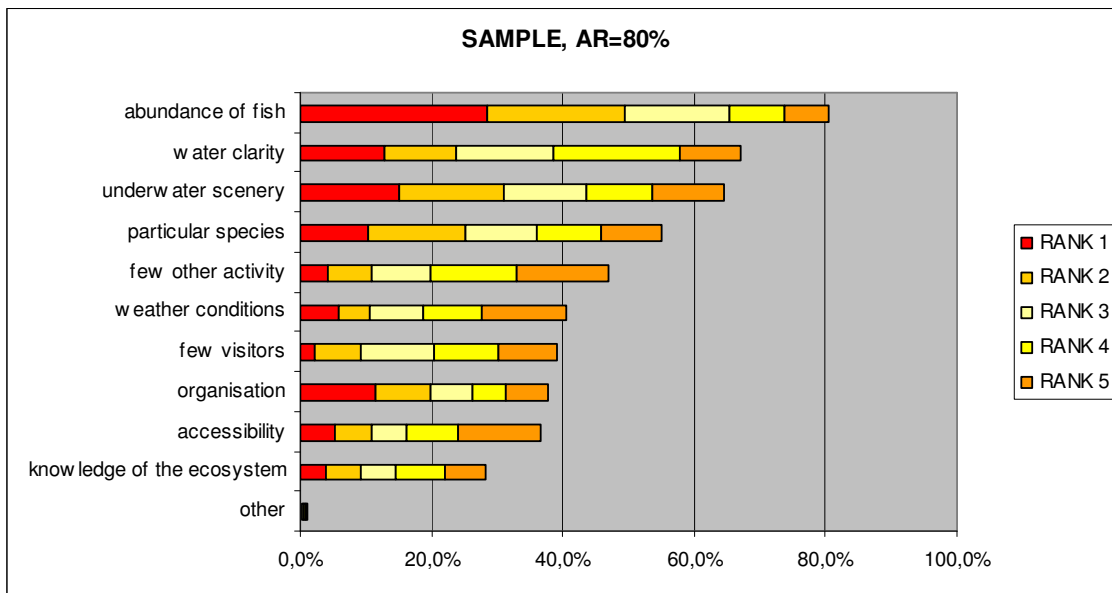
The major means of transport used by non-residents visitors of submarine trails is car in Banyuls and Côte Bleue, and ferry-boat (followed by plane) in Bonifacio. Major means of accommodation used by these visitors are rented houses or apartments in Banyuls, family or relatives in Côte Bleue, camping grounds in Bonifacio. The mean length of their stay ranges from 11 days in Côte Bleue to 20 days in Bonifacio, with a holiday budget of 1 K€ on average (1,9 K€ in Bonifacio), usually shared with 2,8 persons (3,5 persons in Bonifacio). Non-resident visitors may have various motivations concerning the stay in the place where they were surveyed. According to Table 4.15, 40% of interviewed persons considered snorkelling as a major motivation for their stay. This proportion is highest in Côte Bleue, where it reaches 59%.

4.3 Attributes of a snorkelling dive and relation to MPAs

4.3.1 Satisfaction criteria concerning a snorkelling dive

Visitors were asked to select, from a list of 11 items, the 5 major factors influencing their satisfaction concerning a snorkelling dive, and to rank them. Figures 3.1-3.4 present their answers¹¹. On the whole, the three major criteria of satisfaction quoted by visitors are abundance of fish, water clarity and underwater scenery. In Bonifacio, special attention is paid to the organisation of the dive, probably due to the conditions of the visit of the submarine trail in that particular MPA.

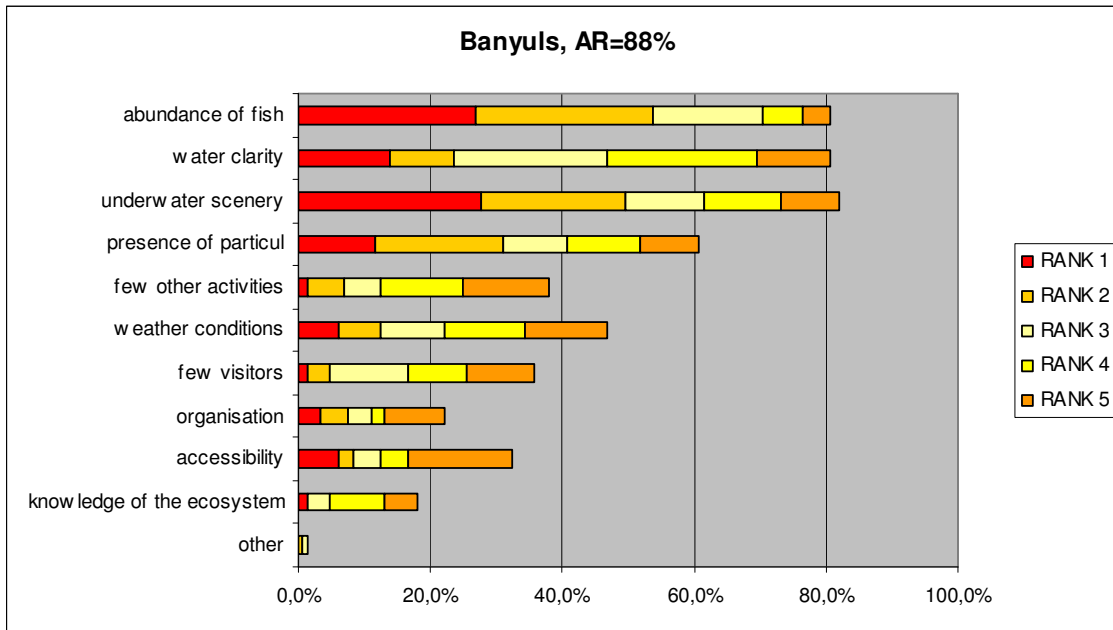
Figure 3.1. Visitors' satisfaction criteria concerning a snorkelling dive: whole sample



Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

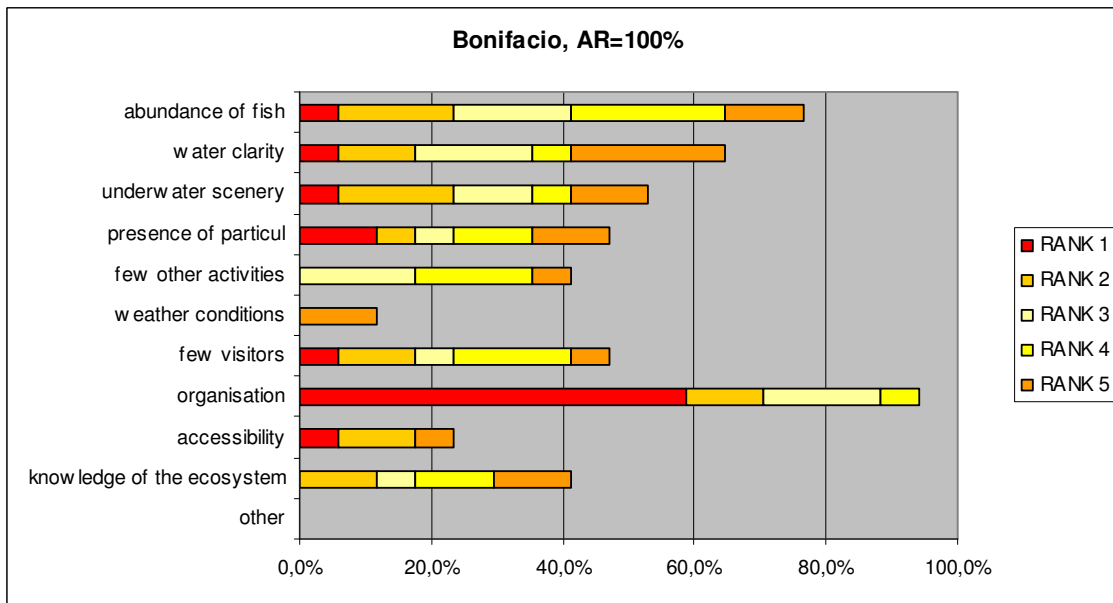
¹¹ Tables containing detailed answers are presented in the appendix of this report.

Figure 3.2. Visitors' satisfaction criteria concerning a snorkelling dive: Banyuls

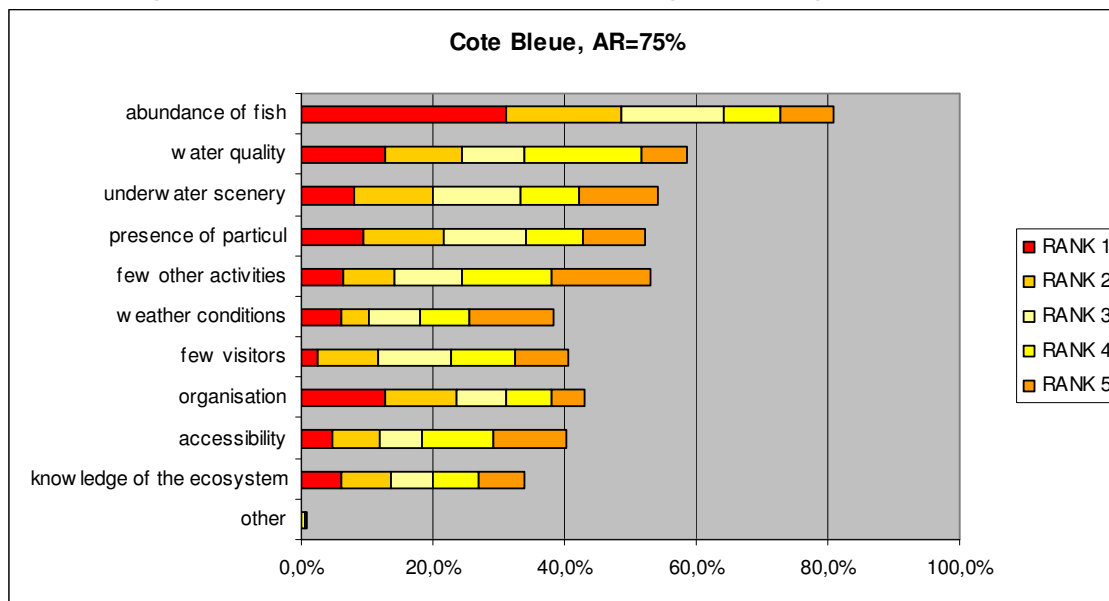


Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Figure 3.3. Visitors' satisfaction criteria concerning a snorkelling dive: Bonifacio



Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Figure 3.4. Visitors' satisfaction criteria concerning a snorkelling dive: Côte Bleue

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

4.3.2 Perceptions of marine environment and MPAs

A question investigated visitors' awareness of possible interferences of snorkelling with the marine environment (Table 4.16). Only one third of visitors in the sample acknowledged this possibility, a lower proportion than in the case of scuba diving (see Chapter 3).

**Table 4.16. Submarine trail visitors:
Do you think snorkelling interferes with marine ecosystem in some areas?**

MPA	Snorkelling interferes with ecosystem			Answ. Rate	If it does, why ?			Answ. Rate
	Yes	No	Don't know		Behaviour of some visitors	Too many visitors	Both	
Banyuls	32%	40%	27%	100%	38%	30%	32%	100%
Bonifacio	35%	41%	24%	100%	67%	17%	17%	100%
Côte Bleue	33%	54%	13%	96%	70%	20%	10%	97%
FULL SAMPLE	33%	49%	18%	97%	59%	23%	18%	98%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Table 4.17 to 4.19 display visitors' answers to questions concerning their relation to MPAs.

Table 4.17. Submarine trail visitors: before today, were you aware of the existence of this MPA?

MPA	Yes	No	Answering Rate
Banyuls	55%	45%	99%
Bonifacio	29%	71%	100%
Côte Bleue	63%	37%	99%
FULL SAMPLE	59%	41%	99%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

**Table 4.18. Submarine trail visitors:
If you knew the existence of the MPA, how much did it influence your decision to dive here?**

MPA	Decisive	Moderate	Low	Answering Rate
Banyuls	30%	57%	13%	98%
Bonifacio	60%	40%	0%	100%
Côte Bleue	79%	14%	7%	96%
FULL SAMPLE	63%	28%	9%	97%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Approximately 6 visitors out of 10 were aware of the existence of the MPA before visiting the submarine trail, a proportion that falls to 23% in the case of Bonifacio (Table 4.17). This knowledge seems to be weaker among submarine trail visitors than among scuba divers, especially in Banyuls and Bonifacio (see Chapter 3, Table 3.34). However, for those who knew the existence of the MPA prior to their visit, this factor strongly influenced their decision to dive there, at least in Bonifacio and Côte Bleue (Table 4.18).

**Table 4.19. Submarine trail visitors:
Do you think that MPAs have a positive impact on the marine environment?**

MPA	Yes	No	Don't know	Answering Rate
Banyuls	73%	5%	22%	97%
Bonifacio	94%	0%	6%	94%
Côte Bleue	98%	1%	1%	97%
FULL SAMPLE	89%	2%	8%	97%

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

Just like scuba divers (see Chapter 3, Table 3.43), submarine trail visitors seem to be convinced that MPAs help protecting marine environment (Table 4.19). However, in Banyuls this opinion is less general than in the two other case-studies.

Chapter 5

Assessing the impact of MPAs on the local economy

1.1 Introduction

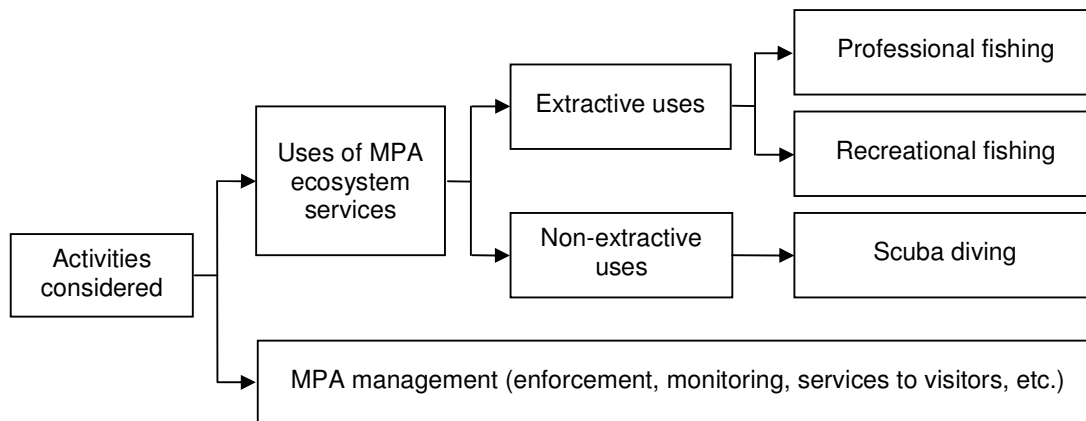
The literature concerning the economic analysis of MPAs has been surveyed in Alban et al., 2006a. One of the topics covered by this analysis is the assessment of the economic impact of MPAs on local communities. Though the basic purpose of MPAs is marine ecosystem conservation, the question of their influence on the local economy is often critical since it governs their social acceptability. This chapter addresses the problem of measuring the local economic impact of MPAs, on the basis of socio-economic field survey results presented in the previous chapters of this report. It is made of three sections. The first one is devoted to the measurement methodology. The second one displays the results of the estimation, in terms of local jobs and added value related to the MPA. The third section addresses the question of sorting out the site effect from the reserve effect.

1.2 Methodology

Human activities related to MPAs impact the economic activity in neighbouring coastal areas by various ways. We first describe the activities and economic impacts that we consider, and then we explain how we measure these impacts.

In this survey, two types of activities related to MPAs are considered (fig.5.1): uses of ecosystem services provided by MPAs, and management of these MPAs.

Figure 5.1. Nature of activities considered



Uses of MPA ecosystem services may be extractive (such as fishing), or non-extractive (such as scuba diving, snorkeling, whale watching, etc.). In this survey, only three types of uses are considered: professional fishing, recreational fishing, and scuba diving. This limitation is

consistent with the scope of the field surveys¹². As regards extractive uses, it may be considered that the bulk of the extractive activities related to the MPAs under survey are considered. As regards non-extractive uses, the limitation imposed by information available from field surveys is undoubtedly more restrictive.

MPA management activities cover the various tasks performed to make the MPA operational: monitoring, enforcement of regulations, services to visitors, information, etc. Data concerning these activities were provided by MPA management authorities, with the help of EMPAFISH case studies scientific partners.

The local economic impact of human activities related to a MPA is due to the jobs and incomes these activities generate in the neighbouring coastal zone. Jobs correspond to the manpower locally needed to manage the MPA, and to run the private businesses related to the MPA uses. Incomes may be of two types: cash, or non-cash. Non-cash incomes correspond to non-market benefits provided by the MPA to the local population (e.g. consumer's surplus of local recreational users). Cash incomes are generated by market-oriented private activities, or may be distributed by public administrations. However, in this last case, incomes distributed locally are due to transfers from other incomes (by means of taxes), and it is necessary to check the geographical origin of these transfers before assessing the net incomes provided locally: if the transfers are operated on a purely local basis, the balance is zero. In the case of the MPAs under survey, though we do not have enough information to compute this balance, we may safely assume that the bulk of MPA management funding is provided by transfers from incomes that are external to the neighbouring coastal zone.

In this survey, due to available data, non-market incomes were ignored, and the following money incomes were considered:

- incomes that commercial fishers derive from their activity within the fishing zone of the MPA¹³;
- incomes that various local private businesses (diving operators, hotels, restaurants,...) derive from the expenditures of non-resident recreational users of the MPA (scuba divers, recreational fishers) during their stay;
- wages earned by MPA staff.

Accordingly, the following jobs were taken into account:

- crew of commercial fishing boats operating within the fishing zone of the MPA;
- jobs locally generated by the expenditures of non-resident scuba divers and recreational fishers during their stay;
- MPA staff.

As regards MPA management, all employees were supposed to be residents of the neighbouring coastal zone. Their number (in terms of yearly full time equivalent jobs) and yearly wages were derived from information provided by MPA management authorities. In the case of commercial fishing, the following methodology was applied:

- all commercial fishers operating within the fishing zone of the MPA (see above, introduction of this report) were considered as "local";
- the share of their annual turnover provided by their activity within the fishing zone of the MPA was estimated from fishers' answers to the field survey;

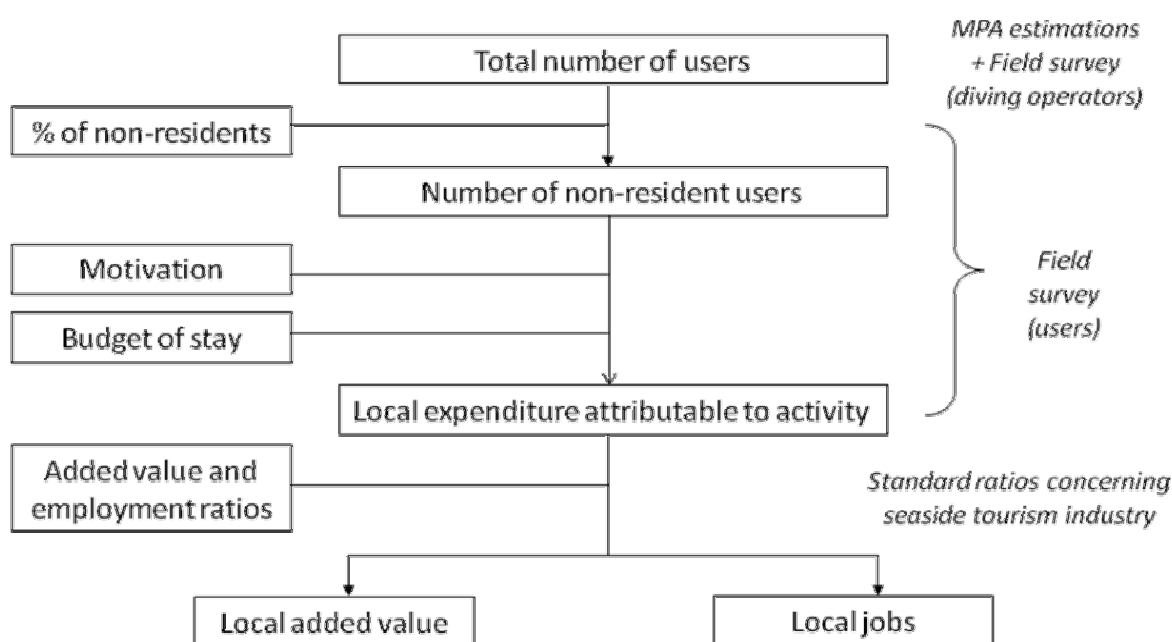
¹² The field surveys concerning snorkeling that were implemented in three case studies (see above, chapter 4) do not provide enough information to assess the local economic impact of this activity.

¹³ This approach may underscore the effects of the MPA on fishers' incomes, since it does not take into account for possible spillover effects of the NTZ beyond administrative MPA limits.

- the corresponding added value¹⁴ was then estimated by applying the following standard (added value / turnover) ratios, derived from the French commercial fishing fleet of the Mediterranean: 70% for boats under 12 metres, 50% for boats between 12 and 24 metres (source: Ifremer, SIH).
- The same ratios were used for allocating manpower (e.g. a boat with a crew of three persons, including skipper, deriving half of its annual landings from the fishing zone of the MPA was accounted for 1.5 jobs).

As regards non-resident recreational users (scuba divers and sport fishers), the following figure sums up the methodology that was used for estimating the economic impact of their local expenditure:

Fig.5. 2. Methodology for estimating the local impact of expenditures of non-resident MPA recreational users (scuba divers, recreational fishers)



- The first step consists in estimating the total yearly number of users. This step was achieved by gathering information from MPA authorities, complemented by information provided by scuba diving operators. It should be stressed that knowledge concerning the number of recreational fishers is quite imprecise in many cases. In the case of scuba divers, more accurate information was obtained through answers of diving operators to the field survey (see above, chapter 3). However, in this case, converting the number of dives into a number of divers may cause some inaccuracies.
- The second step consists in estimating the number of non-resident users. This step was achieved by applying a ratio derived from the field survey to the population estimated at the former step. To this end, all users living at a distance of more than 50 km from the MPA were considered as “non-resident”.

¹⁴ Value of production minus consumption of intermediate goods. The counterpart of added value is the sum of gross incomes (wages, profits) directly generated by the activity considered.

- Among this estimated population of non-resident users, only those whose stay in the area was motivated mainly by diving or fishing were retained at the next step. This information was also provided by answers to the field surveys.
- The local expenditure of these persons was estimated with the help of the field survey (provision was made for the possibility of several persons travelling on the same budget).
- The amount of local added value and the number of local jobs generated by this expenditure were then estimated on the basis of standard ratios derived from statistical data concerning the French seaside tourism industry. According to these data, 1 million € spent by tourists visiting the seaside generate locally 0,42 million € of added value, and 9,89 jobs (full-time yearly equivalent) on the average (Ifremer, *Données économiques maritimes françaises*).

1.3 Results

The whole set of data required by the estimation process was not available in all case studies. The estimation could be completed only in the cases marked with an X in the following table.

Table 5.1. Complete data availability, according to activity and case study

MPA	MPA management	Professional fishing	Scuba diving	Recreational fishing
BANYULS	X		X	
BONIFACIO	X		X	
CABO DE PALOS	X	X	X	
COLUMBRETES	X	X	X	
COTE BLEUE	X		X	X
LA GRACIOSA	X	X		X
LA RESTINGA	X	X	X	X
MEDES	X	X	X	
MONTE DA GUIA	X		X	X
SINIS	X	X	X	
TABARCA	X		X	
TUSCANY			X	
Number of case studies	11	5	11	4

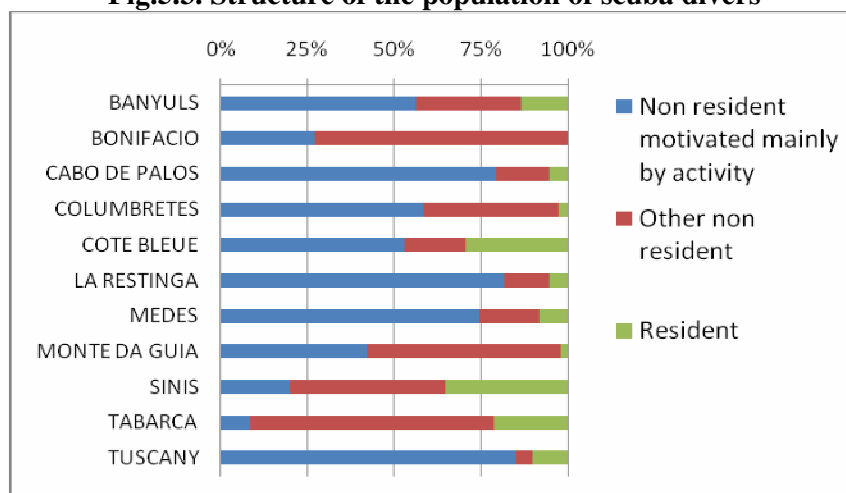
As regards professional fishing, the estimation process could not be completed in the cases of Banyuls, Bonifacio, Côte Bleue, Tabarca and Sinis, due to the lack of field survey, or to the fact that the number of answers was too low (Tuscany Archipelago). In the case of Monte da Guia, professional fishers participating to the survey declared no activity within the administrative limits of the MPA. Considering recreational fishing, the limited number of case studies with complete data availability was due to one or several of the following causes: i) no information concerning main population; ii) no field survey performed; iii) poor rate of answers to field survey.

As regards MPA ecosystem users (fishers and scuba divers), the estimated population in each case study is presented in the table below (extracted from Table 2 in the introduction of this report). As was mentioned earlier, information concerning the number of recreational fishers is scanty and imprecise, due to the diversity and informal character of this activity.

Table 5.2. Estimated population of MPA ecosystem services users

MPA	Professional fishing boats	Recreational fishers	Scuba divers
BANYULS	8	1 460	13 000
BONIFACIO	30	150	10 000
CABO DE PALOS	7	<i>n.a.</i>	9 000
COLUMBRETES	60	<i>n.a.</i>	3 500
COTE BLEUE	40	6 870	16 000
LA GRACIOSA	30	1 250	<i>n.a.</i>
LA RESTINGA	33	1 500	2 700
MEDES	21	<i>n.a.</i>	18 000
MONTE DA GUIA	80	340	1 300
SINIS	124	<i>n.a.</i>	350
TABARCA	<i>n.a.</i>	2 350	1 000
TUSCANY	121	<i>n.a.</i>	3 500
Mean	50	1 989	7 123
Standard deviation	41	2 377	6 376

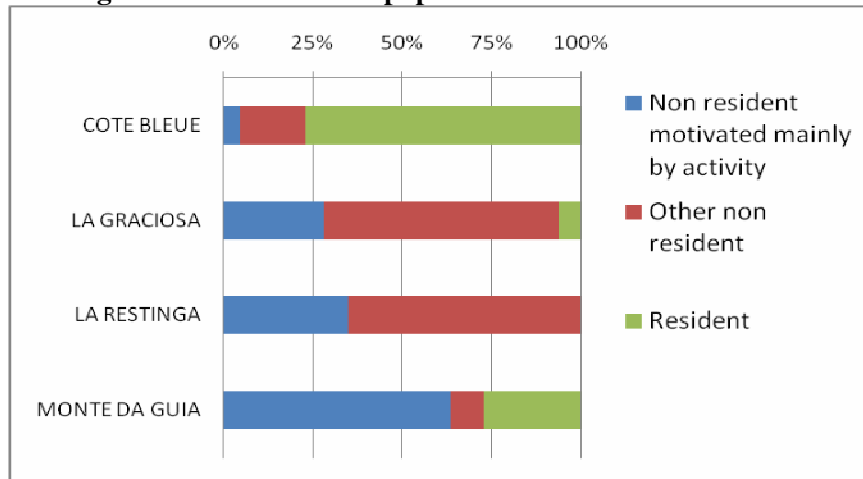
The two figures below display the structure of the populations of recreational users in each case study, according to the residence criterion, and, for non-resident users, to the motivation for coming to the area. Three categories of users are distinguished: i) non-resident users whose stay in the area is mainly motivated by the activity under survey (recreational fishing or scuba diving); ii) other non-resident users; iii) resident users.

Fig.5.3. Structure of the population of scuba divers

In the case of scuba diving, most users are non-residents: the average proportion is 88%, with a minimum of 65% (Sinis) and a maximum of 100% (Bonifacio). On the whole, 68% of these non-resident divers declared that their visit to the area was mainly motivated by diving. But this proportion is highly variable according to case studies: if the diving motivation is clearly

dominant in Banyuls, Cabo de Palos, Côte Bleue, La Restinga, Medes and Tuscany, it is not considered as important in Bonifacio, Monte da Guia, Sinis and Tabarca.

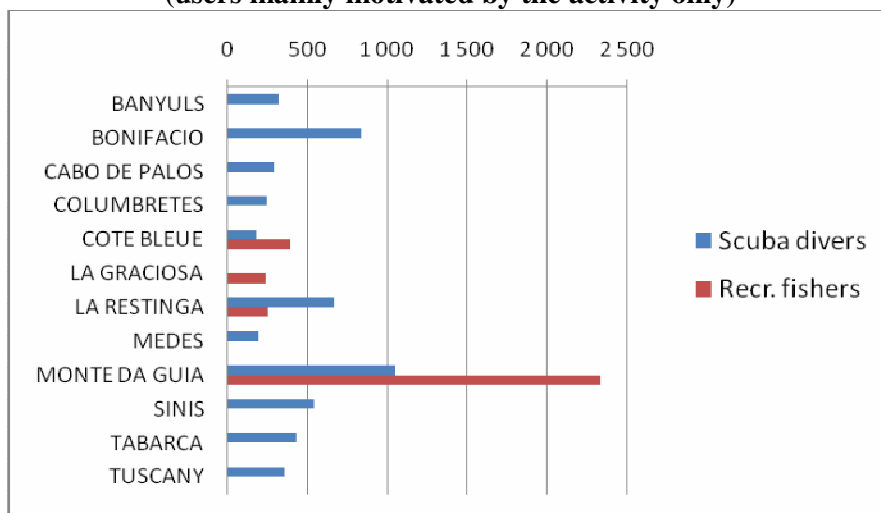
Fig.5.4. Structure of the population of recreational fishers



The proportion of non-resident recreational fishers is very variable: if most fishers are resident in Côte Bleue, the situation is opposite in the three other case studies. In Monte da Guia, the sample is composed of two distinct subsets: “individual” fishers (most of them resident) and customers of charter fishing operators (all of them non-resident). Considering only non-residents, fishing is the major motivation for visiting the area in the case of Monte da Guia, but it is usually considered as a minor motivation in the three other case studies.

Only the first category in the two figures above is involved in the estimation of the economic impact of the MPA. The following figure is restricted to users of this category, and shows their average local expenditure.

Fig.5.5. Average local expenditure (€ / person) of non-resident recreational users (users mainly motivated by the activity only)



In the case of scuba diving, the average local expenditure ranges from less than 300 € in Cabo de Palos, Columbretes, Côte Bleue and Medes to more than 800 € in Bonifacio and Monte da Guia. The heterogeneity is more substantial with recreational fishing: in this case, the average expenditure is around 300 € per person in Côte Bleue, La Graciosa and La Restinga, but it reaches 2300 € in Monte da Guia (customers of charter fishing operators).

The two following tables present the results of the estimations concerning the local economic impact of activities related to the MPAs, in terms of money incomes and of jobs.

Table 5.3. Estimated yearly local incomes related to MPA (€)

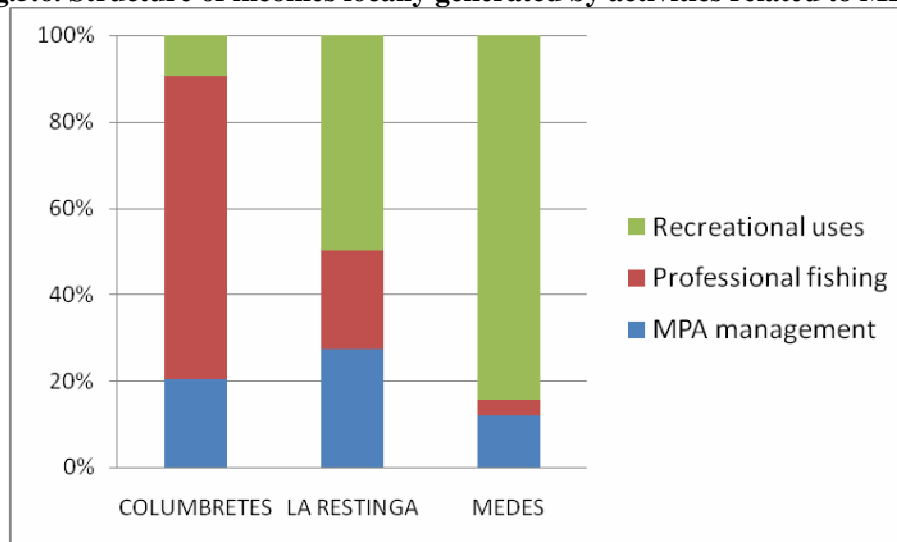
MPA	MPA management wages	Professional fishing added value within MPA	Local added value due to the expenditures of non-resident MPA recreational users	
			Recr. fishers	Scuba divers
BANYULS	162 041	<i>n.a.</i>	<i>n.a.</i>	972 533
BONIFACIO	1 100 000	<i>n.a.</i>	<i>n.a.</i>	948 418
CABO DE PALOS	230 717	<i>n.a.</i>	<i>n.a.</i>	868 303
COLUMBRETES	455 125	1 573 434	<i>n.a.</i>	210 982
COTE BLEUE	178 766	<i>n.a.</i>	52 064	632 199
LA GRACIOSA	313 890	481 634	35 376	<i>n.a.</i>
LA RESTINGA	367 641	306 445	54 548	615 870
MEDES	156 496	48 258	<i>n.a.</i>	1 098 838
MONTE DA GUIA	96 312	<i>n.a.</i>	211 287	241 195
SINIS	239 000	1 140 161	<i>n.a.</i>	15 938
TABARCA	365 000	<i>n.a.</i>	<i>n.a.</i>	15 564
TUSCANY	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	446 446
Mean	333 181	709 986	88 319	551 481
Standard Dev.	263 763	562 755	71 378	374 499
Variation coeff.	0,79	0,79	0,81	0,68

Table 5.4. Estimated number of local jobs related to MPA (yearly full time equivalent)

MPA	MPA management	Professional fishing	Local jobs due to the expenditures of non-resident MPA recreational users	
			Recr. fishers	Scuba divers
BANYULS	4,4	<i>n.a.</i>	<i>n.a.</i>	22,9
BONIFACIO	23,0	<i>n.a.</i>	<i>n.a.</i>	22,3
CABO DE PALOS	5,5	<i>n.a.</i>	<i>n.a.</i>	20,4
COLUMBRETES	8,0	50,4	<i>n.a.</i>	5,0
COTE BLEUE	6,0	<i>n.a.</i>	1,8	14,9
LA GRACIOSA	5,0	50,0	1,1	<i>n.a.</i>
LA RESTINGA	5,0	31,4	1,7	14,5
MEDES	6,5	4,2	<i>n.a.</i>	25,9
MONTE DA GUIA	4,0	<i>n.a.</i>	5,0	5,7
SINIS	6,5	133,9	<i>n.a.</i>	0,4
TABARCA	10,0	<i>n.a.</i>	<i>n.a.</i>	0,4
TUSCANY	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>	10,5
Mean	7,6	54,0	2,1	13,0
Standard Dev.	5,1	43,4	1,7	8,8
Variation coeff.	0,67	0,80	0,81	0,68

According to the estimation, yearly wages paid by MPA management authorities amount approximately to 330 000 € per MPA. Yearly local incomes related to MPAs amount approximately to 720 000 € per MPA in the professional fishing industry, and to 640 000 € per MPA in the various industries providing services to non-resident recreational users (mainly scuba divers). In terms of jobs, MPA management generates approximately 8 jobs per MPA, professional fishing 54 jobs, and local expenditures of non-resident recreational users approximately 15 jobs (yearly full time equivalent). However, the situation varies considerably according to MPAs, and, for extractive uses (professional and recreational fishing), the estimation could be completed only in a few case studies. As regards sport fishing (fully documented in only 4 case studies), few jobs are generated by local expenditures of non-resident users (2.1 per MPA on the average), a situation which may be explained by the fact that an important proportion of recreational fishers are “local”, or are motivated to pay a visit to the area for reasons other than fishing (family vacation for instance). In the case of scuba diving, the number of jobs, though significantly higher, is limited by the seasonal character of the activity.

The relative importance of professional fishing and of recreational activities may be compared in only a few case studies. The figure below presents the situation prevailing in three Spanish MPAs: Columbretes, La Restinga, and Medes. Columbretes provides an example of MPA where professional fishing is dominant, in terms of economic impact. The situation is completely symmetric with Medes, and La Restinga is an intermediate case.

Fig.5.6. Structure of incomes locally generated by activities related to MPAs

1.4 Site effect and reserve effect

The estimated economic impacts presented in the former section cannot be attributed unambiguously to MPAs. If the areas under survey were not protected, probably there would still be some fishing and scuba diving in these places. It is therefore necessary to sort out the “site” effect from the “reserve” effect if we want to state clearly what are the economic consequences of protecting a marine area. In most cases, this task is complicated by the lack of baseline (information concerning the situation prior to the implementation of the MPA), and by the difficulty to define a control zone similar enough to the area under survey. As a consequence, it requires building a model, making it possible to run simulations concerning the consequences of the management measures that are taken in the area under survey. For this purpose, the model must be bioeconomic, multi-activities and spatially explicit. This task, which is performed by WP5 of EMPAFISH, goes beyond the analysis of the field surveys that is presented in this report. However, some qualitative information concerning the relative importance of the site and reserve effects may be obtained through this analysis. To this end, we will now focus on the part of the survey results concerning perceptions and opinions of MPA users.

A first type of information concerning the reserve effect may be drawn from the answers of users concerning their choice criteria for a site of activity. In this field, recreational fishers and divers were asked how much the existence of the MPA had influenced their choice. Their answers are visualised in fig.7 and 8.

Fig.5.7. Declarations of recreational fishers concerning the influence of the MPA on their fishing site choice

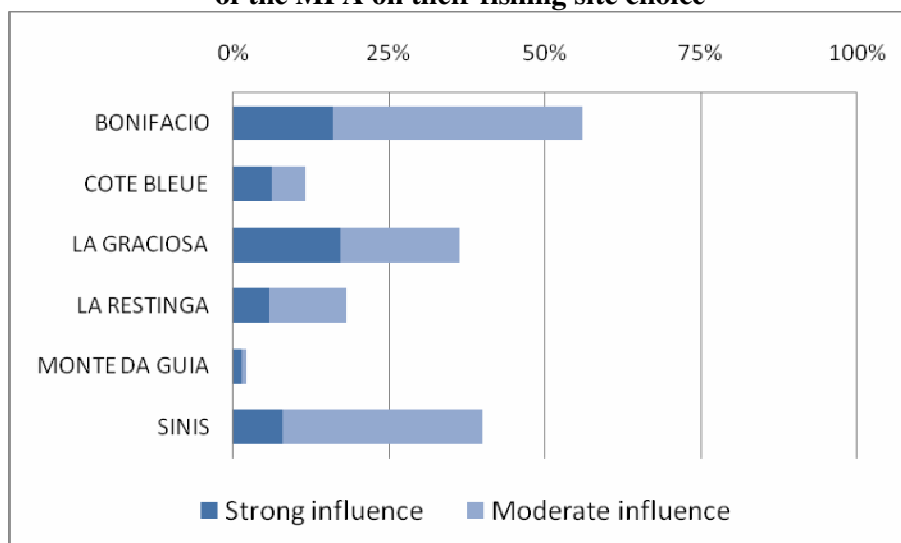
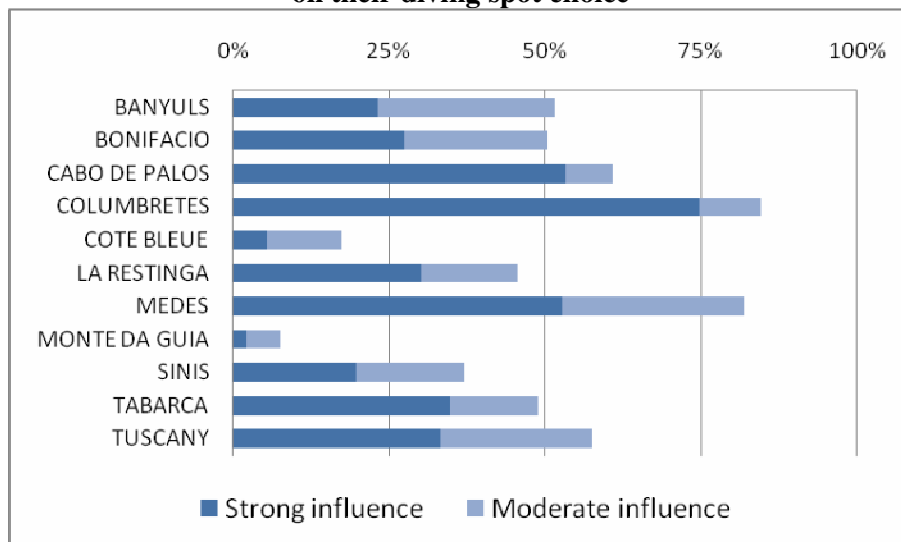


Fig.5.8. Declarations of divers concerning the influence of the MPA on their diving spot choice



Only in 1 case study out of 6 did a majority of recreational fishers declare the existence of the MPA had influenced their decision, and the proportion acknowledging a strong influence of the MPA on their decision was everywhere below 20%. According to divers' answers to the same type of question, the reserve effect seems to be more important for this second category of users: a majority of divers declared that the existence of the MPA had influenced their decision in 6 case studies out of 11, and the proportion was over 75% in 2 cases. Moreover, the acknowledged influence of the MPA on the choice of a diving spot was frequently described as "strong": beyond 50% in 3 cases out of 11, and beyond 25% in 7 cases out of 11.

A second source of information may be found in users' answers to a question concerning the alleged impact of the MPA on their own activity. These answers provide an insight on

subjective perceptions concerning the reserve effect. The three figures below display answers from professional fishers, recreational fishers and diving operators.

Fig.5.9. Opinions of professional fishers concerning the impact of the MPA on their activity

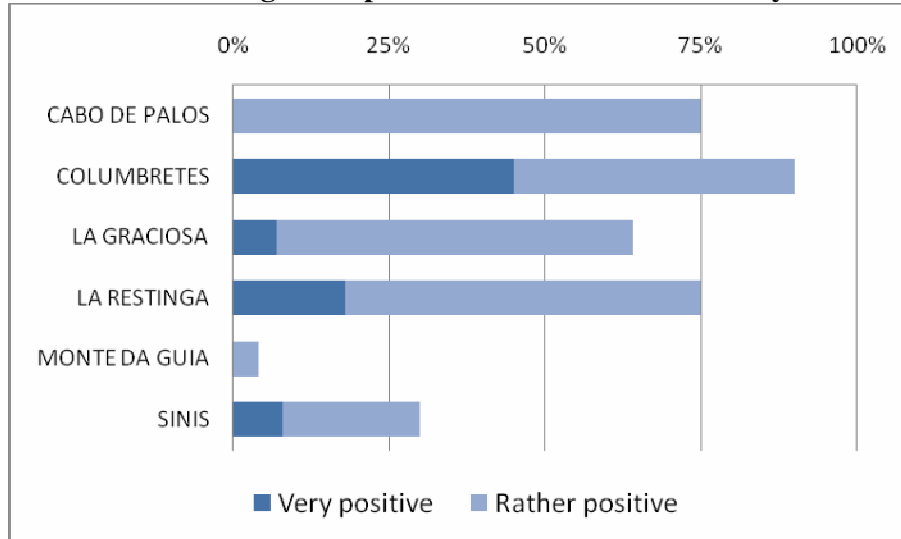


Fig.5.10. Opinions of recreational fishers concerning the impact of the MPA on their activity

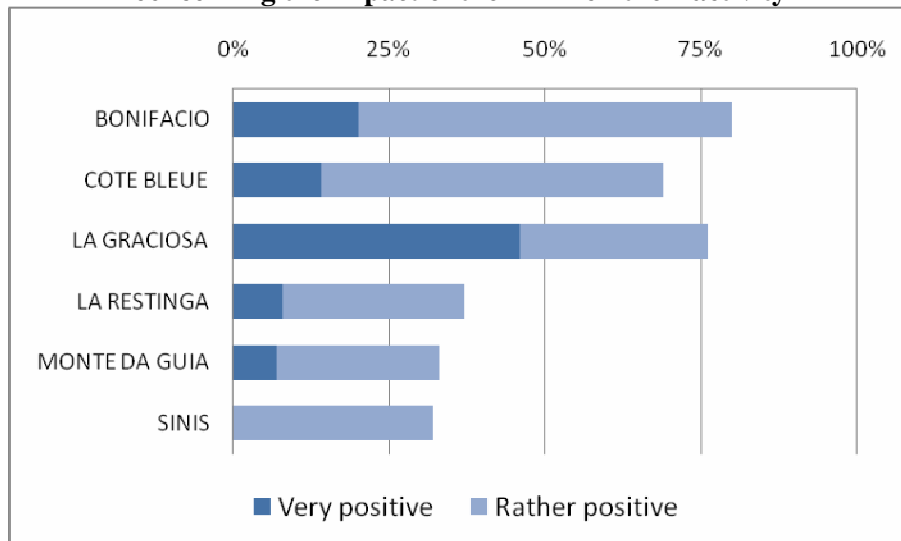
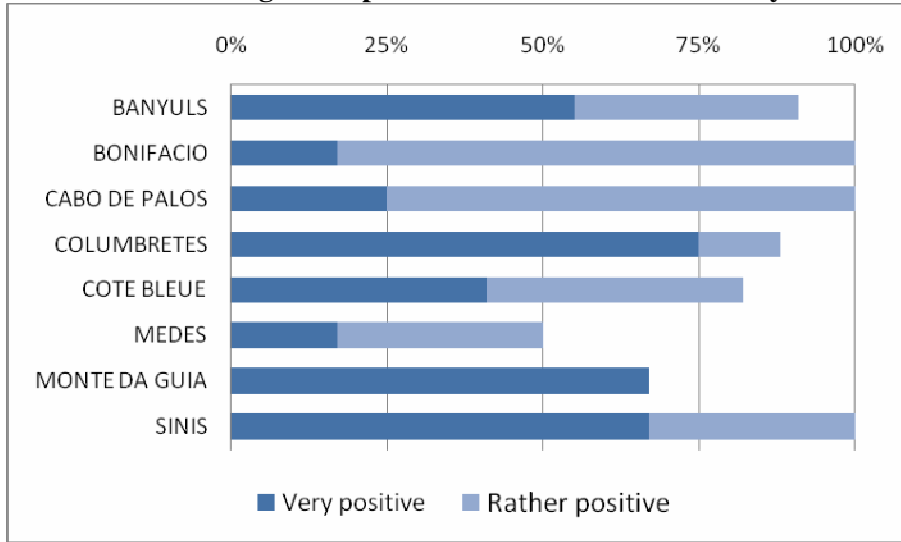


Fig.5.11. Opinions of diving operators concerning the impact of the MPA on their activity



Fishers seem to hesitate about the impact of the reserve effect on their own activity. The influence of the MPA was considered positive by a majority of professional fishers in 4 cases out of 6, and by a majority of recreational fishers in 3 cases out of 6. However, only in 1 case out of 6 was this influence described as “very positive” by more than 20% of fishers (professional as well as recreational). Diving operators have more clear-cut opinions on the same topic, with a proportion of positive opinions never under 50%, and above 75% in 6 cases out of 8. Moreover, these opinions were frequently qualified as “very positive” (above 50% in 4 cases out of 8).

Considering the major criteria mentioned by fishers and divers for choosing a site of activity may help to explain these differences. The three figures below exhibit, for the whole sample (all case studies aggregated), the three major criteria mentioned by professional fishers, recreational fishers, and scuba divers. The proportions and ranking refer respectively to the frequency of citations and to the order of priority of each criterion.

Fig.5.12. Professional fishers’ three major criteria for selecting a fishing site

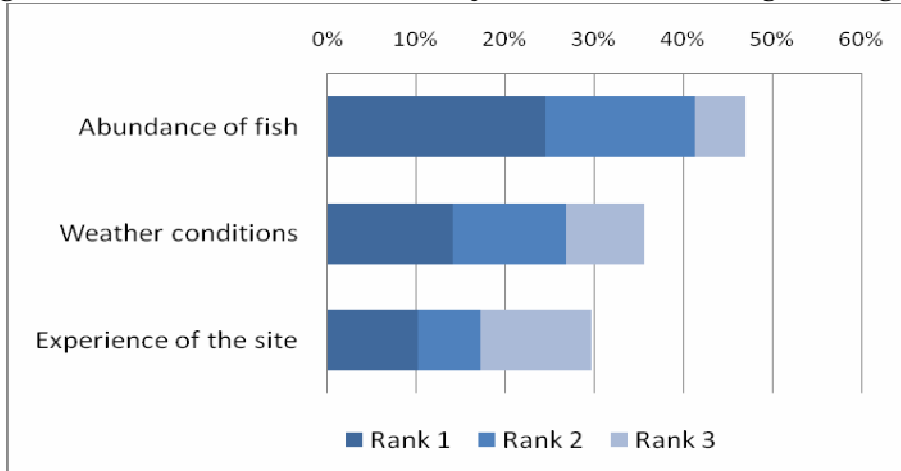
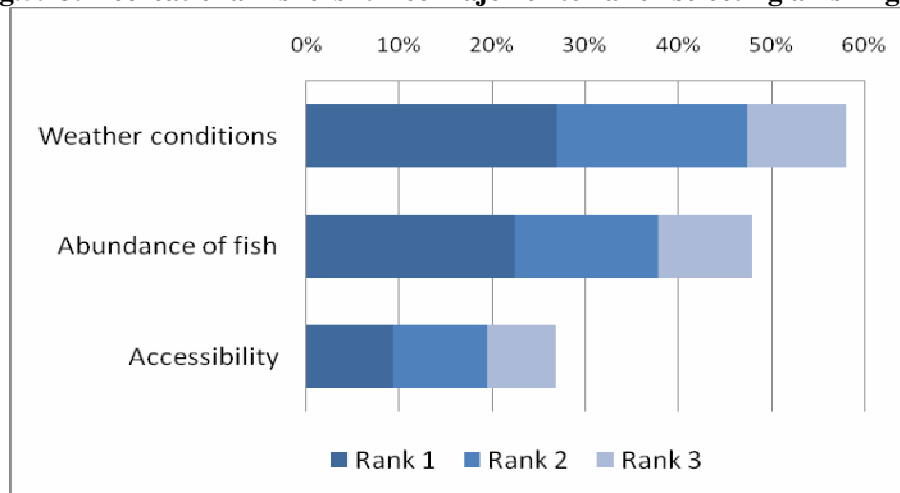
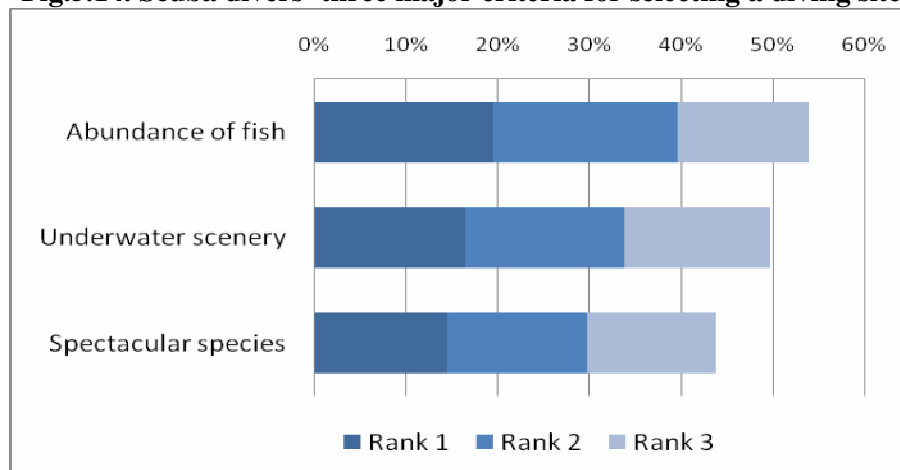


Fig.5.13. Recreational fishers' three major criteria for selecting a fishing site**Fig.5.14. Scuba divers' three major criteria for selecting a diving site**

Unsurprisingly, the figures exhibit the major role played by fish abundance in the choice of fishing or diving site. In the case of fishing, considerations related to fish abundance are balanced by the importance of weather conditions¹⁵. In the case of scuba diving, the quality of the underwater scenery and the presence of some spectacular, or “emblematic” species, also play a major role.

Several regulations taken by MPA authorities are likely to influence directly the state variables that divers regard as major decision criteria (e.g. banning spear fishing in a given place directly influences the abundance, average size and behavior of groupers in this place). This circumstance may account for the positive role acknowledged by divers and, even more, by diving operators to MPAs. On the other hand, the expected positive influence of MPAs on fishing mainly relies on their alleged spillover effects (biomass export and larval dispersion from the NTZ to the fishing zone). However, these effects are generally less conspicuous than

¹⁵ The fact that that this variable is not ranked as high by divers does not mean that it is not important for their activity. But most dives are performed with a diving operator, who is supposed to take care of weather and, more generally, of safety conditions.

the ones that are regarded as important by divers. Moreover, they are partly balanced by the restrictive impact of MPA regulations on the fishing activity. Opinions of fishers concerning the influence of MPA on their activity reflect this ambivalence.

Conclusion

The first purpose of the data presented in this report is to serve as inputs for other workpackages of EMPAFISH, more specifically WP5 (bioeconomic modelling) and WP6 (management tools). Carrying out these workpackages requires socio-economic information about MPA ecosystem users that was not previously available in most cases, and therefore had to be collected by means of field surveys. As was illustrated in the last chapter of the report, these data also provide information for estimating the impact of MPAs on the local economy, in terms of jobs and incomes. Moreover, they also provide a rich empirical substratum for further analysis of MPA users behaviours, e.g. defining homogenous groups of users using multivariate analysis, or elaborating demand curves for non-market activities (e.g. recreational fishing) with the help of travelling cost methodology.

The potential of the data collected through EMPAFISH socio-economic field surveys relies on the following features: i) they cover a wide range of uses (extractive and non-extractive, market and non-market) and of case studies (14 EU MPAs in the Western Mediterranean and Atlantic Ocean); ii) a standardised methodology was applied to each case study; iii) the topics addressed by questionnaires include both “objective” information about users (personal data, costs, activity...) and “subjective” information concerning their opinions and attitudes towards MPAs and other users; iv) a substantial number of questionnaires (over 4000) were filled, processed and entered in a comprehensive database.

However, making a good use of these data requires being aware of their limits.

As regards professional fishing (Chapter 1), the heterogeneity in surveyed populations and in answering rates sometimes makes it difficult to compare results between case studies. Mean values for the whole sample are often highly influenced by the results of one particular case study (Malta), due to the relative size of the sample concerning this case. The survey covered various fleets targeting various species, coming to high differences in annual costs and earnings. Two polar cases were identified: i) Medes, characterized by very small-scale fishing boats with skipper / owner alone on board, and ii) Columbretes, with a high proportion of offshore trawlers. Only two case studies reported trawlers as being in relation with the MPA: Columbretes and Malta (with smaller units in this last case). Other case studies are more homogeneous in term of costs and earnings. However, using survey results about costs and earnings should be done with caution, as answering rates may vary greatly from one question to another, and, in some cases, it seems advisable to check more deeply the reliability of the information provided by the survey. Another difficulty comes from the fact that surveyed MPAs are heterogeneous, in terms of uses as well as management systems. For instance, in Monte da Guia, the MPA is composed of an integral reserve, and a buffer-zone where non-extractive uses are allowed, but fishing is forbidden. On the other hand, some other MPAs do not have a no-take zone (Malta). This type of heterogeneity influences answers to the survey (e.g. concerning the proportion of fishing trips inside the MPA). However, some common features may be found in answers provided by various case studies, in terms of choice criteria of fishing zones, relations with other users, biological and socio-economic impacts of MPA. One of the most noticeable results may be the following: if professional fishers usually have a positive opinion concerning the impact of the MPA on biodiversity and local economy as well, in most cases they believe that the main beneficiaries are the tourism industry and recreational activities.

Several caveats that were raised concerning the professional fishing survey also apply to the recreational fishing survey (Chapter 2). The MPAs are heterogeneous, and the relative weight

of some case studies in the sample (such as Côte Bleue) deeply influences the overall results. Heterogeneity of recreational fishing activities covered by the survey should also be underlined, for two reasons: i) their relative weight varies greatly according to case-study (e.g. spear fishers form less than 12% of the whole sample, but 100% in the specific case of Bonifacio; another example is charter-fishing, which appears only in Monte da Guia); ii) answers to many questions seem to depend highly on the type of fishing activity performed. Another variable that seems to influence answers to the survey is the geographical origin of fishers (these questions will be further addressed with the help of data analysis). Finally, it should be recalled that, without knowledge of the main population, the representativeness of the sample cannot be ascertained.

The quantitative results of the EMPAFISH scuba-diving survey (Chapter 3) are quite substantial, with nearly 100 questionnaires filled by operators, 3000 questionnaires filled by divers, and 13 case-studies covered (12 in the case of operators). It should also be noted that answering rates to most questions are generally high. Beyond the descriptive statistics presented in this report, future prospects concerning further analysis of these results seem promising (data analysis, definition of demand curves). Moreover, according to survey results, fish abundance and quality of the ecosystem deeply influence the demand for diving in a given area, which calls for integrating this activity in the bioeconomic modelling of MPAs. A requirement for further analysis is to quantify, in each case study, the main populations of operators and divers. As regards operators, this will be done thanks to information gathered by each case-study project partner. Concerning divers, in some cases direct information coming from MPA managers is already available. In other cases, it will be possible to make reasonable estimations on the basis of information provided by diving operators, taking advantage of the fact that scuba-diving, unlike recreational fishing, is generally an organised activity.

Surveying submarine trail visitors (Chapter 4) cannot be considered as a substitute for a survey of the wider population of snorkellers. These trails exist only in a few MPAs, and the population of snorkellers who visit them is not necessarily representative of other snorkellers diving in the MPA. However, in MPAs where they have been created, submarine trails are considered as emblematic, because they associate pleasure of discovery with pedagogy. As a result, surveying their visitors is of particular interest. However, due to the small size of its sample, it is difficult to draw conclusions from one of the three case studies (Bonifacio). Moreover, some comparisons may be influenced by the fact that the organisation of the submarine trail is different in each case. For instance, in Bonifacio visitors are accompanied by a guide, and visits are made on appointment only. In Banyuls, visitors may rent audioguides.

Appendix: criteria ranking

- A1. Professional fishers choice criteria of fishing grounds**
- A2. Recreational fishers choice criteria of a fishing site
(individual fishers)**
- A3. Charter fishing customers choice criteria of a fishing site**
- A4. Charter fishing operators choice criteria of a fishing site**
- A5. Scuba divers choice criteria of a diving site**
- A6. Scuba diving operators choice criteria of a diving site**
- A7. Satisfaction criteria concerning a snorkelling dive
(submarine trail visitors)**

Note: Percentages in the following tables are frequencies of quotation, for a given criterion (column) and a given ranking (row). In each case, 100% represents the sample size (number of individuals surveyed) corresponding to the case study. This size is indicated in the first column of the table. The last column of each table is dedicated to the frequencies of "no answers" for each ranking. For a given ranking, the total of this frequency and of frequencies of quotation for each criterion is equal to 100%.

A1. Professional fishers choice criteria of fishing grounds: ranking according to importance (1/3)

MPA and sample size	Ranking	Criteria											No answer
		Abundance of fish	Weather conditions	Experience	Regulations	Particular species	Accessibility	Other boats fish in this area	Few fishers	Proximity of a MPA	Few other activities	Other	
FULL SAMPLE 354	1	24,6%	14,1%	10,2%	18,1%	3,1%	0,6%	1,1%	0,0%	0,0%	0,3%	5,7%	22,3%
	2	16,7%	12,7%	7,1%	5,4%	6,8%	3,7%	2,0%	2,0%	0,3%	0,0%	1,4%	42,1%
	3	5,7%	8,8%	12,4%	2,5%	3,1%	3,1%	2,5%	1,1%	2,3%	0,0%	1,1%	57,3%
	4	1,7%	4,0%	4,2%	4,8%	3,4%	2,8%	3,1%	2,8%	1,1%	1,1%	3,1%	67,8%
	5	1,4%	2,0%	5,1%	4,2%	2,0%	1,1%	1,4%	3,1%	0,9%	0,0%	0,9%	78,0%
	1 to 5	50,0%	41,5%	39,0%	35,0%	18,4%	11,3%	10,2%	9,0%	4,5%	1,4%	12,1%	-
Cabo de Palos 4	1	25,0%	50,0%	25,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	2	50,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	3	0,0%	0,0%	50,0%	0,0%	0,0%	25,0%	0,0%	0,0%	0,0%	0,0%	0,0%	25,0%
	4	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%
	5	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%
	1 to 5	75,0%	100,0%	75,0%	0,0%	0,0%	25,0%	0,0%	0,0%	0,0%	0,0%	0,0%	-
Columbretes 20	1	35,0%	25,0%	10,0%	0,0%	20,0%	0,0%	10,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	2	25,0%	30,0%	5,0%	0,0%	25,0%	0,0%	0,0%	15,0%	0,0%	0,0%	0,0%	0,0%
	3	5,0%	25,0%	15,0%	0,0%	25,0%	5,0%	5,0%	0,0%	20,0%	0,0%	0,0%	0,0%
	4	10,0%	5,0%	5,0%	0,0%	10,0%	25,0%	20,0%	15,0%	10,0%	0,0%	0,0%	0,0%
	5	10,0%	5,0%	25,0%	10,0%	15,0%	0,0%	10,0%	10,0%	10,0%	0,0%	0,0%	5,0%
	1 to 5	85,0%	90,0%	60,0%	10,0%	95,0%	30,0%	45,0%	40,0%	40,0%	0,0%	0,0%	-
La Graciosa 14	1	28,6%	21,4%	14,3%	7,1%	7,1%	7,1%	0,0%	0,0%	0,0%	0,0%	14,3%	0,0%
	2	21,4%	21,4%	21,4%	0,0%	28,6%	0,0%	0,0%	0,0%	7,1%	0,0%	0,0%	0,0%
	3	28,6%	21,4%	28,6%	7,1%	0,0%	0,0%	0,0%	7,1%	7,1%	0,0%	0,0%	0,0%
	4	0,0%	7,1%	14,3%	7,1%	14,3%	14,3%	0,0%	14,3%	7,1%	0,0%	14,3%	7,1%
	5	0,0%	14,3%	14,3%	0,0%	21,4%	14,3%	0,0%	28,6%	7,1%	0,0%	0,0%	0,0%
	1 to 5	78,6%	85,7%	92,9%	21,4%	71,4%	35,7%	0,0%	50,0%	28,6%	0,0%	28,6%	-

Source: EMPAFISH Professional Fishing survey 2005-2006

A1. Professional fishers choice criteria of fishing grounds: ranking according to importance (2/3)

MPA and sample size	Ranking	Criteria											No answer	
		Abundance of fish	Weather conditions	Experience	Regulations	Particular species	Accessibility	Other boats fish in this area	Few fishers	Proximity of a MPA	Few other activities	Other		
Malta 184	1	28,7%	7,9%	15,9%	38,4%	0,6%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	8,5%	10,9%
	2	17,1%	16,5%	6,7%	9,8%	0,0%	6,1%	3,0%	0,0%	0,0%	0,0%	0,0%	3,0%	44,6%
	3	4,3%	6,7%	7,9%	3,7%	0,0%	3,0%	1,2%	0,0%	0,0%	0,0%	0,0%	1,2%	75,0%
	4	1,2%	3,7%	1,2%	4,9%	0,6%	0,6%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	89,1%
	5	0,0%	0,0%	0,0%	0,6%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	99,5%
	1 to 5	51,2%	34,8%	31,7%	57,3%	1,2%	9,8%	4,3%	0,0%	0,0%	0,0%	0,0%	12,8%	-
Medes 16	1	55,6%	0,0%	11,1%	0,0%	11,1%	0,0%	11,1%	0,0%	0,0%	11,1%	0,0%	0,0%	43,8%
	2	11,1%	0,0%	22,2%	11,1%	44,4%	0,0%	0,0%	11,1%	0,0%	0,0%	0,0%	0,0%	43,8%
	3	11,1%	22,2%	22,2%	11,1%	0,0%	22,2%	0,0%	0,0%	11,1%	0,0%	0,0%	0,0%	43,8%
	4	11,1%	11,1%	11,1%	11,1%	0,0%	11,1%	22,2%	11,1%	0,0%	11,1%	0,0%	0,0%	43,8%
	5	0,0%	22,2%	11,1%	55,6%	0,0%	0,0%	0,0%	11,1%	0,0%	0,0%	0,0%	0,0%	43,8%
	1 to 5	88,9%	55,6%	77,8%	88,9%	55,6%	33,3%	33,3%	33,3%	11,1%	22,2%	0,0%	-	
Monte da Guia 51	1	0,0%	0,0%	50,0%	0,0%	0,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	96,1%
	2	0,0%	0,0%	0,0%	0,0%	0,0%	50,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	96,1%
	3	0,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	50,0%	0,0%	96,1%
	4	0,0%	0,0%	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	96,1%
	5	0,0%	0,0%	0,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	98,0%
	1 to 5	0,0%	50,0%	50,0%	50,0%	100,0%	100,0%	50,0%	0,0%	0,0%	0,0%	0,0%	50,0%	-

Source: EMPAFISH Professional Fishing survey 2005-2006

A1. Professional fishers choice criteria of fishing grounds: ranking according to importance (3/3)

MPA and sample size	Ranking	Criteria											No answer
		Abundance of fish	Weather conditions	Experience	Regulations	Particular species	Accessibility	Other boats fish in this area	Few fishers	Proximity of a MPA	Few other activities	Other	
La Restinga 28	1	35,7%	42,9%	7,1%	0,0%	0,0%	0,0%	3,6%	0,0%	0,0%	0,0%	0,0%	10,7%
	2	39,3%	0,0%	17,9%	3,6%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	39,3%
	3	10,7%	0,0%	35,7%	3,6%	0,0%	0,0%	17,9%	0,0%	3,6%	0,0%	3,6%	25,0%
	4	3,6%	3,6%	10,7%	7,1%	0,0%	0,0%	17,9%	0,0%	3,6%	0,0%	25,0%	28,6%
	5	3,6%	3,6%	3,6%	14,3%	0,0%	0,0%	3,6%	0,0%	0,0%	0,0%	7,1%	64,3%
	1 to 5	92,9%	50,0%	75,0%	28,6%	0,0%	0,0%	42,9%	0,0%	7,1%	0,0%	35,7%	-
Sinis 36	1	33,3%	41,7%	2,8%	0,0%	11,1%	0,0%	0,0%	0,0%	0,0%	0,0%	11,1%	0,0%
	2	25,0%	16,7%	8,3%	2,8%	30,6%	5,6%	2,8%	8,3%	0,0%	0,0%	0,0%	0,0%
	3	11,1%	25,0%	27,8%	0,0%	13,9%	5,6%	2,8%	8,3%	2,8%	0,0%	0,0%	2,8%
	4	0,0%	11,1%	16,7%	11,1%	13,9%	2,8%	0,0%	11,1%	0,0%	8,3%	5,6%	19,4%
	5	5,6%	2,8%	22,2%	5,6%	2,8%	5,6%	5,6%	11,1%	0,0%	0,0%	2,8%	36,1%
	1 to 5	75,0%	97,2%	77,8%	19,4%	72,2%	19,4%	11,1%	38,9%	2,8%	8,3%	19,4%	-
Tuscany 1	1	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	2	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	3	0,0%	0,0%	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	4	0,0%	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	5	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	1 to 5	100,0%	100,0%	100,0%	100,0%	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	-

Source: EMPAFISH Professional Fishing survey 2005-2006

A2. Recreational fishers choice criteria of a fishing site: ranking according to importance (individual fishers) (1/2)

MPA and sample size	Ranking	Criteria												No answer
		Weather conditions	Abundance of fish	Accessibility	Safety	Experience	Few fishers	Particular species	Few other activities	Regulations	Other fishers	Proximity of a MPA	Other	
FULL SAMPLE 700	1	27,0%	22,4%	9,4%	6,3%	5,0%	4,1%	4,3%	2,9%	3,4%	1,4%	1,3%	12,4%	0,0%
	2	20,4%	15,4%	10,0%	8,6%	7,3%	5,0%	4,9%	3,0%	4,6%	1,7%	1,4%	5,6%	12,1%
	3	10,7%	10,1%	7,4%	8,4%	6,6%	7,3%	7,7%	5,0%	5,4%	3,4%	2,4%	1,3%	24,1%
	4	8,6%	7,9%	8,9%	6,6%	6,7%	6,1%	4,4%	6,9%	4,1%	3,1%	3,3%	1,6%	31,9%
	5	5,3%	6,3%	7,0%	8,3%	5,6%	6,7%	4,6%	6,1%	4,3%	3,9%	2,4%	2,6%	37,0%
	1 to 5	72,0%	62,1%	42,7%	38,1%	31,1%	29,3%	25,9%	23,9%	21,9%	13,6%	10,9%	23,4%	--
Bonifacio 10	1	30,0%	30,0%	10,0%	10,0%	10,0%	0,0%	0,0%	0,0%	10,0%	0,0%	0,0%	0,0%	0,0%
	2	10,0%	30,0%	0,0%	10,0%	10,0%	10,0%	10,0%	0,0%	10,0%	0,0%	0,0%	10,0%	0,0%
	3	0,0%	20,0%	20,0%	10,0%	10,0%	0,0%	20,0%	0,0%	10,0%	0,0%	10,0%	0,0%	0,0%
	4	30,0%	0,0%	0,0%	10,0%	10,0%	40,0%	10,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	5	10,0%	0,0%	20,0%	20,0%	20,0%	0,0%	20,0%	0,0%	10,0%	0,0%	0,0%	0,0%	0,0%
	1 to 5	80,0%	80,0%	50,0%	60,0%	60,0%	50,0%	60,0%	0,0%	40,0%	0,0%	10,0%	10,0%	--
Côte bleue 259	1	32,4%	23,2%	11,6%	5,4%	3,1%	6,2%	5,0%	3,5%	1,5%	2,3%	0,8%	5,0%	0,0%
	2	21,2%	13,5%	16,6%	12,0%	7,3%	5,8%	2,3%	3,9%	5,4%	3,9%	1,2%	3,1%	3,9%
	3	10,0%	11,6%	11,2%	11,6%	5,8%	9,7%	8,1%	7,7%	7,3%	4,6%	3,1%	0,0%	9,3%
	4	11,6%	9,7%	12,0%	9,3%	8,5%	7,3%	3,1%	10,8%	3,5%	4,6%	5,4%	0,4%	13,9%
	5	6,6%	6,6%	9,7%	12,7%	4,2%	6,9%	5,0%	9,7%	4,6%	6,9%	3,5%	3,5%	20,1%
	1 to 5	81,9%	64,5%	61,0%	51,0%	29,0%	35,9%	23,6%	35,5%	22,4%	22,4%	13,9%	12,0%	--
La Graciosa 184	1	19,0%	28,3%	10,3%	11,4%	6,5%	4,3%	2,7%	4,3%	4,3%	1,1%	2,7%	4,9%	0,0%
	2	21,2%	20,7%	8,7%	8,2%	6,5%	6,0%	6,0%	4,9%	6,0%	1,1%	1,1%	2,2%	7,6%
	3	15,8%	13,0%	4,3%	8,7%	5,4%	7,1%	6,5%	4,9%	7,1%	4,3%	3,3%	1,1%	18,5%
	4	9,8%	4,9%	10,9%	8,2%	6,0%	7,1%	6,0%	7,6%	4,3%	3,8%	4,3%	1,6%	25,5%
	5	9,8%	7,1%	6,0%	8,7%	8,7%	7,6%	5,4%	7,6%	6,0%	2,2%	2,7%	1,6%	26,6%
	1 to 5	75,5%	73,9%	40,2%	45,1%	33,2%	32,1%	26,6%	29,3%	27,7%	12,5%	14,1%	11,4%	--

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

A2. Recreational fishers choice criteria of a fishing site: ranking according to importance (individual fishers) (2/2)

MPA and sample size	Ranking	Criteria												No answer
		Weather conditions	Abundance of fish	Accessibility	Safety	Experience	Few fishers	Particular species	Few other activities	Regulations	Other fishers	Proximity of a MPA	Other	
Malta 25	1	8,0%	28,0%	40,0%	0,0%	8,0%	0,0%	0,0%	4,0%	12,0%	0,0%	0,0%	0,0%	0,0%
	2	12,0%	24,0%	12,0%	0,0%	8,0%	0,0%	0,0%	0,0%	8,0%	0,0%	0,0%	0,0%	36,0%
	3	28,0%	0,0%	8,0%	0,0%	12,0%	0,0%	0,0%	4,0%	0,0%	0,0%	0,0%	0,0%	48,0%
	4	4,0%	8,0%	4,0%	0,0%	16,0%	0,0%	0,0%	0,0%	16,0%	0,0%	0,0%	0,0%	52,0%
	5	4,0%	0,0%	0,0%	0,0%	8,0%	0,0%	0,0%	4,0%	8,0%	0,0%	0,0%	0,0%	76,0%
	1 to 5	56,0%	60,0%	64,0%	0,0%	52,0%	0,0%	0,0%	12,0%	44,0%	0,0%	0,0%	0,0%	--
Monte da Guia 55	1	45,5%	18,2%	9,1%	5,5%	1,8%	1,8%	10,9%	0,0%	3,6%	3,6%	0,0%	0,0%	0,0%
	2	36,4%	20,0%	7,3%	16,4%	7,3%	1,8%	5,5%	0,0%	0,0%	0,0%	1,8%	1,8%	1,8%
	3	7,3%	12,7%	12,7%	12,7%	10,9%	7,3%	23,6%	0,0%	1,8%	7,3%	0,0%	1,8%	1,8%
	4	1,8%	20,0%	12,7%	7,3%	9,1%	5,5%	16,4%	1,8%	7,3%	3,6%	1,8%	5,5%	7,3%
	5	0,0%	12,7%	18,2%	9,1%	3,6%	18,2%	9,1%	0,0%	1,8%	7,3%	3,6%	7,3%	9,1%
	1 to 5	90,9%	83,6%	60,0%	50,9%	32,7%	34,5%	65,5%	1,8%	14,5%	21,8%	7,3%	16,4%	--
La Restinga 142	1	17,6%	15,5%	0,7%	0,7%	6,3%	2,8%	3,5%	1,4%	4,2%	0,0%	1,4%	45,8%	0,0%
	2	13,4%	7,7%	0,7%	0,7%	5,6%	4,2%	7,7%	1,4%	2,1%	0,0%	2,8%	17,6%	35,9%
	3	6,3%	4,9%	0,0%	0,0%	6,3%	3,5%	2,1%	2,8%	0,7%	0,0%	0,0%	4,2%	69,0%
	4	3,5%	2,1%	0,0%	0,0%	1,4%	1,4%	1,4%	0,7%	0,0%	0,0%	0,0%	2,8%	86,6%
	5	0,0%	0,7%	0,0%	0,0%	0,7%	2,1%	0,0%	0,7%	0,0%	0,0%	0,0%	1,4%	94,4%
	1 to 5	40,8%	31,0%	1,4%	1,4%	20,4%	14,1%	14,8%	7,0%	7,0%	0,0%	4,2%	71,8%	--
Sinis 25	1	60,0%	12,0%	0,0%	16,0%	8,0%	0,0%	4,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	2	24,0%	16,0%	12,0%	12,0%	20,0%	4,0%	8,0%	0,0%	4,0%	0,0%	0,0%	0,0%	0,0%
	3	0,0%	4,0%	16,0%	20,0%	8,0%	16,0%	12,0%	4,0%	12,0%	0,0%	8,0%	0,0%	0,0%
	4	8,0%	20,0%	12,0%	8,0%	8,0%	8,0%	0,0%	16,0%	16,0%	4,0%	0,0%	0,0%	0,0%
	5	0,0%	24,0%	4,0%	8,0%	20,0%	8,0%	8,0%	8,0%	12,0%	4,0%	4,0%	0,0%	0,0%
	1 to 5	92,0%	76,0%	44,0%	64,0%	64,0%	36,0%	32,0%	28,0%	44,0%	8,0%	12,0%	0,0%	--

Source: EMPAFISH Recreational Fishing survey 2005-2006 (individual fishers)

A3. Charter fishing customers choice criteria of a fishing site: ranking according to importance (1/1)

MPA and sample size	Ranking	Criteria											No answer	
		Abundance of fish	Specific species	Fish Size	Weather conditions	Experience	Proximity of MPA	Regulations	Safety	Accessibility	Imitation behavior	Few fishers		Few other activities
Monte da Guia 20	1	25,0%	65,0%	0,0%	10,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	2	35,0%	0,0%	35,0%	10,0%	10,0%	5,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	5,0%
	3	35,0%	5,0%	30,0%	10,0%	10,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	10,0%
	1 to 3	95,0%	70,0%	65,0%	30,0%	20,0%	5,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	--

Source: EMPAFISH Recreational Fishing survey 2005-2006 (charter-fishing customers)

A4. Charter fishing operators choice criteria of a fishing site: ranking according to importance (1/1)

MPA and sample size	Ranking	Criteria											No answer	
		Abundance of fish	Weather conditions	Particular species	Experience	Few fishers	Safety	Accessibility	Regulations	Imitation behavior	Proximity of MPA	Few other activities		
Monte da Guia 2	1	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	2	0,0%	50,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	3	0,0%	50,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	4	0,0%	0,0%	0,0%	50,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	5	0,0%	0,0%	0,0%	0,0%	0,0%	50,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
	1 to 5	100,0%	100,0%	100,0%	50,0%	50,0%	50,0%	50,0%	0,0%	0,0%	0,0%	0,0%	0,0%	--

Source: EMPAFISH Recreational Fishing survey 2005-2006 (charter-fishing operators)

A5. Scuba divers choice criteria of a diving site: ranking according to importance (1/3)

MPA and sample size	Ranking	Criteria											No Answer
		Abundance of fish	Underwater scenery	Spectacular species	Water clarity	Weather conditions	Ship-wreck	Safety	Few divers	Accessibility	Few other activities	Other	
FULL SAMPLE 1920	1	19,5%	16,6%	14,6%	14,9%	12,7%	5,5%	7,0%	2,7%	3,2%	1,4%	1,9%	0,0%
	2	20,2%	17,3%	15,2%	14,4%	10,6%	6,3%	4,3%	3,6%	3,5%	2,5%	0,1%	2,1%
	3	14,2%	15,8%	14,0%	13,5%	9,7%	8,0%	4,6%	7,0%	4,5%	3,5%	1,0%	4,1%
	1 to 3	54,0%	49,6%	43,7%	42,9%	33,0%	19,7%	15,9%	13,3%	11,3%	7,4%	2,9%	--
Banyuls 75	1	21,3%	18,7%	13,3%	18,7%	9,3%	6,7%	6,7%	1,3%	1,3%	1,3%	1,3%	0,0%
	2	26,7%	16,0%	13,3%	17,3%	9,3%	1,3%	4,0%	5,3%	1,3%	1,3%	0,0%	4,0%
	3	21,3%	18,7%	22,7%	6,7%	10,7%	0,0%	1,3%	4,0%	5,3%	4,0%	0,0%	5,3%
	1 to 3	69,3%	53,3%	49,3%	42,7%	29,3%	8,0%	12,0%	10,7%	8,0%	6,7%	1,3%	--
Benidorm 201	1	23,4%	10,4%	17,4%	19,4%	12,4%	6,0%	1,5%	1,5%	6,5%	0,5%	1,0%	0,0%
	2	15,4%	11,9%	26,4%	19,4%	10,0%	3,0%	4,0%	2,0%	3,5%	2,0%	0,0%	2,5%
	3	15,9%	15,9%	17,4%	13,4%	11,4%	4,0%	6,0%	5,0%	3,0%	1,0%	0,5%	6,5%
	1 to 3	54,7%	38,3%	61,2%	52,2%	33,8%	12,9%	11,4%	8,5%	12,9%	3,5%	1,5%	--
Bonifacio 58	1	25,9%	25,9%	10,3%	12,1%	10,3%	3,4%	6,9%	1,7%	0,0%	3,4%	0,0%	0,0%
	2	20,7%	24,1%	19,0%	12,1%	10,3%	0,0%	3,4%	0,0%	1,7%	5,2%	0,0%	3,4%
	3	10,3%	20,7%	17,2%	17,2%	12,1%	5,2%	1,7%	3,4%	0,0%	3,4%	0,0%	8,6%
	1 to 3	56,9%	70,7%	46,6%	41,4%	32,8%	8,6%	12,1%	5,2%	1,7%	12,1%	0,0%	--
Cabo de Palos 115	1	39,1%	4,3%	19,1%	18,3%	6,1%	5,2%	5,2%	0,0%	0,9%	0,9%	0,9%	0,0%
	2	20,9%	12,2%	16,5%	20,9%	7,0%	9,6%	2,6%	0,9%	1,7%	1,7%	0,0%	6,1%
	3	9,6%	12,2%	12,2%	17,4%	11,3%	11,3%	0,9%	5,2%	0,9%	2,6%	4,3%	12,2%
	1 to 3	69,6%	28,7%	47,8%	56,5%	24,3%	26,1%	8,7%	6,1%	3,5%	5,2%	5,2%	--
Columbretes 194	1	30,9%	4,1%	26,3%	16,0%	8,2%	3,1%	4,1%	2,1%	4,1%	0,5%	0,5%	0,0%
	2	16,5%	16,5%	20,6%	18,0%	9,3%	5,2%	1,5%	3,6%	4,1%	2,6%	0,0%	2,1%
	3	14,9%	12,9%	11,9%	16,0%	11,3%	7,2%	5,2%	8,8%	4,6%	4,1%	0,0%	3,1%
	1 to 3	62,4%	33,5%	58,8%	50,0%	28,9%	15,5%	10,8%	14,4%	12,9%	7,2%	0,5%	--

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

A5. Scuba divers choice criteria of a diving site: ranking according to importance (2/3)

MPA and sample size	Ranking	Criteria											No Answer
		Abundance of fish	Underwater scenery	Spectacular species	Water clarity	Weather conditions	Ship-wreck	Safety	Few divers	Accessibility	Few other activities	Other	
Côte Bleue 677	1	13,1%	26,0%	7,5%	11,8%	17,1%	5,6%	8,1%	3,0%	3,7%	1,0%	3,0%	0,0%
	2	18,8%	20,8%	12,1%	11,4%	11,5%	8,3%	5,6%	4,6%	4,6%	1,8%	0,1%	0,4%
	3	14,0%	19,5%	9,5%	11,2%	9,6%	9,5%	5,0%	9,2%	6,6%	3,8%	1,0%	1,0%
	1 to 3	45,9%	66,3%	29,1%	34,4%	38,3%	23,3%	18,8%	16,7%	14,9%	6,6%	4,1%	--
Malta 164	1	12,2%	12,8%	8,5%	15,9%	17,1%	14,0%	14,6%	1,2%	2,4%	1,2%	0,0%	0,0%
	2	18,3%	11,6%	12,2%	15,9%	9,8%	9,1%	6,1%	3,7%	1,8%	3,7%	0,0%	7,9%
	3	10,4%	12,2%	17,7%	13,4%	7,3%	9,1%	2,4%	6,7%	6,1%	3,7%	0,0%	11,0%
	1 to 3	40,9%	36,6%	38,4%	45,1%	34,1%	32,3%	23,2%	11,6%	10,4%	8,5%	0,0%	--
Medes 96	1	21,9%	27,1%	9,4%	6,3%	4,2%	0,0%	11,5%	6,3%	0,0%	7,3%	6,3%	0,0%
	2	32,3%	24,0%	16,7%	0,0%	9,4%	3,1%	3,1%	3,1%	0,0%	8,3%	0,0%	0,0%
	3	17,7%	0,0%	22,9%	18,8%	7,3%	6,3%	3,1%	10,4%	0,0%	3,1%	4,2%	6,3%
	1 to 3	71,9%	51,0%	49,0%	25,0%	20,8%	9,4%	17,7%	19,8%	0,0%	18,8%	10,4%	--
Monte da Guia 53	1	26,4%	18,9%	20,8%	15,1%	11,3%	1,9%	3,8%	1,9%	0,0%	0,0%	0,0%	0,0%
	2	30,2%	9,4%	7,5%	34,0%	9,4%	3,8%	0,0%	1,9%	3,8%	0,0%	0,0%	0,0%
	3	18,9%	13,2%	9,4%	22,6%	15,1%	5,7%	1,9%	3,8%	3,8%	5,7%	0,0%	0,0%
	1 to 3	75,5%	41,5%	37,7%	71,7%	35,8%	11,3%	5,7%	7,5%	7,5%	5,7%	0,0%	--
La Restinga 156	1	17,3%	7,1%	31,4%	20,5%	8,3%	1,3%	3,2%	5,1%	2,6%	1,9%	1,3%	0,0%
	2	23,7%	15,4%	12,2%	10,9%	17,9%	5,1%	3,8%	2,6%	3,8%	2,6%	0,0%	1,9%
	3	14,1%	18,6%	21,8%	15,4%	7,1%	6,4%	7,1%	3,2%	1,9%	1,3%	1,3%	1,9%
	1 to 3	55,1%	41,0%	65,4%	46,8%	33,3%	12,8%	14,1%	10,9%	8,3%	5,8%	2,6%	--
Sinis 32	1	6,3%	12,5%	21,9%	12,5%	21,9%	3,1%	12,5%	0,0%	3,1%	0,0%	6,3%	0,0%
	2	15,6%	31,3%	18,8%	18,8%	6,3%	3,1%	0,0%	3,1%	0,0%	3,1%	0,0%	0,0%
	3	21,9%	12,5%	9,4%	12,5%	9,4%	21,9%	3,1%	3,1%	0,0%	6,3%	0,0%	0,0%
	1 to 3	43,8%	56,3%	50,0%	43,8%	37,5%	28,1%	15,6%	6,3%	3,1%	9,4%	6,3%	--

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

A5. Scuba divers choice criteria of a diving site: ranking according to importance (3/3)

MPA and sample size	Ranking	Criteria											No answer
		Abundance of fish	Underwater scenery	Spectacular species	Water clarity	Weather condition	Ship-wreck	Safety	Few divers	Accessibility	Few other activities	Other	
Tabarca 37	1	16,2%	10,8%	16,2%	13,5%	8,1%	8,1%	13,5%	5,4%	8,1%	0,0%	0,0%	0,0%
	2	18,9%	8,1%	18,9%	18,9%	10,8%	8,1%	0,0%	8,1%	8,1%	0,0%	0,0%	0,0%
	3	8,1%	18,9%	8,1%	10,8%	13,5%	13,5%	16,2%	2,7%	2,7%	2,7%	0,0%	2,7%
	1 to 3	43,2%	37,8%	43,2%	43,2%	32,4%	29,7%	29,7%	16,2%	18,9%	2,7%	0,0%	--
Tuscany 62	1	21,0%	4,8%	14,5%	22,6%	9,7%	9,7%	3,2%	6,5%	3,2%	3,2%	1,6%	0,0%
	2	25,8%	17,7%	8,1%	12,9%	3,2%	6,5%	9,7%	6,5%	4,8%	3,2%	0,0%	1,6%
	3	12,9%	11,3%	14,5%	11,3%	4,8%	9,7%	6,5%	6,5%	9,7%	9,7%	0,0%	3,2%
	1 to 3	59,7%	33,9%	37,1%	46,8%	17,7%	25,8%	19,4%	19,4%	17,7%	16,1%	1,6%	--

Source: EMPAFISH Scuba diving survey 2005-2006 (divers)

A6. Scuba diving operators choice criteria of a diving site: ranking according to importance (1/1)

Sample size	Ranking	Criteria													No answer
		Safety	Abundance of fish	Weather conditions	Water clarity	Ship-wreck	Underwater scenery	Accessibility	Spectacular species	Few divers	Few other activities	Regulations	Experience	Other	
FULL SAMPLE 93	1	38,7%	9,7%	19,4%	11,8%	2,2%	4,3%	1,1%	1,1%	1,1%	1,1%	1,1%	0,0%	8,6%	0,0%
	2	14,0%	7,5%	21,5%	11,8%	6,5%	8,6%	10,8%	5,4%	1,1%	4,3%	0,0%	0,0%	7,5%	1,1%
	3	8,6%	17,2%	4,3%	9,7%	10,8%	12,9%	6,5%	5,4%	5,4%	5,4%	4,3%	4,3%	2,2%	3,2%
	4	4,3%	14,0%	6,5%	6,5%	20,4%	7,5%	2,2%	10,8%	10,8%	2,2%	1,1%	3,2%	2,2%	8,6%
	5	8,6%	17,2%	2,2%	6,5%	6,5%	8,6%	11,8%	7,5%	8,6%	2,2%	2,2%	1,1%	4,3%	12,9%
	1 to 5	74,2%	65,6%	53,8%	46,2%	46,2%	41,9%	32,3%	30,1%	26,9%	15,1%	8,6%	8,6%	24,7%	--

Source: EMPAFISH Scuba diving survey 2005-2006 (operators)

A7. Satisfaction criteria concerning a snorkelling dive (submarine trail visitors): ranking according to importance

MPA and sample size	Ranking	Criteria											No answer
		Abundance of fish	Water clarity	Underwater scenery	Presence of particular species	Few other activities	Weather conditions	Few visitors	Organisation	Accessibility	Knowledge of the ecosystem	Other	
FULL SAMPLE, 396	1	28,5%	12,9%	15,2%	10,4%	4,3%	5,8%	2,3%	11,4%	5,3%	4,0%	0,0%	0,0%
	2	21,0%	10,9%	15,9%	14,6%	6,6%	4,8%	7,1%	8,3%	5,6%	5,1%	0,3%	0,0%
	3	15,9%	14,9%	12,6%	11,1%	8,8%	8,1%	11,1%	6,6%	5,3%	5,3%	0,3%	0,0%
	4	8,3%	19,2%	9,8%	9,6%	13,4%	9,1%	9,8%	5,1%	7,8%	7,6%	0,3%	0,0%
	5	6,8%	9,1%	10,9%	9,3%	13,9%	12,6%	8,8%	6,3%	12,6%	6,3%	0,3%	3,0%
	1 to 5	80,6%	66,9%	64,4%	55,1%	47,0%	40,4%	39,1%	37,6%	36,6%	28,3%	1,0%	--
Banyuls, 145	1	26,9%	13,8%	27,6%	11,7%	1,4%	6,2%	1,4%	3,4%	6,2%	1,4%	0,0%	0,0%
	2	26,9%	9,7%	22,1%	19,3%	5,5%	6,2%	3,4%	4,1%	2,1%	0,0%	0,7%	0,0%
	3	16,6%	23,4%	11,7%	9,7%	5,5%	9,7%	11,7%	3,4%	4,1%	3,4%	0,7%	0,0%
	4	6,2%	22,8%	11,7%	11,0%	12,4%	12,4%	9,0%	2,1%	4,1%	8,3%	0,0%	0,0%
	5	4,1%	11,0%	9,0%	9,0%	13,1%	12,4%	10,3%	9,0%	15,9%	4,8%	0,0%	1,4%
	1 to 5	80,7%	80,7%	82,1%	60,7%	37,9%	46,9%	35,9%	22,1%	32,4%	17,9%	1,4%	--
Bonifacio, 17	1	5,9%	5,9%	5,9%	11,8%	0,0%	0,0%	5,9%	58,8%	5,9%	0,0%	0,0%	0,0%
	2	17,6%	11,8%	17,6%	5,9%	0,0%	0,0%	11,8%	11,8%	11,8%	11,8%	0,0%	0,0%
	3	17,6%	17,6%	11,8%	5,9%	17,6%	0,0%	5,9%	17,6%	0,0%	5,9%	0,0%	0,0%
	4	23,5%	5,9%	5,9%	11,8%	17,6%	0,0%	17,6%	5,9%	0,0%	11,8%	0,0%	0,0%
	5	11,8%	23,5%	11,8%	11,8%	5,9%	11,8%	5,9%	0,0%	5,9%	11,8%	0,0%	0,0%
	1 to 5	76,5%	64,7%	52,9%	47,1%	41,2%	11,8%	47,1%	94,1%	23,5%	41,2%	0,0%	--
Côte Bleue, 234	1	31,2%	12,8%	8,1%	9,4%	6,4%	6,0%	2,6%	12,8%	4,7%	6,0%	0,0%	0,0%
	2	17,5%	11,5%	12,0%	12,4%	7,7%	4,3%	9,0%	10,7%	7,3%	7,7%	0,0%	0,0%
	3	15,4%	9,4%	13,2%	12,4%	10,3%	7,7%	11,1%	7,7%	6,4%	6,4%	0,0%	0,0%
	4	8,5%	17,9%	9,0%	8,5%	13,7%	7,7%	9,8%	6,8%	10,7%	6,8%	0,4%	0,0%
	5	8,1%	6,8%	12,0%	9,4%	15,0%	12,8%	8,1%	5,1%	11,1%	6,8%	0,4%	4,3%
	1 to 5	80,8%	58,5%	54,3%	52,1%	53,0%	38,5%	40,6%	43,2%	40,2%	33,8%	0,9%	--

Source: EMPAFISH Snorkelling survey 2005-2006 (submarine trail visitors)

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