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## **Recreation user knowledge, support and engagement in French MPAs: are there reverse side-effects of the French soft regulation and management approach?**

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**1.0 Introduction**

This paper demonstrates the complexity of engaging with recreational users as a marine protected area (MPA) stakeholder group in a country where MPAs are a relatively recent concept superimposed on well-established and historically settled human uses. MPAs are generally considered an important tool for conservation of marine biodiversity, habitats and various ecosystem services, including those related to recreational use (Abecasis et al., 2013; Rees et al., 2015). According to Rees et al. (2015), research on MPA management has historically focussed on fisheries and biodiversity conservation related issues with less emphasis on social aspects. However, understanding the social aspects of MPAs is also important for effective management (Abecasis et al., 2013; Fiske, 1992; Rees et al., 2015). Understanding recreation values and use, as a significant aspect of MPAs, can contribute to more effective engagement of recreational users in the management process, more effective targeting of management strategies for different stakeholder groups, and efficient allocation of often limited management resources (Rees et al., 2015; Smallwood et al., 2012).

**1.1 Importance of understanding stakeholder views for effective MPA management**

Understanding and factoring in the views of local stakeholders is an important component of effective MPA management (Abecasis et al., 2013; Halkos & Matsiori, 2017 ; Hastings & Ryan, 2017). Hastings and Ryan (2017) and Voyer et al. (2013) observed that effective MPA management also requires the community to understand and support what is being protected and why. Community understanding is more likely to foster support for an MPA and its management practices (Abecasis et al., 2013; Halkos & Matsiori, 2017; Tonin & Lucaroni, 2017). That is, effective MPA management requires managers and stakeholders to have a mutually agreed understanding of the purpose and function of MPAs as a policy tool (Chuenpagdee et al., 2013; Stamieszkin, Wielgus, & Gerber, 2009). This approach is part of what is termed participatory governance (Gaventa, 2007; Parkins & Sinclair, 2014)

Mutual understanding may be a difficult goal as community and stakeholder views can differ regarding how MPAs should be managed and what they should achieve (Abecasis et al., 2013). For example, some authors found local community resistance to establishment and presence of MPAs owing to perceived impact on livelihoods (Salmona & Verardi, 2001; Voyer et al., 2013; Wood & Glasson, 2005). Other authors found that local communities and other stakeholders generally support MPAs as a means for effective management of resources and the associated benefits (Abecasis et al., 2013; Hastings & Ryan, 2017; Tonin & Lucaroni, 2017).

Stakeholders associated with marine and coastal recreation are an important consideration for MPA management (O'Mahony et al., 2009). As with the wider community, engagement with recreational stakeholder groups can be complex because their views are often diverse and even contradictory (Abecasis et al., 2013; Hughes Jones, & Phau, 2016). For example, Rees et al. (2015) noted similarities and differences in response to an MPA across different recreation types. Ahtiainen et al. (2013) and Stamieszkin et al. (2009) found that people who spent more leisure time in marine environments had a greater concern for the management of the particular marine area where they spent time. Rees et al. (2015) noted that understanding the importance of a given MPA for recreation groups facilitates more effective management.

51

52 Bennett and Dearden (2014) observed that stakeholder views of an MPA can also vary  
53 depending on MPA governance structures and management practices, where inclusive  
54 engagement (among other things) is likely to encourage support. In addition, Chuenpagdee et  
55 al. (2013) highlighted that stakeholder response to MPAs is a function of the pre-existing  
56 socio-political context of the area in which the MPA is established, the nature and extent of  
57 community involvement in establishment and the governance structure of the MPA once  
58 established. That is, while there are established ‘good practice’ engagement approaches  
59 regarding MPAs, effectiveness relies on the range of community priorities and concerns,  
60 regional socio-political context, the legacy of past management practices and decisions and  
61 influence of current management approaches in the region (Hughes, Jones, & Phau, 2016).  
62 That is, effective management requires a detailed understanding of the specific local context  
63 in which an MPA is established.

64

## 65 **1.2 MPAs in France**

66

67 The French government has traditionally focussed on its mainland territories, but has recently  
68 strengthened its political ambitions in the marine and coastal environment (Trouillet, 2014).  
69 As such, the MPA concept is a relative late comer to marine and coastal management in  
70 France (Deboudt et al., 2015). While legislative frameworks to manage specific pressures  
71 were introduced in the 1970’s (Deboudt et al., 2008), the French Marine Protected Areas  
72 Agency, along with the first Marine Natural Park was created decades later in 2006. The  
73 European Natura 2000 network of protected areas focused on threatened terrestrial species  
74 and habitats was created in 1992. It was expanded to include French marine and coastal areas  
75 in 2008. The European Union Marine Strategy Framework Directive was also adopted in the  
76 same year. Since establishment of the first Marine Park, the French Government set an  
77 objective to incorporate 20% of marine and coastal waters under French jurisdiction into  
78 MPAs by 2020 (AAMP, 2015).

79

80 Expansion of the natural protected areas network in France has coincided with an evolving  
81 management approach. An initial focus on nature conservation and landscape protection has  
82 expanded to consideration of socio-ecological systems. The systems approach highlighted the  
83 need to manage protected areas as a network within a geographical context to achieve long-  
84 term conservation goals and social equity (Mathevet & Godet, 2015; Mathevet et al., 2016).  
85 This broader approach has two main implications. Firstly, owing to this socio-economic  
86 context, French protected areas, including MPAs, have generally open public access and few  
87 regulations (Bouin, 2006; Meur-Ferec, 2007). That is why only 1.44% of French natural  
88 protected areas (marine and terrestrial areas together) are covered by the IUCN protected area  
89 categories I, II and III (IUCN France, 2017). Regulation is not entirely absent at a national  
90 scale but it mainly concerns specific small sites and restricted zones within protected areas  
91 (eg. National reserves, hearts of National parks, Biosphere reserves). Secondly, the French  
92 approach emphasises participatory management that seeks to integrate community needs with  
93 nature conservation through win-win solutions (Mathevet & Godet, 2015; Martin et al.,  
94 2017). A strong focus on social considerations means French MPA managers now act as  
95 mediators, using their authority to encourage engaging stakeholders in deliberative processes  
96 and formalizing collective decisions, mostly through local committees’ participation  
97 (Mounet, 2007). However, participatory management remains highly institutional and  
98 politicized as evidenced by the composition of various consultation committees (e.g. elected  
99 officials, state agencies, representatives of regional fishery, tourism industry, environmental  
100 protection associations, etc.). Consequently, the negotiation processes struggle to engage

101 “ordinary” citizens not aligned with formal and often partisan organizations (Julien La  
102 Bruyère, 2008). In the case of outdoor recreation, independent users represent the vast  
103 majority of recreational users (Thiery, 2013). Mounet et al. (2012) indicate that the formal  
104 institutionalization of outdoor recreation in the participatory process means that the  
105 traditional spokesperson and sport federations are not representative of the whole recreational  
106 user community. As a consequence, recreational users as a stakeholder group are difficult to  
107 approach and understand for public authorities (Mounet, 2007). The lack of recreation  
108 organization membership and the associated difficulties with engagement, exacerbates MPA  
109 managers’ negative perceptions that recreation use is a threat and is uncontrollable.

110

111 This paper presents findings from a study of recreational users associated with marine and  
112 coastal protected areas in France, with a focus on “non-organized” users. The study  
113 concentrated on non-extractive recreation and mainly physically active types as these were  
114 identified as significant users of the French MPAs. The study provides insights into the  
115 characteristics of different recreation stakeholders and their relationship with MPAs as a  
116 relatively recent phenomenon in France. To this end, we explore four main variables: the  
117 levels of recreational user knowledge about the MPAs, the willingness to engage with local  
118 management, the support for regulation and the importance of MPA as a place to practice  
119 their respective recreation activity. The aim of the paper is to highlight the implications of a  
120 soft MPA management approach in terms of recreational user knowledge and engagement  
121 with MPAs governed by a mandate for public participatory management.

122

## 123 **2.0 Method**

124

### 125 **2.1. Selected sites, activities and sampling regime**

126

127 A total of seven recreation activities were selected based on previous reports and informal  
128 discussions with French MPA managers (Maison, 2009) (Table 1). The selected activities  
129 (except scuba diving) are mostly conducted independently by users, rather than as part of an  
130 organized club activity. Little data exist on independent recreational uses that represents an  
131 important part of recreational practices in MPAs.

132

133 The study area included a total of ten local sites: two Marine Natural Parks and eight marine  
134 and coastal Natura 2000 sites (Figure 1). Each of the sites are ranked as IUCN categories IV  
135 and V, which means that their main objectives are to protect biodiversity as well as to foster  
136 sustainable management of natural resources (IUCN France, 2013). All of the selected sites  
137 are open to the public with no specific regulation for recreation activities. A multisite study  
138 enabled data to be gathered for a range of recreation activities and user types representing  
139 different sociocultural contexts and how this related to the perception of MPAs.

140

141 Figure 1

142

143 Survey data was gathered using a questionnaire administered on-site to French recreational  
144 users as a face-to-face interview in French language by trained research assistants between  
145 April and November in 2016. This sampling methodology was preferred because it enables  
146 higher response rates, compared to other sampling methods (such as online surveys or phone  
147 calls for example) (Berthier, 2010). It also enabled targeted sampling of respondents  
148 participating in specific recreation activities at a specific location based on field observations

149 rather than self-reported behaviour. Total data collection required 96 days in-field, distributed  
150 as evenly as possible according to seasons, school holidays and the days of the week, in an  
151 attempt to prevent potential overrepresentation of specific users (such as local people,  
152 tourists, students...).

153

154 A minimum sample size of 50 responses for each activity in each geographical area (i.e.  
155 Brittany or Mediterranean) was used as a nominal minimum sample size to enable valid  
156 comparative statistical analysis (Berthier, 2010). Because of the variety of the site  
157 characteristics and activity types within the MPAs, research assistants were free to move  
158 through each site to meet users. When there were few recreational users at a site (less than 20  
159 for the entire day), all people observed to be conducting one of the target activities were  
160 invited to participate in an interview. When the sites were crowded (e.g. some beaches or car  
161 parks), assistants were invited to interview the maximum of people on their way. This  
162 convenience sampling may not be strictly representative of the broader population from a  
163 statistical point of view but allows a good representation of the diversity of attitudes  
164 (Ghiglione & Matalon, 1978; De Singly, 2016). Surfers, kite-surfers, hikers, were  
165 interviewed on beaches, trails or car parks. Sailors, boaters and divers were interviewed on  
166 harbor pontoons or at dive centers located in close proximity to the practice sites. Due to the  
167 difficulty to question kayakers, half of them were interviewed directly in the field (ports,  
168 beaches) and the other half during two sports events organized in two different protected  
169 areas.

170 Research assistants read out the questions and then entered responses into the questionnaire.  
171 The questionnaire included 29 questions and the survey took approximately 12 minutes to  
172 complete.

173

## 174 **2.2. Questionnaire design**

175

176 Questions included basic demographics (age, sex, occupation, residential status) and  
177 information about the type of recreation activity they were practicing at the time of the  
178 survey. Occupation was categorized into ten groups according to the French system of  
179 classification, and residential status included three groups (Table 2). Questions relating to the  
180 MPA at each survey site included four dimensions: knowledge of MPA presence and local  
181 management, willingness to engage with local MPA management, personal support for more  
182 environmental regulation in MPAs and the importance of MPAs for practicing their particular  
183 recreational activity. The questionnaire included open and closed responses. Closed questions  
184 required a response using a 5 point rating scale (1 = totally disagree, 5 = totally agree) with a  
185 neutral mid-point (3) and an additional “don’t know” option.

186

### 187 **2.2.1 Knowledge of MPA presence and management**

188

189 Respondents were asked whether or not the area in which they were recreating at the time of  
190 the survey was under nature protection regulation with a choice of three responses: yes, no,  
191 and do not know. If the answer was ‘yes’ respondents were asked what types of regulation  
192 applied as an open question. The terminology of the open answers were standardized into  
193 regulation classes and sub-classes using grounded based theory (Glazer, 1992). The veracity  
194 of the standardized individual responses was verified according to the regulations that

195 actually applied to the area respondents were recreating in. Based on the results, respondents  
196 were classified according to 3 categories:

- 197 1) No knowledge about the MPA: included those respondents who answered ‘no’ or  
198 ‘don’t know’ to the question regarding whether the area was under environmental  
199 regulation.
- 200 2) Low level knowledge about the MPA: includes those respondents who answered  
201 ‘yes’ but did not know what type of regulation, provided an incorrect type for the  
202 area, referred to specific visible actions (e.g. local management actions, signs), or  
203 provided very general answers (e.g. coastal conservation, wildlife protection...).
- 204 3) Correct knowledge about the MPA: includes those who responded ‘yes and  
205 provided answers that were correct or partially correct. Answers were considered  
206 correct when they were consistent with the existing regulation status of the area  
207 where they conducted their recreation activity or areas close to where they  
208 practiced.  
209

## 210 **2.2.2 Declared importance to practice in a MPA**

211  
212 Respondents were asked to rate their response (on the 5 point rating scale) to the statement, ‘It  
213 is important for me to practice my activity in a MPA’. To help respondents, especially those  
214 who didn’t understand the term “MPA”, concrete French examples were given, such as  
215 “natural reserve”, “marine park” or “Natura 2000 site”.

## 216 **2.2.3 Personal acceptance of more regulation for environmental reasons**

217  
218 Respondents were asked to rate their response (on the 5 point rating scale) to the statement, ‘I  
219 would be ready to support more regulations focused on protecting MPA [they use for  
220 recreation], even if it limited the ability to access the area for recreation’.

## 222 **2.2.4 Willingness to engage with local MPA management**

223  
224 Respondents were asked to rate their response (on the 5 point rating scale) to the statement, ‘I  
225 am willing to get involved personally in managing my recreation practice area’ When asking  
226 the question, examples of types of engagement were provided by the interviewer (local  
227 meeting participation, contributions to decision making, involvement in management  
228 actions).  
229

## 230 **2.2.5 Statistical analysis**

231  
232 Statistical analyses were performed using R software (version 3.5.1). When the dependent  
233 variable included at least five ordinal responses (age, declared importance, personal  
234 acceptance and willingness), the non-parametric Kruskal–Wallis test was applied. For tests  
235 that were significant, we performed a post-hoc analyses to determine which levels of the  
236 independent variable differ from each other level. Pairwise multiple comparisons were  
237 conducted using the Dunn test and a Bonferroni correction for p-values adjustment (detailed  
238 results are included in appendix B). Relationships between pairs of qualitative variables were  
239 estimated using a chi-square statistical test. To further explore the underlying structure  
240 between groups of variables, multivariate analysis were performed using the package  
241 FactoMineR (Lê, S., Josse, J. & Husson, F., 2008). Results from correspondence analysis  
242 (CA) on contingency tables were projected on two-dimensional scatter plots of the first and



243 second principal components (only the CA graphs which concerned the recreation types are  
244 presented in this paper). To explore the demographic profile between geographic regions of  
245 respondents, Multiple Correspondence Analysis (MCA) for each recreational activity was  
246 applied. The geographic region was used as the supplementary variable and remaining  
247 variables as active variables.

248

### 249 **3.0 Results**

250

251 An approximate total of 1166 people were invited to participate and 1000 questionnaires  
252 were completed (85.7% response rate<sup>1</sup>). This included 586 responses in Brittany and 414  
253 responses in the Mediterranean across the seven targeted recreation activities (Table 1).  
254 Kayaking and surfing responses are absent from the Mediterranean region. Surfing is not  
255 commonly practiced in this region while kayakers were few and difficult to sample.

256

257 Table 1

258

#### 259 **3.1 Recreation types and demographics**

260

261 For the total sample of 1000 respondents, most were male (74%) and lived locally in the area  
262 where they were surveyed (55.2%) or owned a holiday home in the area (10.6%) (Table 2).  
263 About one third were visiting the area as tourists (34.2%). For each respective region  
264 (Mediterranean and Brittany), there was a similar pattern of demographic distribution across  
265 respondents.

266

267 Table 2

268

269 Recreational activities were significantly associated with all demographic variables: sex, age,  
270 profession and place of residence. Males were dominant in each category except in hiking  
271 where 56.5% were females ( $\chi^2 = 157.06$ .  $df = 6$ .  $p < 0.0001$ ). A higher proportion of males was  
272 associated with boating (91.0%) kite surfing (89.2%) and sailing (86.7%). Regarding the  
273 significant association with age, boating, sailing and hiking were practiced by older age  
274 groups while surfing and kitesurfing were associated with younger age groups (Kruskal-  
275 Wallis  $H = 363.83$ .  $df = 30$ .  $p < 0.0001$ ). The significant relationship between recreational  
276 activities and professional occupation ( $\chi^2 = 349.21$ .  $df = 48$ .  $p < 0.0001$ ) generally reflected the  
277 respective age profile of activities. Activities including boating and sailing were mainly  
278 associated with retirees (older age groups) and surfing was mainly associated with students  
279 (younger age groups). However, kitesurfing was associated with a broad range of  
280 occupations. Finally, boating and sailing respondents were mostly local residents while hikers  
281 and scuba divers were mainly tourists ( $\chi^2 = 274.96$ .  $df = 12$ .  $p < 0.0001$ ).

282

#### 283 **3.2. MPA management dimensions**

284

285 Descriptive statistics and statistical association results relating to the four dimensions of  
286 MPAs measured are presented in Appendix A and Table 3. Results from Table 3 are  
287 described in turn.

288

289 Table 3

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<sup>1</sup> This response rate (85,7%) is based on 35 days in-field data.

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Figure 2

### **3.2.1. Knowledge of MPA presence and management**

About half of all respondents (48.7%) demonstrated "correct" knowledge regarding the MPA they used. However, many had incomplete knowledge (32.2%) or no knowledge (19.1%) about the MPA. Knowledge of MPA presence and management was significantly associated with all demographic variables (Table 3). A higher proportion of respondents with "correct" knowledge were male compared to respondents with incomplete or no knowledge. Older respondents tended to be more knowledgeable than younger respondents, while tourists tended to have the lowest knowledge when compared with residents and secondary residents. The projection into the two first principal components from Correspondence Analysis shows that scuba divers (67.5% correct knowledge), sailors (65.7) and boaters (62.8%) tended to have better knowledge of the MPAs than other activity types (Figure 2a). Conversely, kayakers (35.1% correct knowledge) and kite surfers (40.9% correct knowledge) were less likely to be knowledgeable about MPAs in the area they practiced their activity.

### **3.2.2. Declared importance to practice in a MPA**

About half of all respondents (54.7%) either totally agreed or agreed with the idea that it was important for them to practice their activity in a MPA. 13.4% had a neutral point of view. About one-third (31.9%) disagreed or totally disagreed. Results indicated strong statistical relations between respondents' declared importance to practice their recreation in an MPA and the type of recreation activity (Table 3). Declared importance was significantly associated with two demographic variables: sex ( $H=5,77$ .  $df=1$ .  $p=0.0163$ ) and occupation ( $H=18.18$ .  $df=8$ .  $p=0.0199$ ). Correspondence analysis shows that practicing their recreation activity in an MPA was considered more important for scuba divers and boaters and less important for sailors and kite surfers (Figure 2b). MPAs were of higher importance to females and retirees.

### **3.2.3. Personal support for more MPA environmental regulation**

Most respondents (63%) agreed or totally agreed with the notion of additional environmental regulations for MPAs. 16.9% had a medium point of view and 20.1% totally disagreed or disagreed. The personal support for more MPA regulation for environmental reasons appears to be strongly associated with all variables (Table 3). Females (79.8% agree or totally agree) were more supportive than males (57.1 %). Students (69.2% agree or totally agree) were more supportive of more regulation while retirees were the less supportive (54%). Tourist respondents were more supportive (66.9% agree or totally agree) than locals (58.5%). Younger respondents (65,4% agree or totally agree) were more supportive than older respondents (55,4%). Correspondence analysis shows that Hikers (83.7% agree or totally agree) and scuba divers (71.2%) tended to be more supportive than sailors and boaters while kite surfers tended to be neutral (Figure 2c).

### **3.2.4. Willingness to engage in local MPA management:**

340 Just under half of respondents (46.6%) agreed or totally agreed with a willingness to engage  
341 in local MPA management. 16.4% were neutral, while. 37% totally disagreed or disagreed.  
342 Our results showed that the willingness to engage was strongly significantly associated with  
343 recreation activity type ( $H=31.294$ ,  $df=6$ ;  $p<0.0001$ ) (Table 3). Correspondence analysis  
344 highlights the contrast between scuba divers (25% agree) and surfers (23% agree) compared  
345 to boaters (55.3% disagree) and hikers (45.9% disagree) in their interest to engage in local  
346 MPA management (Figure 2d). Results also show that variables with a high score of  
347 willingness (scores 4 and 5), located in the centre of the CA graph, are not linked with any  
348 specific activity.

349

## 350 **4.0 Discussion**

351

352 This study aimed to understand recreational users' relationships with MPAs and management  
353 through the exploration of four relationship dimensions of knowledge, willingness to engage,  
354 support for regulation and importance of MPAs to recreation practice between recreation  
355 activities and French MPAs. France promotes participatory MPA management. Hence there  
356 is a requirement to consider the views of recreational users as an important MPA stakeholder  
357 group, among other stakeholders. The results of this study highlight the current limits of a  
358 participatory governance approach to MPA management which in France is strongly  
359 influenced by few regulations for public access.

360

### 361 **4.1 Recreation types and demographics**

362

363 Our results (table 2) are consistent with the main characteristics of French outdoor activities  
364 as described in the national literature, in terms of gender, demographics and general practice.

365

366 In our study, the respondents are predominantly men (74%). This proportion is higher than  
367 that observed in other French studies (60% in CNAPS, 2002 ; 46.1% in Evrard, 2014 ; 47.6%  
368 in Lefèvre, 2016) but can be explained by the specific activities selected in the sample.  
369 Thiery (2013) confirms that nautical activities in France are mostly dominated by men (76%).  
370 This is especially the case for activities such as boating, sailing, and kite-surfing (Bernard,  
371 2016; Le Corre, 2013; Perras et al., 2015) even if there appears to be an increased proportion  
372 of women for some other sports (eg. hiking, kayaking) (Evrard, 2014; Lefèvre, 2016; Lefèvre  
373 et Thiery, 2010; Thiery, 2013). Thierry (2013) notes that terrestrial activities are the most  
374 feminized activities in France. This gender effect is well known in the French literature  
375 (Evrard, 2014) and tends to accentuate when users get older (INJEP, 2017). The French  
376 literature explains this gender imbalance in terms of the constraints created by combined  
377 responsibilities of the family and the professional life of women and consequently, their  
378 limited time for outdoor recreation.

379

380 Results globally highlight an over-representation of users from higher professional categories  
381 (33% of higher-level professions<sup>2</sup>), with regards to the distribution of the French population  
382 (24.4%, French National Institute for Statistics and Economic Research,  
383 <https://www.insee.fr/fr/accueil>). This result is consistent with previous national research that  
384 points at the social and economic discrimination in nature-based recreation access, equipment  
385 and site of practice in the French population (Lefèvre, 2016; Lefèvre et Thiery, 2010, 2011;

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2 We consider here the higher-level professions as the category which covers “Artisans, merchants, company directors” and “Higher education and the liberal profession” (Table 2)

386 Muller, 2006), especially in nautical activities (Bernard, 2016 ; Evrard, 2014; Michot, 2005 ;  
387 Muller, 2006).

388

389 Age is also a strong discriminant variable because of the combined effects of the physical  
390 demands (eg. surfing and kite-surfing are physically demanding activities that favour young  
391 people compared with sailing, boating, hiking), the purchasing power effect (young people  
392 are more attracted by cheaper activities compared to older people), the longevity of the  
393 activities (eg. kite-surfing appeared in the 1990's and it was less attractive for older people in  
394 2016), the culture and the social habits associated with some activities in terms of the  
395 traditional opposition between conformism (eg: sailing, boating, diving, kayaking, hiking)  
396 and hedonism/transgression (eg. surfing, kitesurfing) (Jallat, 2018 ; Michot, 2005; Pociello,  
397 1995 ; Robène et Jorand, 2018).

398

399 The residence status relationship with recreation activities is influenced by requirements to  
400 practice the activity. Activities with a strong territorial dependence (eg. sailing and boating  
401 both require a home port) naturally tend to be associated with the local population in France.  
402 Conversely, activities which require little equipment and promote geographical roaming tend  
403 to be associated with the tourist population. This is particularly the case for hiking which is  
404 an important way for tourists to experience regions like Brittany and the Mediterranean.

405

#### 406 **4.2 Knowledge of MPA and management**

407

408 Abecasis et al. (2013) emphasized that good stakeholder knowledge of MPAs is an important  
409 part of community engagement and effective management. French MPAs appear to have low  
410 visibility for many recreational users. One third of people knew the site where they recreated  
411 was under environmental protection but do not know much about its boundaries or its specific  
412 regulations. One fifth of people simply did not know about the existence of the MPA at all.

413

414 Our results show that better informed recreational users were those involved in activities  
415 requiring formal training and those with long-term experience of the local context. The  
416 formal training required for scuba diving includes knowledge of local regulations (Le Carrer,  
417 2017). This training may explain the higher level of scuba diver knowledge about MPAs  
418 compared to other activities without training requirements. Boaters and sailors were mostly  
419 older or retired local residents who have been practicing in the same area for several decades.  
420 Moreover, they tend to be members of local community organizations, and are more likely to  
421 be involved in local authorities (Bernard, 2016, Evrard, 2014). A tradition of local use and  
422 involvement may lead them to be better informed about the MPAs (Ahtiainen et al., 2013;  
423 Stamieszkin, Wielgus, & Gerber, 2009). Conversely, hiking, kayaking and kite surfing have  
424 no formal training requirement and involve younger or non-local participants, and hence  
425 these types of recreational users tended to have a low level of MPA knowledge.

426

427 The minimal MPA regulatory approach in France intended to minimise public resistance and  
428 promote equity of access could create alternative issues resulting from poor recreational user  
429 knowledge about the management objectives (particularly conservation objectives),  
430 especially amongst those without a long tradition of use. Lack of knowledge could lead to  
431 difficulties with community support for, and engagement in, MPA management (Hastings &  
432 Ryan, 2017; Voyer et al., 2013).

433

#### 434 **4.3 Importance of MPAs for recreation: the influence of perceived benefits**

435  
436 The generally low perceived importance of French MPAs as a place for practice recreational  
437 activities may relate to minimal regulations. The level of stakeholder concern in relation to  
438 MPAs has been linked to perceived positive or negative impacts on stakeholders' lives and  
439 livelihoods (Abecasis et al., 2013; Salmona & Verardi, 2001; Voyer et al., 2013). The results  
440 of this study indicate that minimal regulation means the presence or absence of MPAs in  
441 France make little difference to recreational users. The minimal MPA regulation is associated  
442 with the absence of an onsite management presence and promoting open, access for all. This  
443 approach means that managers must ensure effective management of the MPAs while  
444 minimizing evidence of any management intervention (Mounet, 2007). Consequently, some  
445 types of recreational users have a low level of knowledge and are less likely to connect the  
446 location with conservation actions and access restrictions often associated with protected  
447 areas.

448  
449 A significant positive response to the importance of MPAs for recreation can be observed for  
450 recreation activities that may receive clearly identifiable benefits, such as for scuba divers  
451 and boaters. The dive related finding aligns with that of Rees et al. (2015) who found  
452 increased dive charter activity linked to the establishment of an MPA in the UK. The French  
453 MPAs are associated with important or unique marine habitat, and hence, better quality dive  
454 experiences. Many of the surveyed boaters also practiced fishing and hence, MPAs may be  
455 considered favourably as they are generally associated with marine habitat that support fish  
456 populations (Rees et al., 2015). So it is perhaps not the French MPAs themselves that are  
457 important, given they are soft management instruments with little influence on access, but the  
458 locations the MPAs are associated with that are important.

#### 460 **4.4 Support for more MPA regulation**

461  
462 In this study, most respondents (63%) supported the introduction of additional MPA  
463 regulations to some degree. These results seem to be a positive indicator of concern for the  
464 preservation of the marine and coastal environment. This finding appears to counter the  
465 concerns of French MPA managers that recreational users are a general threat to conservation  
466 objectives (Maison, 2009). However, the finding seems to contradict a study by Mounet  
467 (2007) who noted that outdoor recreational users generally perceived environmental  
468 protection as a constraint that limited access to desirable sites. Resistance to increased  
469 management of recreation access to protected areas has been noted by other studies (Hughes,  
470 Jones, & Phau, 2016; Hughes, Tye and Chandler, 2016; Wood & Glasson, 2005). Soft  
471 regulation is generally accepted by recreational users because it is less likely to infringe on  
472 public use. However, if managers identify a proven or assumed impact, stronger regulation  
473 proposals often face user opposition and potential conflict with managers. Results from this  
474 study come from a context in which there were generally little or no contentious issues  
475 associated with the MPAs.

476  
477 It is possible that if there were stronger concerns and tension related to MPA access, support  
478 for additional regulation would be lower. Additional regulations that may hinder this tradition  
479 of use. For example, Bennett and Dearden (2014) found that local communities in Thailand  
480 considered that MPAs limited access to much needed resources to maintain livelihoods.  
481 Similar findings were also identified in American Samoa (Fiske, 1992), Italy (Salmona  
482 & Verardi, 2001) and Australia (Voyer et al., 2013; Wood & Glasson, 2005). From a slightly  
483 different perspective, Abecasis et al. (2013) found that communities in the Azores were  
484 unlikely to support MPAs. Rather they were likely to ignore MPA restrictions on resource

485 extraction as the communities considered their exploitation of marine resource to be  
486 sustainable, despite evidence to the contrary. Along these lines, the results of this study  
487 indicate that recreation activities associated with older people and a long tradition of use by  
488 locals (sailing and boating) were less likely to support increased regulation. In contrast, the  
489 findings of this study indicate that tourists (non-locals) were more supportive than local  
490 residents regarding additional regulations for French MPAs. Tourist and non-resident support  
491 may relate to perceptions of MPAs being associated with enhanced benefits. That is,  
492 stakeholders generally support MPAs when they are seen to be an effective means for  
493 management of a resource from which the stakeholders can then benefit (Abecasis et al.,  
494 2013; Hastings & Ryan, 2017; Tonin & Lucaroni, 2017). Tourists or nonlocal recreational  
495 users are thus likely to support more regulation because they would not have the constraints  
496 of regulation on their day to day lives and could take advantage of tourism related benefits  
497 associated with improved nature conservation.

498

#### 499 **4.5 Involvement in MPA management**

500

501 Respondents were moderately willing to be involved in the MPA management process. The  
502 moderate interest is likely a product of a lack of knowledge, generally low importance of  
503 MPAs for access and practicing recreation which ultimately rests on the soft regulatory  
504 approach associated with French MPAs. This presents a significant challenge given some  
505 scholars note that effective MPA management requires active involvement of key  
506 stakeholders (Abecasis et al., 2013; Halkos & Matsiori, 2017; Hastings & Ryan, 2017). The  
507 lack of strong interest for involvement by recreational users as a key stakeholder group thus  
508 presents a significant challenge for French MPA managers for whom recreation is a priority  
509 issue (Maison, 2009). A further complication is the lack of organized representation of MPA  
510 recreational users, where most recreational users are independent of formal clubs and  
511 associations. A lack of organized group membership means recreation activity spokespersons  
512 are often few and sometimes not very representative of the broader views. Mounet (2007)  
513 notes that methods for effective participative management involving self-organized  
514 recreational users still require development. Indeed, the current approach to MPA  
515 management in France is designed to cater for engagement of formal organization  
516 representatives who can make collective decisions about MPA use and is not designed to  
517 engage independent users (Folco & Germain, 2015). Given that most recreational users of  
518 MPAs are independent of formal organizations and do not have a strong interest in  
519 engagement, this presents a significant challenge to the requirement of participatory  
520 management in France.

521

#### 522 **4.5 Limitations**

523

524 Despite the precautions taken to limit methodological bias, it is important to recognize some  
525 limitations of this research. Firstly, in terms of the sampling method, although research  
526 assistants were trained to interview people without a social or physical discrimination, the  
527 sampling protocol was opportunistic with no standardized approach for selecting participants.  
528 This was due to the characteristics of some sites which were mainly open (eg. beaches, car  
529 parks). This raises the potential for bias in the sample that could not be quantified in the  
530 absence of previous local baseline surveys. However, the demographic profile of the sample  
531 in this study is consistent with national French literature. Secondly, demographics results  
532 indicate that the target recreational activities, were generally part of the same category of  
533 French society, that is a social category with a relatively high level of education and  
534 subsequently were likely to be informed and concerned about the natural environment. It

535 would be interesting for future research to include other more heterogeneous recreational uses  
536 (eg beach activities, harvesting activities, etc.) to gain insight into the perspectives about  
537 MPAs of a broader cross section of people access MPAs for recreation. Thirdly, we  
538 intentionally selected our study sites based on geographic location and protected area status  
539 (Brittany and Mediterranean; Natural park and Natura 2000). However, our sites had no or  
540 few conflicts involving the recreation activities included in the research. It is very likely that  
541 inclusion of activities or sites with conflicts regarding access to sites or resources may have  
542 resulted in different patterns of response (eg. possible enhanced knowledge about the MPAs,  
543 willingness to engage with local management, less support for more regulation). Finally, it is  
544 possible that the effects of social desirability may skew the results especially related to  
545 regulatory issues (Berthier, 2010). This effect could have overestimated some results (eg.  
546 interest of practicing in a protected marine area, personal acceptance of more regulation, the  
547 willingness to engage in management). This suggests that the generally low level of interest  
548 in engagement with MPAs in this study may be lower than our study indicates.  
549

## 550 **5.0 Conclusion**

551  
552 This paper presented the findings of a French recreational user survey regarding knowledge  
553 of MPAs, the importance of MPAs to their recreation activity, and support for additional  
554 regulation and engagement associated with French MPAs. It seems that soft regulation of  
555 French MPAs to avoid impinging on recreation access and public liberties is associated with  
556 an overall low visibility and recreational user disinterest and disengagement regarding MPAs.  
557

558 Could it thus be concluded that there is a need for more regulation, despite concerns about  
559 impinging on liberties in French MPAs? Past examples involving stronger regulatory  
560 management based, in part, on the exclusion of humans from protected areas, were not  
561 supported by local people and also failed to meet the management objectives (Mathevet &  
562 Godet, 2015, Mounet, 2007; Folco & Germain, 2015). At the other extreme, soft regulation  
563 appears to propagate a lack of recreational user knowledge, support and willingness for  
564 engagement with MPAs. Between these two extremes, Mathevet and Godet (2015) suggest a  
565 hybrid approach balancing top down regulation with bottom-up community engagement.  
566 However, while stronger regulation and community engagement could increase the visibility  
567 of French MPAs, dealing with the complexity of independent recreational users, overlaid  
568 with a tradition of freedom of access presents significant challenges for MPA managers.  
569

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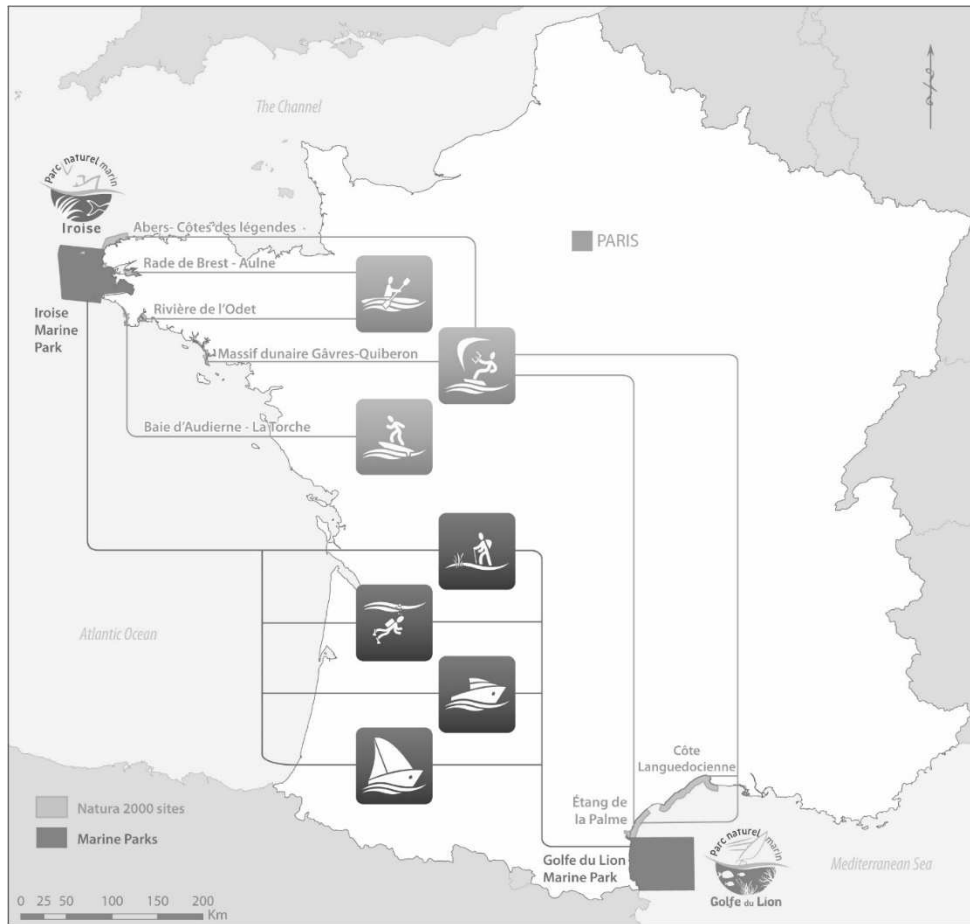
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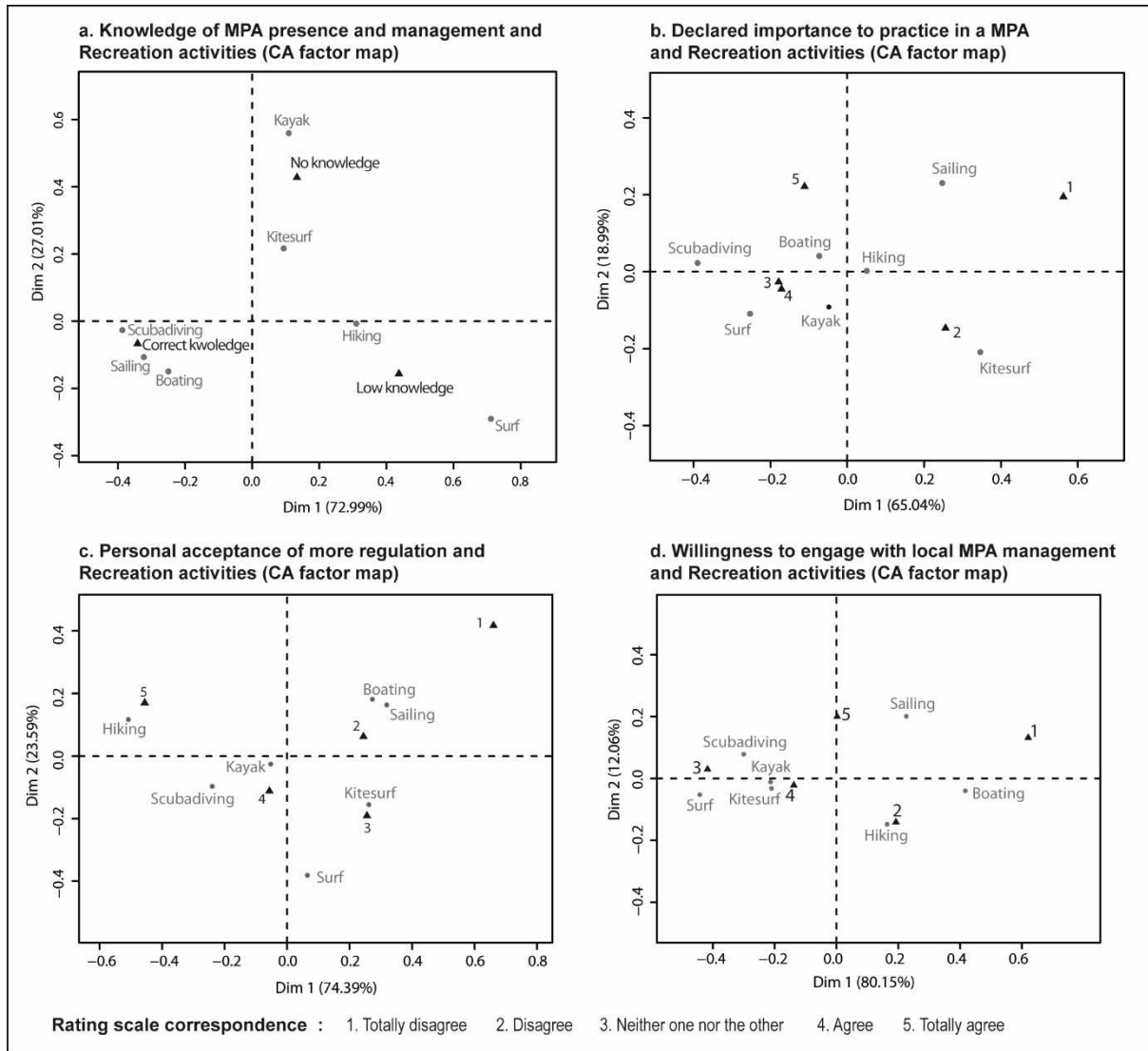
748

749 Conflicts of interest: none

750



No color is required for Figure 1 (black and white printing).



No color is required for Figure 2 (black and white printing).

Recreation Activity	Brittany		Mediterranean		Total
	Marine Natural Parks	Natura 2000 sites	Marine Natural Parks	Natura 2000 sites	
Hiking	101	-	93	-	194
Boating	82	-	74	-	156
Sailing	80	-	86	-	166
Scuba diving	77	-	81	-	158
Kite surfing	-	69	-	80	149
Kayaking	-	78	-	-	78
Surfing	-	99	-	-	99
Sub-total	586		414		
<b>Total</b>	1000				

No color is required for Table 1 (black and white printing).

	Hiking n=194	Surf n=99	Scuba diving n=158	Sailing n=166	Boating n=156	Kitesurf n=149	Kayak n=78	Total Sample N=1000	Total %*
<b>Gender:</b>									
- Male	83	77	112	144	142	132	47	737	74
- Female	108	22	46	22	14	16	31	259	26
- No response	3	0	0	0	0	1	0	4	-
<b>Age:</b>									
- Under 15 years	0	3	2	0	0	2	0	7	0.7
- 15-29 years	21	44	38	9	6	45	14	177	17.9
- 30-44 years	34	44	46	20	19	58	23	244	24.6
- 45-59 years	75	7	50	49	40	32	34	287	29.0
- 60-74 years	57	1	21	78	78	11	6	252	25.4
- More than 75 years	2	0	0	10	12	0	0	24	2.4
- No response	5	0	1	0	1	1	1	9	-
<b>Occupation:</b>									
- Farmers	0	0	1	1	3	0	0	5	0.5
- Artisans, merchants, company directors	5	10	10	12	18	14	4	73	7.4
- Higher education and the liberal professions	47	24	59	38	16	52	19	255	25.7
- Intermediate professions	34	11	17	13	5	20	15	115	11.6
- Employees	32	14	24	9	22	25	13	139	14.0
- Workers	4	4	1	2	6	3	4	24	2.4
- Retirees	57	0	13	82	82	10	9	253	25.5
- Students	10	24	19	1	1	7	5	67	6.7
- Schoolboys	0	5	12	1	1	3	6	28	2.8
- Others	4	6	2	6	2	12	2	34	3.4
- No response	1	1	0	1	0	3	1	7	-
<b>Residential status:</b>									
- Locals	50	59	51	125	119	100	44	548	55.2
- Tourists	127	34	11	10	7	38	31	339	34.2
- Secondary resident	17	6	92	31	30	8	2	105	10.6
- Non-response	0	0	4	0	0	3	1	8	-
<b>Region of practice:</b>									
- Brittany	101	99	77	80	82	69	78	586	58,6
- Mediterranean	93	0	81	86	74	80	0	414	41,4

\*The total (%) was calculated without the "no response" numbers.

No color is required for Table 2 (black and white printing).

	Knowledge of MPA		Declared importance to practice in a MPA		Personal acceptance of more regulation		Willing to engage in MPA management	
	Chi-square $\chi^2$ (df)	P-value	Kruskal-Wallis H (df)	P-value	Kruskal-Wallis H (df)	P-value	Kruskal-Wallis H(df)	P-value
<b>Recreation types</b>	166.23 (12)	<0.0001	42.58 (6)	<0.0001	91.60 (6)	<0.0001	31.294 (6)	<0.0001
<b>Sex</b>	22.12 (2)	<0.0001	5.77 (1)	0.0163	50.45 (1)	<0.0001	0.00 (1)	0.9816
<b>Age</b>	36.45 (15)	0.0015	5.73 (5)	0.3329	13.97 (5)	0.0158	11.20 (5)	0.0475
<b>Occupation</b>	27.97 (16)	0.0319	18.18 (8)	0.0199	38.34 (8)	<0.0001	11.97 (8)	0.1523
<b>Residential status</b>	15.32 (4)	0.0040	6.20 (2)	0.0451	20.11 (2)	<0.0001	0.80 (2)	0.6689

No color is required for Table 3 (black and white printing).