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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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2
3 **1.0 Introduction**
4

5 This paper demonstrates the complexity of engaging with recreational users as a marine
6 protected area (MPA) stakeholder group in a country where MPAs are a relatively recent
7 concept superimposed on well-established and historically settled human uses. MPAs are
8 generally considered an important tool for conservation of marine biodiversity, habitats and
9 various ecosystem services, including those related to recreational use (Abecasis et al., 2013;
10 Rees et al., 2015). According to Rees et al. (2015), research on MPA management has
11 historically focussed on fisheries and biodiversity conservation related issues with less
12 emphasis on social aspects. However, understanding the social aspects of MPAs is also
13 important for effective management (Abecasis et al., 2013; Fiske, 1992; Rees et al., 2015).
14 Understanding recreation values and use, as a significant aspect of MPAs, can contribute to
15 more effective engagement of recreational users in the management process, more effective
16 targeting of management strategies for different stakeholder groups, and efficient allocation
17 of often limited management resources (Rees et al., 2015; Smallwood et al., 2012).
18

19 **1.1 Importance of understanding stakeholder views for effective MPA management**
20

21 Understanding and factoring in the views of local stakeholders is an important component of
22 effective MPA management (Abecasis et al., 2013; Halkos & Matsiori, 2017 ; Hastings &
23 Ryan, 2017). Hastings and Ryan (2017) and Voyer et al. (2013) observed that effective MPA
24 management also requires the community to understand and support what is being protected
25 and why. Community understanding is more likely to foster support for an MPA and its
26 management practices (Abecasis et al., 2013; Halkos & Matsiori, 2017; Tonin & Lucaroni,
27 2017). That is, effective MPA management requires managers and stakeholders to have a
28 mutually agreed understanding of the purpose and function of MPAs as a policy tool
29 (Chuenpagdee et al., 2013; Stamieszkin, Wielgus, & Gerber, 2009). This approach is part of
30 what is termed participatory governance (Gaventa, 2007; Parkins & Sinclair, 2014)
31

32 Mutual understanding may be a difficult goal as community and stakeholder views can differ
33 regarding how MPAs should be managed and what they should achieve (Abecasis et al.,
34 2013). For example, some authors found local community resistance to establishment and
35 presence of MPAs owing to perceived impact on livelihoods (Salmona & Verardi, 2001;
36 Voyer et al., 2013; Wood & Glasson, 2005). Other authors found that local communities and
37 other stakeholders generally support MPAs as a means for effective management of resources
38 and the associated benefits (Abecasis et al., 2013; Hastings & Ryan, 2017; Tonin & Lucaroni,
39 2017).
40

41 Stakeholders associated with marine and coastal recreation are an important consideration for
42 MPA management (O’Mahony et al., 2009). As with the wider community, engagement with
43 recreational stakeholder groups can be complex because their views are often diverse and
44 even contradictory (Abecasis et al., 2013; Hughes Jones, & Phau, 2016). For example, Rees
45 et al. (2015) noted similarities and differences in response to an MPA across different
46 recreation types. Ahtiainen et al. (2013) and Stamieszkin et al. (2009) found that people who
47 spent more leisure time in marine environments had a greater concern for the management of
48 the particular marine area where they spent time. Rees et al. (2015) noted that understanding
49 the importance of a given MPA for recreation groups facilitates more effective management.
50

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’.

221 222 **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 rate¹). 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

¹ 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 professions²), 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;

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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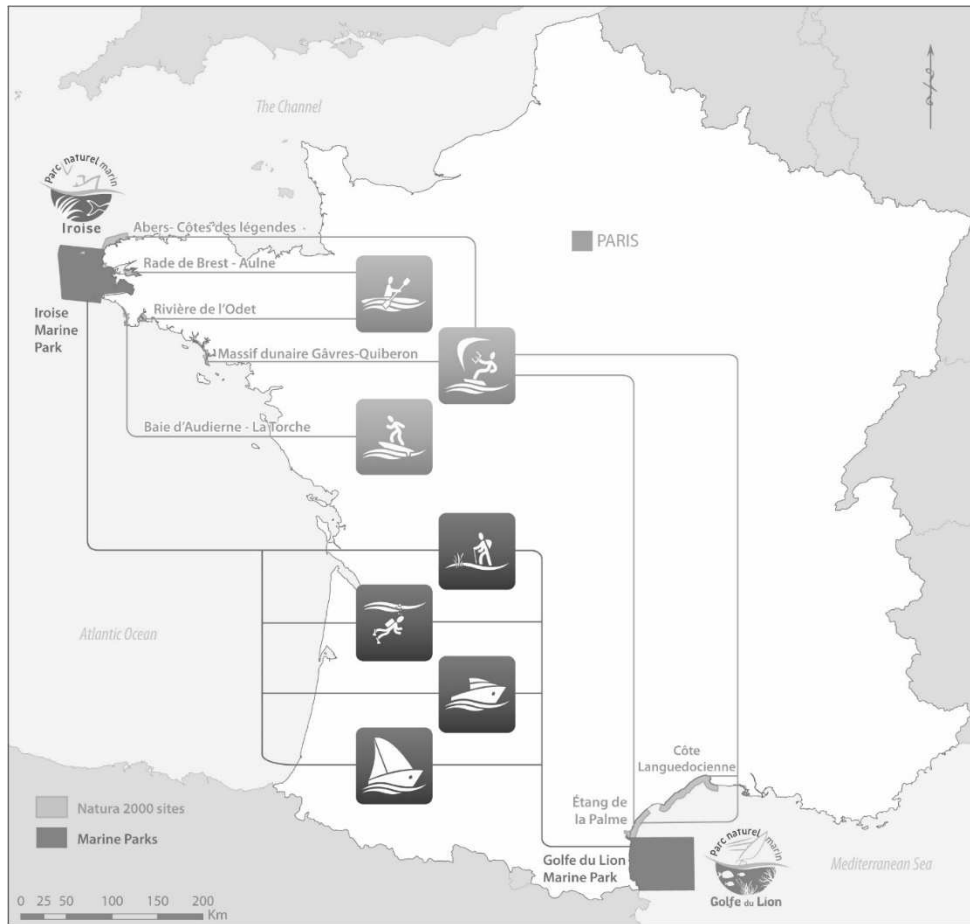
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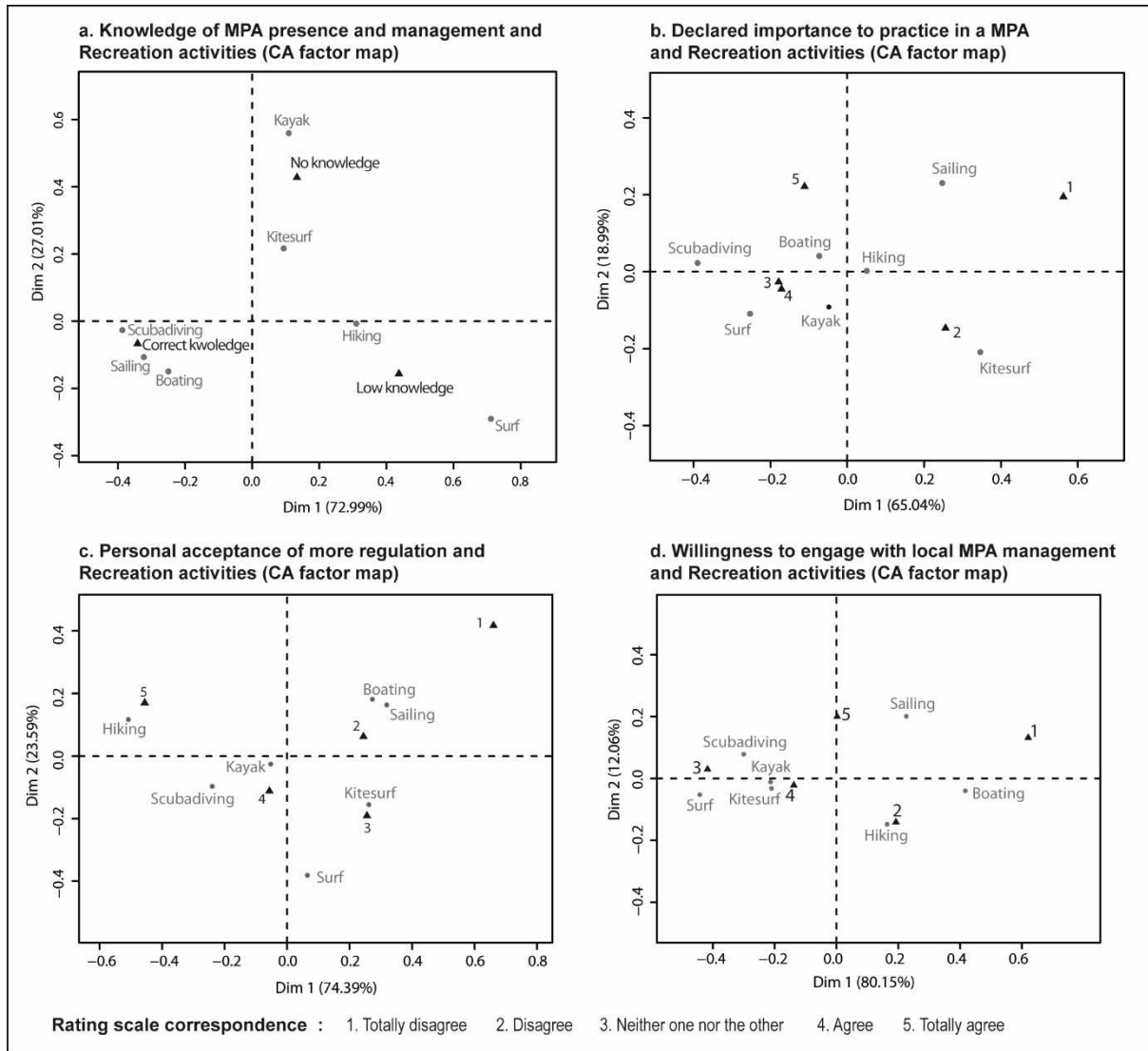
748

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		
Total	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 %*
Gender:									
- 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	-
Age:									
- 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	-
Occupation:									
- 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	-
Residential status:									
- 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	-
Region of practice:									
- Brittany	101	99	77	80	82	69	78	586	58,6
- Meditterrean	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 χ^2 (df)	P-value	Kruskal-Wallis H (df)	P-value	Kruskal-Wallis H (df)	P-value	Kruskal-Wallis H(df)	P-value
Recreation types	166.23 (12)	<0.0001	42.58 (6)	<0.0001	91.60 (6)	<0.0001	31.294 (6)	<0.0001
Sex	22.12 (2)	<0.0001	5.77 (1)	0.0163	50.45 (1)	<0.0001	0.00 (1)	0.9816
Age	36.45 (15)	0.0015	5.73 (5)	0.3329	13.97 (5)	0.0158	11.20 (5)	0.0475
Occupation	27.97 (16)	0.0319	18.18 (8)	0.0199	38.34 (8)	<0.0001	11.97 (8)	0.1523
Residential status	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).