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1 The scientific councils of natural protected areas as a window on the epistemic
2 landscape of the conservation knowing-doing space

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16 Abstract – In environmental management, like in other applied operational domains, concrete actions are
17 often at odds with state-of-the-art theoretical knowledge. Institutional settings organizing the way
18 scientific knowledge is applied in environmental management practice play an active role in structuring
19 such knowledge-action discrepancies. Scientific councils of protected areas are key institutions playing
20 this role. Their two main missions are (1) to design, monitor, and evaluate the production of knowledge
21 inside protected areas, and (2) to advise managers as to designing and implementing conservation actions.
22 This article explores a database gathering information on scientific councils in France. The case of this
23 country is exemplary because the existence of scientific councils is systematic in its protected areas, and
24 their structure is streamlined by regulatory requirements. We use this database to investigate the
25 publication records of the members of these scientific councils. This enables us to shed a quantitative
26 light on the “epistemic landscape” (i.e., the kinds of knowledge and knowledge-holders that play a key
27 role in interactions between science and practice) that scientific councils materialize. Our findings suggest
28 that this epistemic landscape is poorly connected to the concerned protected areas. Moreover, some
29 prominent topics in academic research (functional ecology, invasion biology and conservation planning)
30 appear to be neglected in the recollected publication records. Such results prompt the question of whether
31 the composition of SCs should be adjusted to reinforce the role of scientists tackling research questions
32 applied to the PA at issue, and to better reflect scientific priorities in the conservation literature. Though
33 results solely based on bibliometric analysis should be interpreted with due caution, they are useful open
34 debates on how to improve the design of institutions structuring knowing-doing spaces, beyond the
35 specific case of French scientific councils.

36
37
38 Keywords – knowing-doing gaps, scientific councils, protected areas, bibliometric analysis, expertise.

39
40
41 **1. Introduction**

42 Since the 2000s, a growing literature has emphasized that environmental initiatives are plagued by so-
43 called “knowing-doing gaps” or “knowledge implementation gaps”, with major detrimental implications
44 [1-3]. These “gaps” refer to the fact that environmental actions in the field are often at odds with state-of-
45 the-art scientific knowledge, which might translate into wrong-headed or at least suboptimal
46 environmental policies and actions.

47 Although this literature was certainly useful to raise awareness among environmental scientists and
48 practitioners, the term “gap” was arguably ill-chosen. Whereas this term suggests that a void separates

49 knowledge from action, the so-called “knowing-doing gaps” owe their very existence to complex
50 mechanisms hindering knowledge transfer and/or the application of transferred knowledge. These so-
51 called “gaps” are hence better characterized as *spaces* “in which shared interests, value conflicts, and
52 complex relationships between scientists and publics can interact” [4-6].

53 In this article, we propose a focussed, but hopefully useful, exploration of some aspects of what we term
54 “the epistemic landscape” of these spaces. We use this phrase to refer to the pattern of knowledge
55 characterizing these spaces, i.e., the kinds of knowledge and knowledge-holders that play a constructive
56 (or destructive) role in interactions between science and actors involved in designing, monitoring and
57 evaluating environmental actions.

58 In general terms, the design and implementation of environmental actions involve complex, multifarious
59 decision-making processes, with multiple actors and institutions playing different, sometimes
60 overlapping, and/or contradictory roles [7-11]. This complex picture is often referred to as “governance”.
61 Governance patterns condition the extent to which different forms of knowledge percolate through
62 decision-making processes and shape actions, making them key drivers of the epistemic landscape [6].
63 Yet, the influence and importance of governance patterns extend beyond epistemic issues: they also wield
64 crucial influence in determining how legitimate [12-13] and operational [14] collective decisions are. A
65 vast literature provides valuable insights into this multifarious influence of governance patterns. However,
66 by highlighting how governance patterns have concomitant effects on the epistemic landscape, legitimacy
67 and operability, the existing literature tends to overlook its distinct effects on the epistemic domain,
68 potentially ignoring some of its unique peculiarities.

69 To overcome this lacuna in the literature, Mangos et al. [6] proposed a conceptual framework, based on
70 Meinard & Tsoukias’s [15] analysis of the concept of rationality of decision support, which is itself
71 anchored in Habermas’s theory of communicative action [16]. According to Mangos et al. [6], what we
72 term the “epistemic landscape” (the authors do not use this phrase) is moulded by three constraints
73 (reflecting Meinard & Tsoukias’s [15] three conceptions of rationality, which themselves reflect
74 Habermas’s three models of rational action [16]): “framing”, “initiative”, and “governance.” The first
75 constraint refers to the fact that, in some decision-making processes, some actors are entitled to filter the
76 kind of information that can be used to inform decision-making. The second one presents the notion that
77 some decision makers impose that decision support should leave them enough room to make decisions
78 they can really consider to be theirs, rather than being entirely or mostly dictated by the decision support.
79 Lastly, Mangos et al. [6] use the term “governance” in a more specific sense than the one in which it is
80 used in the literature more broadly, to refer to the fact that, in some decision-making processes, some
81 actors are entitled to validate or invalidate decisions, and are therefore in a position to discard acts of
82 decision support that point towards decisions they are not liable to validate. In an empirical case-study,
83 Mangos et al. [6] show how these three constraints materialize and mould the epistemic landscape.
84 Similar studies at larger scales are needed to elaborate a general picture of the constraints and their effects
85 on the epistemic landscape, which would be useful to understand important aspects of the structure and
86 functioning of epistemic landscapes.

87 However, by confining their focus to mechanisms endowed with a *constraining* force, Mangos et al. [6]
88 arguably overlook important phenomena and processes moulding the epistemic landscape in subtler
89 manners. Such phenomena and processes might give prominence to some pieces of knowledge at the
90 expense of others, or suggest courses of actions without enforcing them. In that sense, Mangos et al.’s [6]
91 conceptual model provides only a partial view on the epistemic landscape, which should be
92 complemented by other perspectives that address the phenomena and processes neglected by this model.

93 In this article, our aim is to provide such a view, by analyzing a specific institutional setting designed to
94 organizing interactions between science and decision-making in many conservation projects or
95 institutions: scientific councils (SCs) – also termed “scientific boards”, “scientific committees”, or
96 “research councils”. These are interdisciplinary and multi-institutional entities created on a legal or
97 voluntary basis. SCs are made up of experts appointed for an office (between 4 and 6 years) who are
98 willing, without any additional remuneration, to devote part of their time to supporting the management
99 of a protected area [17, 18]. We focus on the case of the scientific councils of natural protected areas

100 (PAs) in France, because the existence of SCs is systematic in PAs in this country, and their structure is
101 streamlined by regulatory requirements, whereas in most other countries the existence and structure of
102 scientific councils are less systematic [18]. The establishment of SCs in PAs has become almost
103 systematic in France since the 1980s. They are mandatory in national parks and national nature reserves.
104 SCs in such PAs typically meet at least 2 to 3 times a year in plenary sessions. They have two main
105 missions. First, they are responsible for designing, monitoring and evaluating the production of
106 knowledge within the respective PA. Second, they offer guidance to managers as to designing and
107 implementing conservation operations and management decisions. Managers of PAs and associated field
108 workers always participate in the activities of their SCs. Although they lack the right to vote, they make
109 essential contributions to the debates by providing information and analyses of situations, informed by
110 their practices and knowledge of the field. SCs do not function like national expert committees or
111 regulatory science [19] and retain a certain autonomy in their functioning and the treatment of subjects
112 [20]. They provide opinions, advice or reflections aimed at enlightening the decision, and therefore are
113 not in a position to constrain decision support or decision-making, as are actors involved in the
114 mechanisms described by Mangos et al.'s [6] model. Hence, French scientific councils offer a valuable
115 lens through which to explore how scientific knowledge flows from scientific institutions to PA
116 managers.

117 To that end, this article explores a database gathering information on SCs in France, and investigates the
118 publication records of these SC members. This enables us to shed a quantitative light on the epistemic
119 landscape structured by these SCs, and to discuss the broader lessons that can be drawn from such an
120 analysis, especially in terms of recommendations to strengthen the flow of relevant knowledge through
121 knowing-doing spaces in conservation.

122

123 2. Materials and methods

124 To explore the structure and composition of SCs, we used a database elaborated by Ronsin [18]. This
125 database lists the SC members of protected areas in the French Alps (two administrative regions: "Rhône-
126 Alpes" and "Provence-Alpes-Côte d'Azur"), where the concentration of PAs (and therefore SCs) is
127 particularly high, with 39 SCs involving 577 individual members. The present analysis focuses on 30 out
128 of these 39 SCs: those associated with PAs pursuing explicitly articulated conservation objectives. These
129 PAs are of different types: National Nature Reserve (NNR) (n = 12), Regional Natural Park (RNP) (n =
130 11), National Natural Park (NNP) (n = 6) and combined RNP and NNR (n = 1).

131 Beyond basic analyses of the structure of the database, we explored the composition and structure of SCs
132 using a bibliometric approach. We analyzed the publication records of SC members to draw a picture of
133 the knowledge produced by individuals playing an active role in this "knowing-doing space". Two main
134 questions were explored: (1) what are the fields of knowledge produced by individuals in this space, and
135 (2) is this knowledge directly applied in the PA to which these individuals are attached by being members
136 of their SC?

137 The basic choice to use a bibliometric approach has important methodological stakes. On one hand, it is
138 unquestionably justified by the fact that SC members are supposed to be scientific experts, and
139 publications are one of the basic scientific tasks performed by scientists. Publications serve not only as a
140 means for scientists to divulge their findings and bolster their reputation, but also as a benchmark for
141 others to assess their scientific competence. However, on the other hand, not all scientists publish in
142 journals indexed in bibliometric databases. Some may not prioritize publication, some might prefer
143 publishing in the grey literature, and others might be involved in scientific domains neglected by
144 prominent scientific journals, etc. Consequently, a study like ours, focused on publications gathered in
145 bibliometric databases, runs the risk of presenting a skewed perspective, by turning a blind eye to an
146 important part of the epistemic landscape. Although this limitation should be duly kept in mind when
147 analyzing data and interpreting results, it is crucial not to overlook the advantages of bibliometric
148 databases: they provide a large corpus of material, relevant to examining the work and competence of
149 scientific experts, associated with elements for querying the corpus, such as keywords.

150 A preliminary analysis was carried out to identify the best bibliographical database to ensure
151 representativeness of publication records. Using a randomly selected subset of authors (n = 30), we used
152 the “author search” tools from two of the most extensive bibliographic databases: Web of Science (WoS)
153 and Scopus. This analysis showed that Scopus offered, on average, a better picture of the bibliography of
154 each author (Supplemental material 1). Based on this preliminary analysis, we decided to use the Scopus
155 author search tool. Using SC members’ full names, we then performed a manual series of queries on the
156 publication records of SC members until 2021, as identified in the selected database.

157 To answer question (1) above, scanning publication records to identify dominant topics inductively would
158 run the risk of producing spurious outcomes that reflect arbitrary and uncontrolled choices in the
159 definition of topics. This is due to the fuzziness of boundaries between topics, the tendency for many
160 studies to address several topics, and the nested nature of topics. A hypothetico-deductive approach was
161 therefore deployed, starting by formulating a hypothesis that a given topic is addressed, and then testing
162 whether this hypothesis is rejected or not by querying the database. This hypothetico-deductive approach
163 also unavoidably requires making choices about which topics are deemed relevant, and establishing
164 criteria for determining if a given study should be considered as addressing the chosen topic or not.
165 However, in this approach, arbitrariness is transparently acknowledged and controlled. Using this
166 approach, we searched in SC members’ bibliographic records for publications containing studies
167 addressing three key topics of conservation science: conservation planning, invasive species, and
168 functional ecology. These three topics were selected by the authors based on their understanding of
169 conservation science and practice. This choice is therefore to some extent subjective, and it is important to
170 note that other authors could have opted for different topics. However, because this choice simply feeds
171 hypotheses that are subsequently tested in a hypothetico-deductive approach, this subjectivity does not
172 hamper the objectivity and scientific credentials of the overall method. That being said, as stressed in the
173 discussion below, further studies testing alternative hypotheses would undoubtedly be interesting and
174 valuable.

175 To check whether researchers in SCs publish articles with conservation planning approaches, we applied
176 a systematic search on the whole corpus of articles based on the following keywords: “conservation
177 planning”, “adaptive management”, “management decision*” (with “*” meaning that we search also for
178 plural and other words declinations when relevant), “conservation decision*”, “prioritization”, used with
179 the “OR” Boolean operator in a one-step search on Title, abstract and (author + Scopus) keywords. To
180 make sure that the query yields relevant results, a simple search was done using wider keywords
181 (“planning”, “management”, “decision*”, “prioritization”). As expected, this search provided a larger
182 number of publications. From the corpus of publications represented by the difference between the two
183 searches (i.e. 1507 publications - 142 found in the first search), three random samples of 30 publications
184 were manually checked. These articles mostly (95%) did not address conservation planning issues, which
185 supports the relevance of our initial query protocol.

186 The same approach was implemented concerning the topic of invasive species, using the keywords
187 “alien*”, “invasive*”, “non-indigenous”, “introduced”, “exotic*”, “non-native*”, similarly in a one-step
188 search on Title, abstract and (author + Scopus) keywords. Articles mentioning the Linnaean binomial
189 names of species considered invasive in the national reference inventory Taxrefv14
190 (<https://inpn.mnhn.fr/programme/referentiel-taxonomique-taxref>) were also included.

191 A more elaborate, two-step approach was needed to implement a similar analysis concerning the literature
192 in functional ecology, because relevant keywords to this domain are polysemous and can be found, with
193 very different meanings, in other disciplines, beyond ecology. The two steps used to address this
194 difficulty are the following: (i) Keywords “service*”, “ecosystem*”, “trait*”, “flux*”, “stock*”,
195 “mechanis*” were used to search independently (i.e., using the OR Boolean operator) on title, abstract
196 and (author + Scopus) keywords. This first step produced a corpus of publications for each of these
197 keywords. (ii) These corpuses were then pooled by pair (e.g., results of “service*” and the results of
198 “ecosystem*” pooled, corresponding to a “service*” OR “ecosystem*” search) obtaining 15 pairs of
199 keywords. On each of these pairs, a new search was done with the “func*” radical. Results of these new
200 searches were pooled together giving the final set of publications considered as dealing with functional

ecology. As shown in Supplemental material 2, filtering publications using the radical “func*” has an important impact, deleting large numbers of publications, regardless of the pairs of words used in the previous search. To ensure the relevance of this selection procedure, in particular regarding the potential exclusion of publications about functional ecology due to the use of the “func*” radical, three random samples of 30 publications, chosen from those deleted after applying the search based on “func*”, were manually checked. Only 6% of these publications appeared relevant. This result shows that using the radical “func*” is effective to discard irrelevant articles of ecosystem ecology. A final manual check was carried out throughout the results to discard potential remaining irrelevant publications.

To answer question (2) above, we searched in SC members’ bibliographic records containing studies with PA names mentioned in their title, abstract and authors or Scopus keywords. A preliminary clarification of PA names was needed. Indeed, although some names are unequivocal, in some cases a given name can be used for two different PAs (e.g., “Camargue” for NNR of Camargue and RNP of Camargue). Besides, sometimes several names are used to refer to a single PA, because of the complexity of its real name or because a single SC represents several small PAs. The names selected are listed in Table 1.

3. Results

3.1. Researchers in SCs and their scientific production

SC members are mostly researchers (60%), but other professions and/or statuses are represented (Fig. 1). The 30 SCs involved a total of 295 researchers (hereafter referred to as “authors”). 40% of the members are non-researchers who work in institutions linked to nature or cultural conservation (e.g., botanical conservatory, museums, naturalist associations, and teachers). SCs are of various sizes, ranging from 6 to 41 members. However, the proportion of researchers in SCs is relatively constant, ($\mu = 62\% \pm 18$ SD, Fig. 2).

The presence of practitioners and education professionals in SCs shows that the knowledge produced by researchers is not the only kind of knowledge contributing to the field. However, the former kind of knowledge is given prominence by the dominance of researchers in SCs, which entrenches the relevance of a bibliometric analysis of their scientific production.

A large majority of researchers come from life sciences and social sciences (Fig. 3). Results of the bibliographic search for each author in Scopus returned $N = 10581$ publications for 295 authors. 22 authors (7%) had no bibliographic records found in Scopus. Articles comprise a significant majority (86%) of these publications (Fig. 4). For the following analyses, only “Article” records are kept, giving $n = 9048$ publications, which eliminates 4 additional authors. The lack of publications certainly reflects the authors’ background in social sciences. Indeed, in France, researchers in social sciences usually publish in French rather than in international scientific journals. Hence, their bibliography is not listed in databases like Scopus.

In 91% of the publications, only one of the authors is a SC member (Fig. 5). 821 publications have 2 authors or more belonging to a SC. Some publications have no less than 6 authors belonging to SCs. 66% ($n = 542$) of the publications with at least 2 authors from SCs have authors that come from different SCs. 31% ($n = 253$) are publications with 2 authors that come from the same SC. 2% ($n = 23$) and 0.3% ($n = 3$) publications have 3 or 4 authors respectively that come from the same SC. This means that members of SCs do not collaborate a lot with other SC members, and when they do, it is mostly with people from another SC.

3.2. Local relevance of the knowledge produced

470 publications mention at least one PA name (~5% of n , Fig. 6). This shows that very few articles of SC members refer to a particular PA (among those concerned by this analysis) in an explicit manner. Some PAs have no records, and the number of records is usually low (< 50 per PA). A noteworthy exception is Camargue (RNN + PNR). This can be attributed to Camargue’s unique significance as a wetland in France, particularly valuable for bird migration, thus attracting numerous research projects in this context [21]. However, all these research projects are not necessarily conducted inside the specific PAs. These records come from 134 different authors among the selected 295. 89 records correspond to

252 collaborations between at least two members of SC (same or different).

253

254 3.3. Scientific topics addressed

255 3.3.1. Ecosystem/Functional ecology

256 The methods we used to extract the articles dealing with functional ecology gave a result of 507
257 publications, representing 5.6% of the total n. It corresponds to 119 authors with 76 publications with at
258 least two different authors from SCs (same or different). These relatively low figures confirm analyses
259 highlighting difficulties to establish strong science/implementation links on functional ecology issues
260 [22]. 30 SCs are concerned, with a very unequal distribution (Fig. 7), 1 PA accounting for almost a
261 quarter of publications, 26 PAs accounting for less than 5% of publications each, and 12 PAs for less than
262 2%.

263

264 3.3.2. Conservation planning:

265 142 publications were found representing 1.6% of the whole corpus of articles. This percentage appears
266 surprisingly low, considering the importance of this discipline for spatial planning of conservation actions
267 within PAs. It corresponds to 68 authors with 25 publications with at least two different authors from SCs
268 (same or different). 25 SCs are concerned (5 have no publications), with a very unequal distribution (Fig.
269 8), with 3 PAs accounting for more than 10% of publications each, and 16 PAs for less than 2%.

270

271 3.3.3. Invasive species:

272 518 publications were found (486 sourced through the keywords-based approach, and 32 via scientific
273 names of invasive species), representing 5.7% of the total corpus. Given the significant impact of invasive
274 species on natural areas and the extensive coverage of this topic in scientific literature, this percentage is
275 strikingly low [23, 24]. Corresponding to 122 authors with 63 publications with at least two different
276 authors from SCs (same or different). 30 SCs are concerned, again with a very unequal repartition, only
277 one PA representing more than 10% of publications, while 12 account for less than 2% each (Fig. 9).

278

279 4. Discussion

280 In this article, we have used a regional database on SCs and a bibliometric approach to shed quantitative
281 light on interactions between scientific productions and conservation actions.

282 In the picture that emerges, this epistemic landscape is largely dominated by life sciences. The knowledge
283 produced by researchers operating in this landscape appears to be poorly connected to the concerned
284 protected areas. Prominent topics in academic research in ecology (functional ecology, alien invasive
285 species, and conservation planning) do not account for much of the publication records recollected.
286 Further studies, applying similar or complementary methodologies to assess the representation of other
287 relevant domains or disciplines could usefully enrich such conclusions. Further studies should also
288 attempt at generalizing such conclusions by assessing the extent to which various types of knowledge
289 percolate through SCs, in terms of broad domains (natural vs. social sciences, descriptive vs. prescriptive
290 approaches, etc.) and in terms of origins (in particular, possibilities for local knowledge to be taken into
291 account).

292 At this stage, our results prompt the question of whether the composition of SCs should be adjusted to
293 reinforce the role of scientists tackling research questions applied to the PA at issue, and to better reflect
294 scientific priorities in the conservation literature. However, articulating recommendations of that sort
295 would require precise analyses of decision-making processes and governance structures, in a case-by-case
296 basis, which falls beyond our scope in the present article.

297 Beyond the research question addressed in the present article, other aspects of the database deserve
298 further explorations. For example, one might notice that only 16% of SC members are women, which
299 raises questions about whether this gender imbalance reflects a similar imbalance in the population of
300 experts liable to participate in SCs, or is rather due to additional discriminatory mechanisms (concerning
301 this aspect, see for example the work of Montana & Borie [25], in another context). Another noteworthy
302 imbalance is that only 5% of the members are under 35 years old, whereas 70% of them are around 50

303 years old or more. This raises the question whether incentives could be designed to foster young
304 scientists' participation in SCs. These questions and numerous others fall beyond our scope here, but
305 should be addressed in further studies using this database or similar ones. Like our own analysis, such
306 future studies could bear important lessons to understand the nature and the structure of knowing-doing
307 spaces better, thanks to the pivotal role played by SCs in these spaces (see above). However, a word of
308 caution is in order when articulating general conclusions on the basis of such analyses. At a
309 methodological level, one should bear in mind the usual caveats of bibliometric analyses. Although our
310 choice of a bibliometric database was rationally motivated, a comparison with results from other
311 databases could be insightful. Besides, because the "grey literature" is typically excluded from such large-
312 scale databases, the picture of epistemic landscape offered on this basis is unavoidably partial. This is a
313 general limit associated with large-scale bibliographic databases. Moreover, the approach that consists in
314 analyzing interactions between researchers and managers based on publications might be criticized. The
315 most active researchers in their interaction with managers might as well be researchers that publish
316 relatively little. In-depth empirical investigations are therefore needed to assess the extent to which
317 publication records correctly represent the nature of interactions between researchers and practitioners.
318 Besides, as explained in the introduction, the French SCs studied have a very specific functioning,
319 streamlined by regulatory requirements, which makes them uniquely advisory bodies, without any
320 constraining influence on decision-making. For the purpose of our investigation, this specificity is crucial,
321 because it enables us to claim that our study of these SCs sheds light on "soft" mechanisms moulding the
322 epistemic landscape without any constraining force. Gaining access to a more comprehensive
323 understanding of the epistemic landscape requires complementing this picture by opening complementary
324 windows on the epistemic landscape. One prominent such complementary window is the one that Mangos
325 et al.'s [6] open. Other, yet to be elaborated, approaches might also open other complementary windows.
326 Important theoretical resources are available for that purpose, outside the decision science body of
327 literature in which the present contribution is anchored. In particular, the literature in sociology can shed
328 complementary lights on our topic. Further studies are needed to explore such research avenues.

329 A relatively remote perspective for analyses like ours in this article is to be able to articulate general
330 recommendations, such as whether SC should be generalized to address the largely deplored discrepancy
331 between conservation knowledge and practice. Whereas SCs are widespread in France, as explained in the
332 introduction, in the rest of Europe, few SCs exist for certain national parks, without their existence being
333 systematic [17]. For instance, Switzerland has just eight SCs for twenty-two PAs (19 parks and three
334 UNESCO sites). In North America and Australia, forms of SCs exist, but only on a national scale without
335 any direct actions in territorial governance [18]. However, outside France, where its application is
336 regulatory-framed, the label "SC" encompasses a wide array of roles and rules of functioning, which
337 makes it hazardous to generalize the conclusions reached in the present study. The above-mentioned
338 studies of complementary windows on epistemic landscapes are therefore imperatively needed before
339 envisaging the production of recommendations.

340 Similarly, while our conclusions may hold some relevance for thinking through the structure and
341 functioning of institutions existing in countries lacking SCs but with other institutions entrusted with
342 similar roles, generalizations cannot be warranted without opening a series of complementary
343 perspectives on these epistemic landscapes. Contexts of that kind are observed, for example, in the United
344 States. There, although individual parks do not have their own scientific council, the interstate national
345 park service has a "National Park System Advisory Board", which is responsible for identifying the
346 heritage sites to be protected (www.nps.gov/resources/advisoryboardmembers.htm). Besides, some
347 particularly protected areas, such as the Sonoran Desert (Arizona), have conservation plans that include a
348 territorial advisory board. Similarly, in Australia, a scientific council dealing with endangered species is
349 attached to the Department of Parks and Wildlife of the Ministry of the Environment (The Western
350 Australian Threatened Species Scientific Committee:
351 dceew.gov.au/environment/biodiversity/threatened/tssc#:~:text=The%20Threatened%20Species%20Scientific%20Committee,the%20Minister%20for%20the%20Environment.EEW). In the United Kingdom, a
352 Science Advisory Panel is established at national level for the management of marine protected areas.

354 In an even broader perspective, other ways to mobilize science should be investigated in the same
355 dynamics. For example, scientific research is carried out by “Parks Canada department”, a federal service
356 for Canadian national parks ²⁷. European or North American parks welcome, or even fund, research teams
357 on their territory to conduct studies related to their concerns and interests [26]. Full-fledged comparisons
358 of these different options would be needed to conclude on whether SCs of the French sort should be
359 generalized.

360
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364

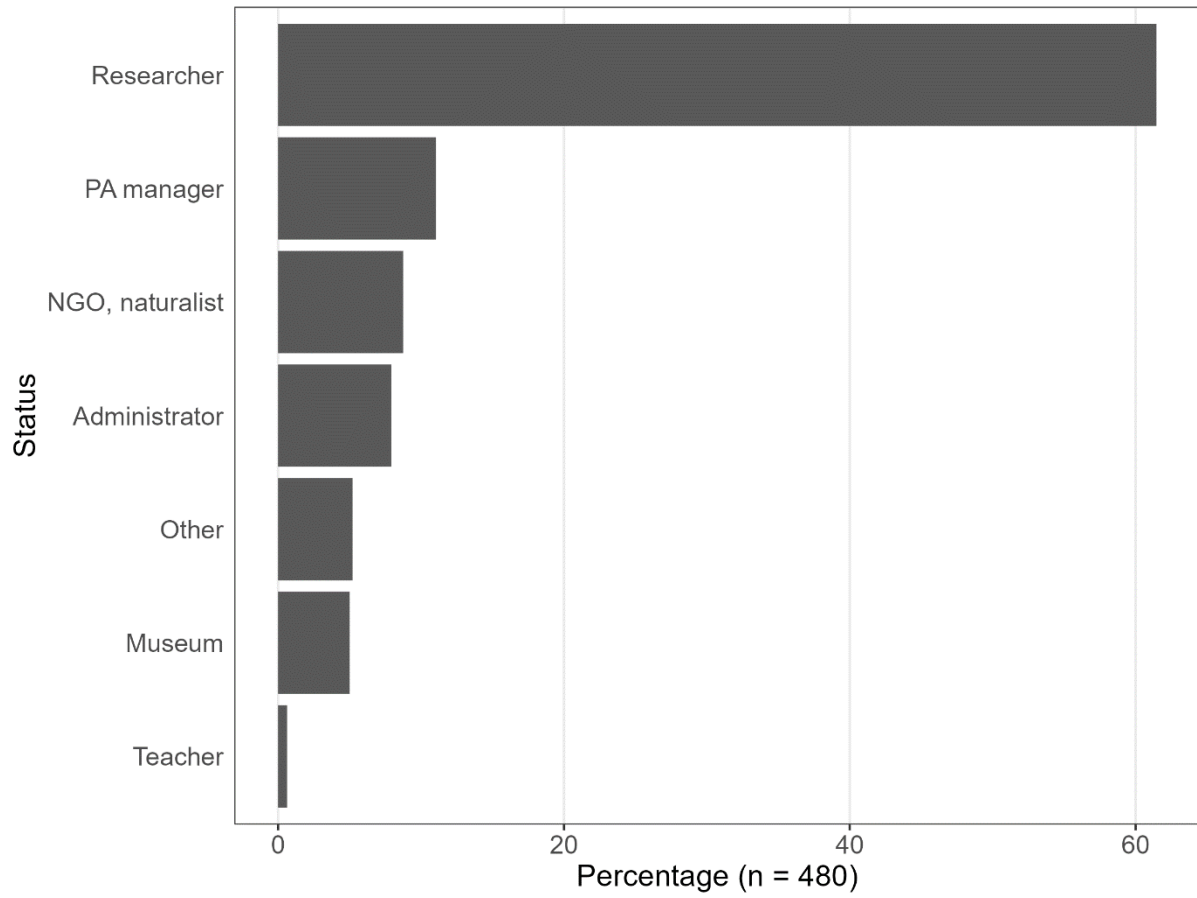
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- 425 26. Benson, E. CHAPTER 9 Demarcating Wilderness and Disciplining Wildlife: Radio Tracking
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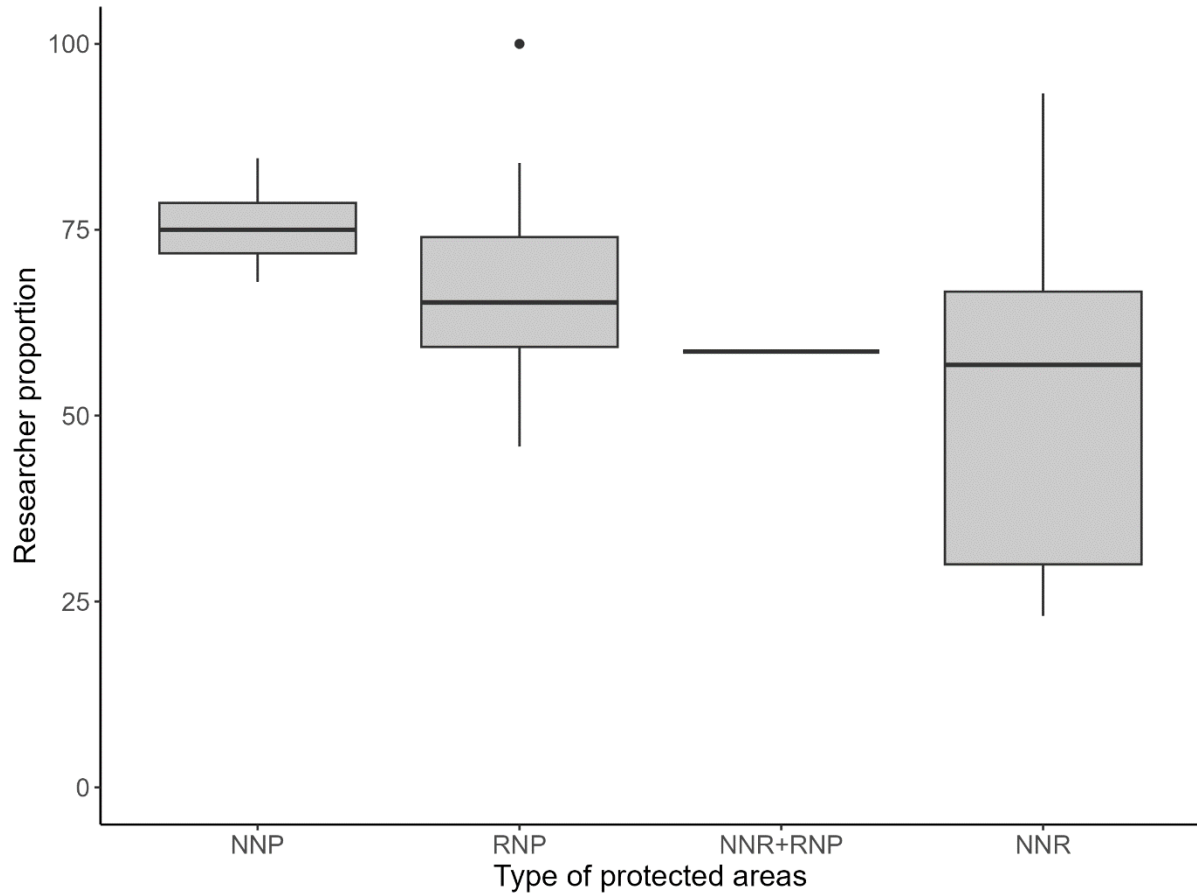
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432 Figure 1: Status of members of SCs. PA stands for Protected Areas.

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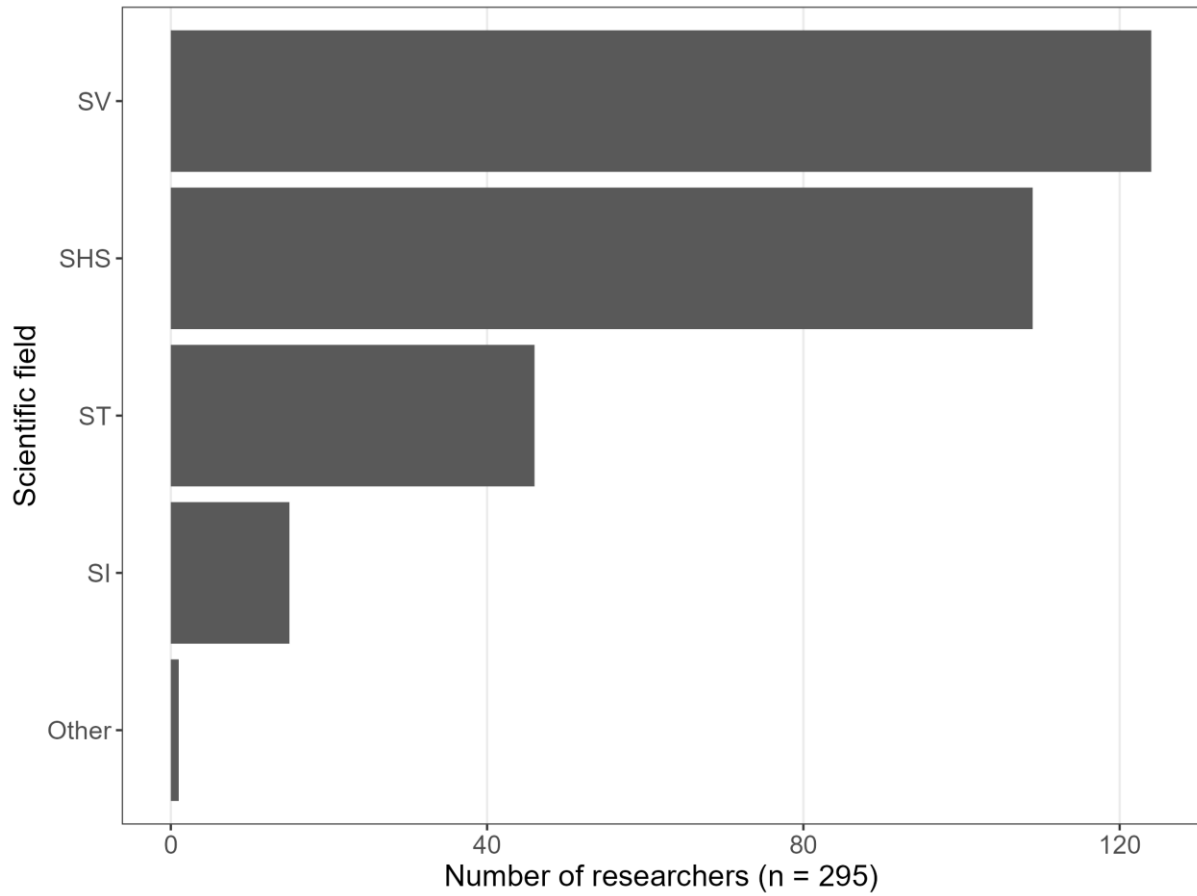


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435 Figure 2: Proportion of researchers among SCs members for each type of protected areas. NNP stands for
 436 National Natural Park (n = 6), RNP for Regional Natural Park (n = 11), NNR for National Nature Reserve
 437 (n = 12) and NNR+RNP combined NNR and RNP (n = 1).

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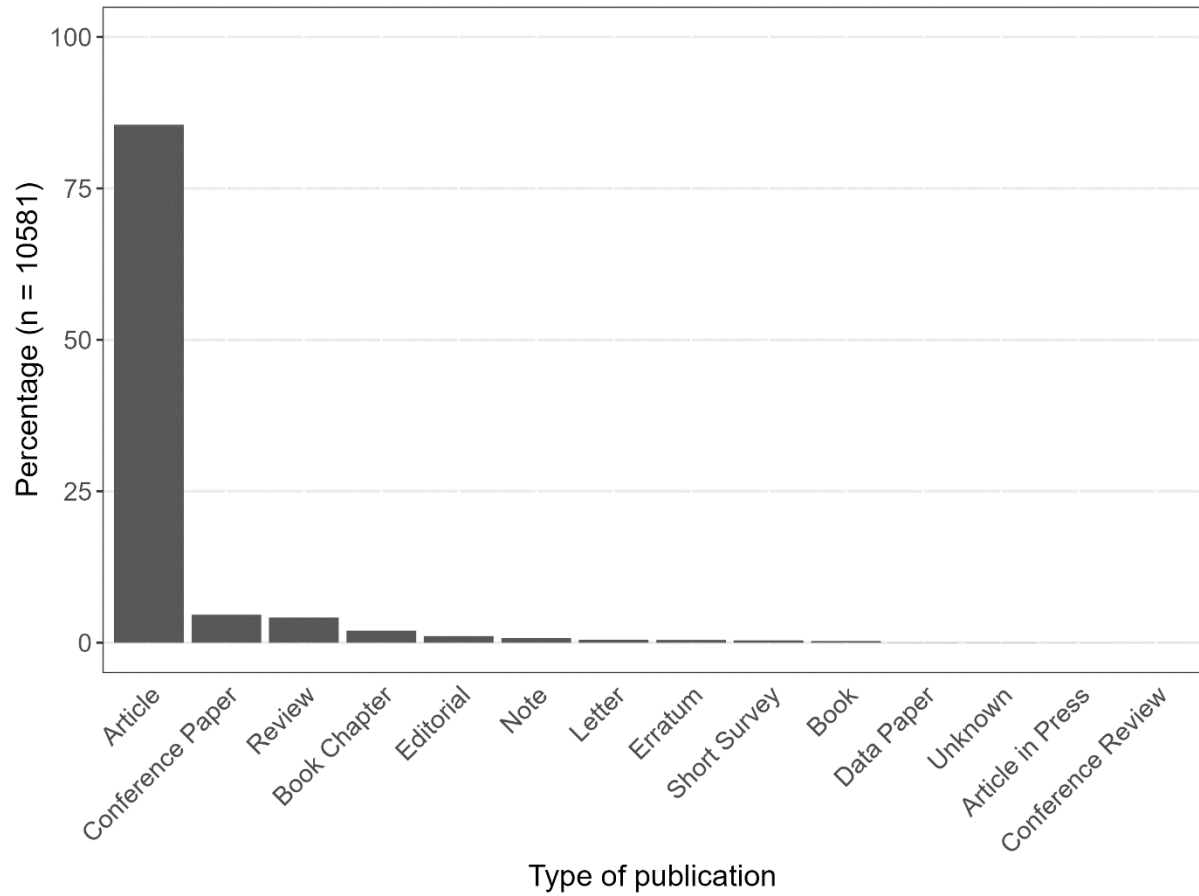


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441 Figure 3: Number of researchers for each scientific field. SV stands for “Life sciences”, SHS for “Social
442 sciences”, ST for “Earth sciences”, SI for “Information sciences”.

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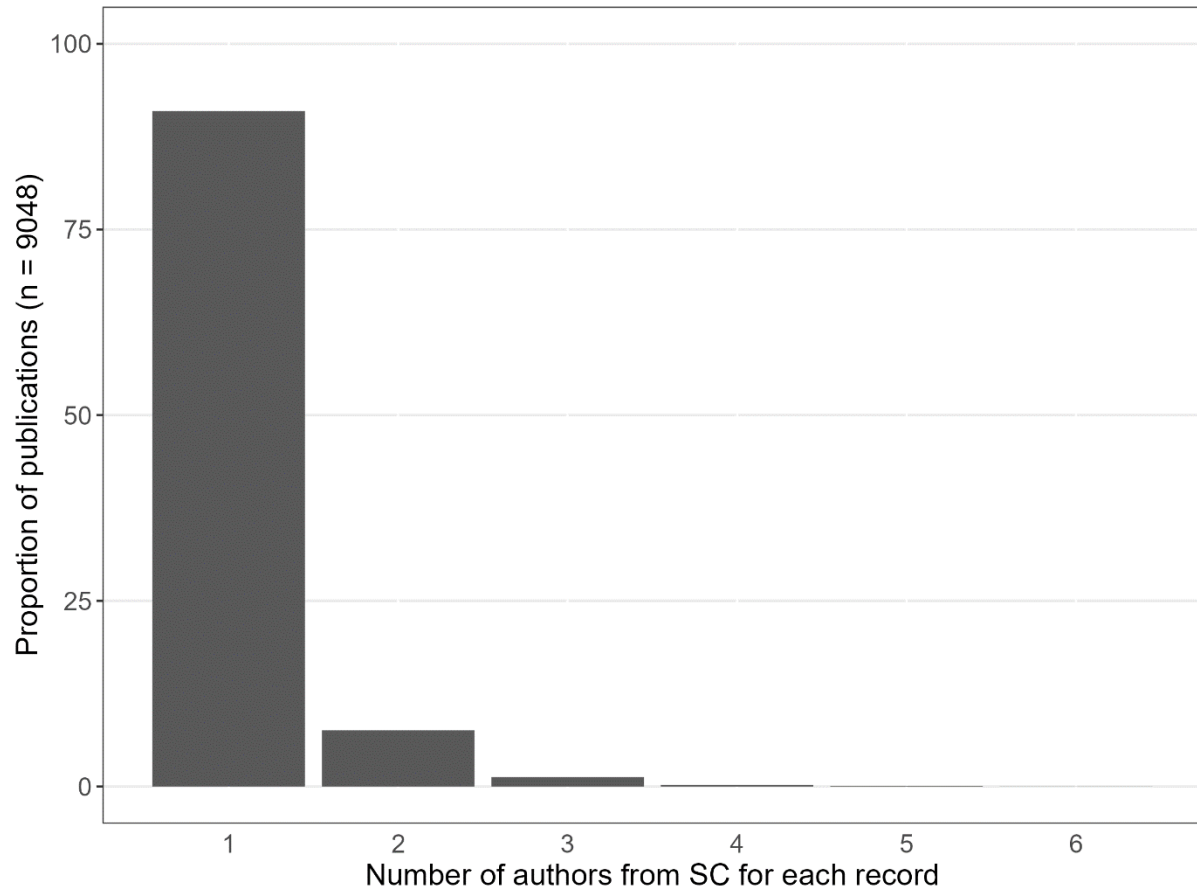


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446 Figure 4: Percentage of each type of publication in N = 10581 for the 295 authors.

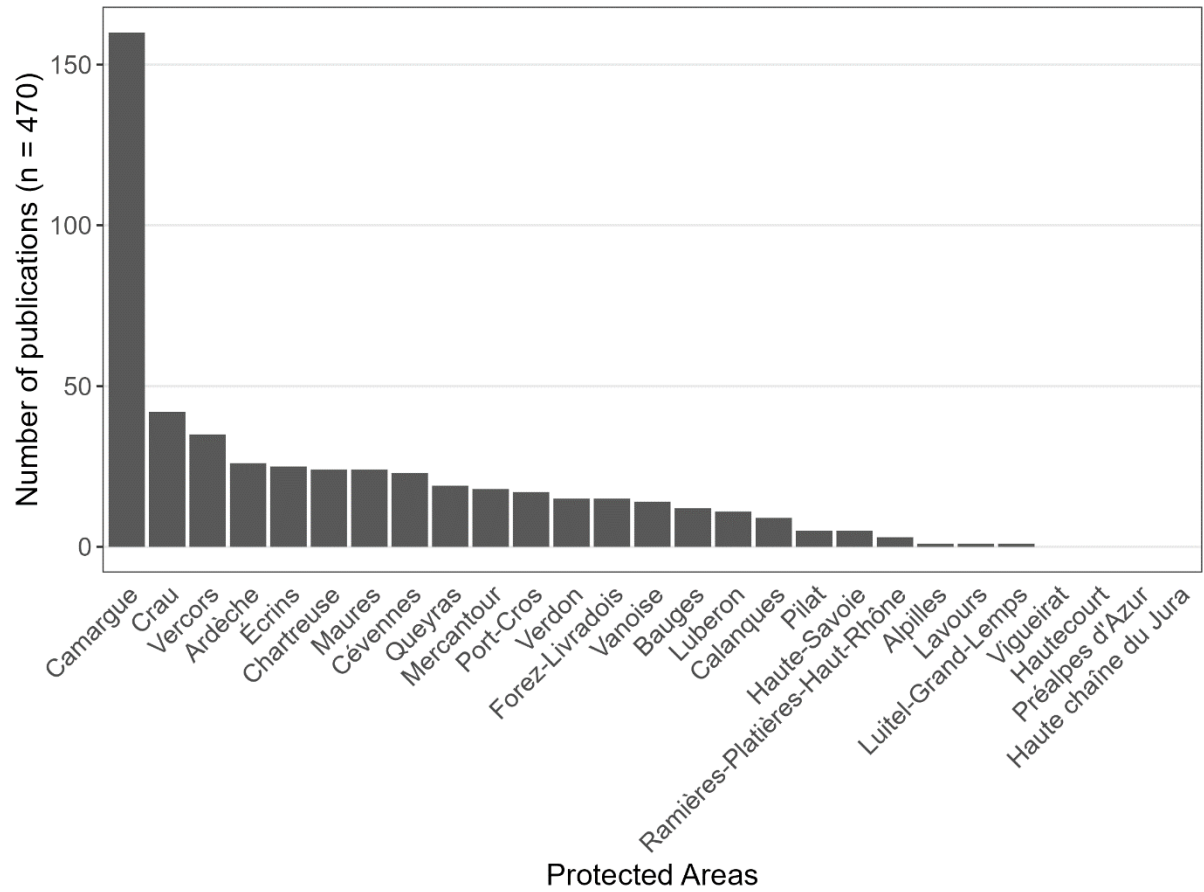
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Figure 5: Proportion of publications (articles) for each number of (co-)authors from SCs.

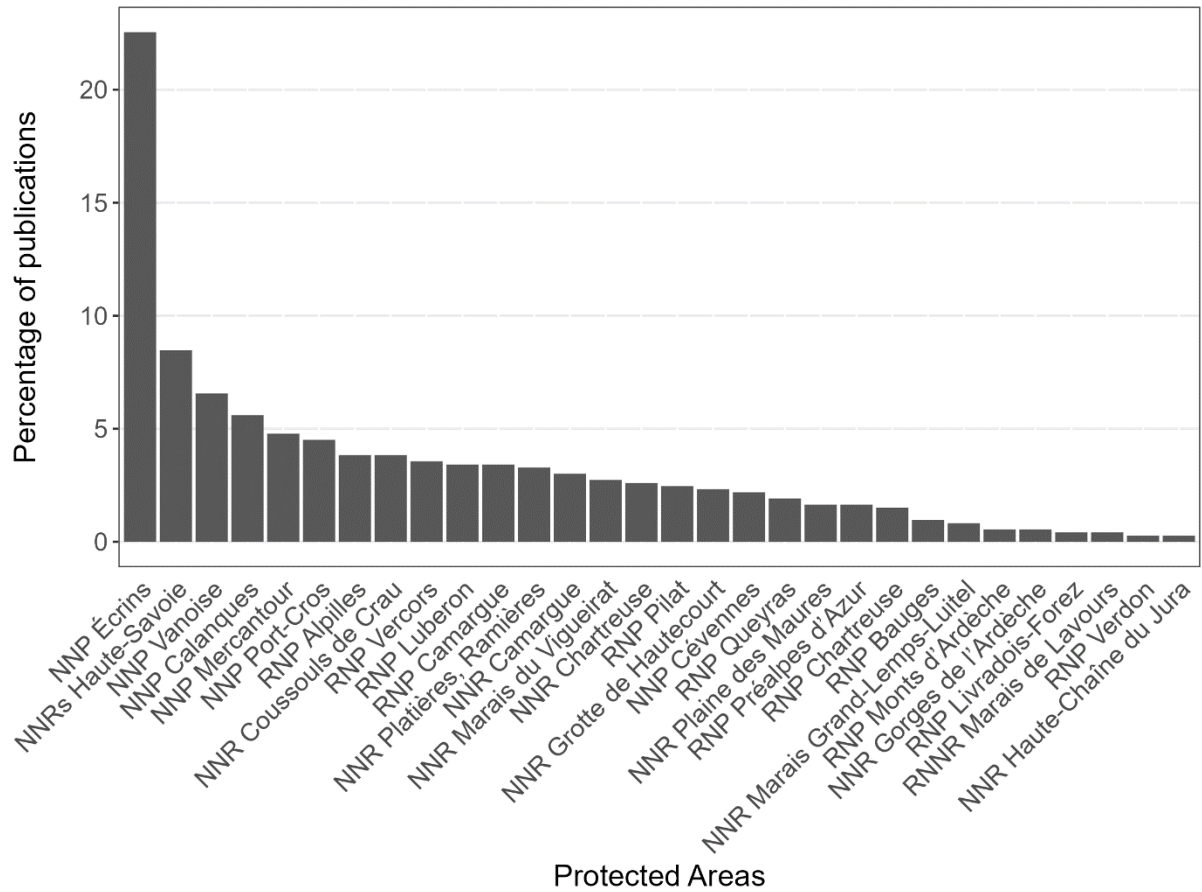


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454 Figure 6: Number of publications dealing with each protected area.

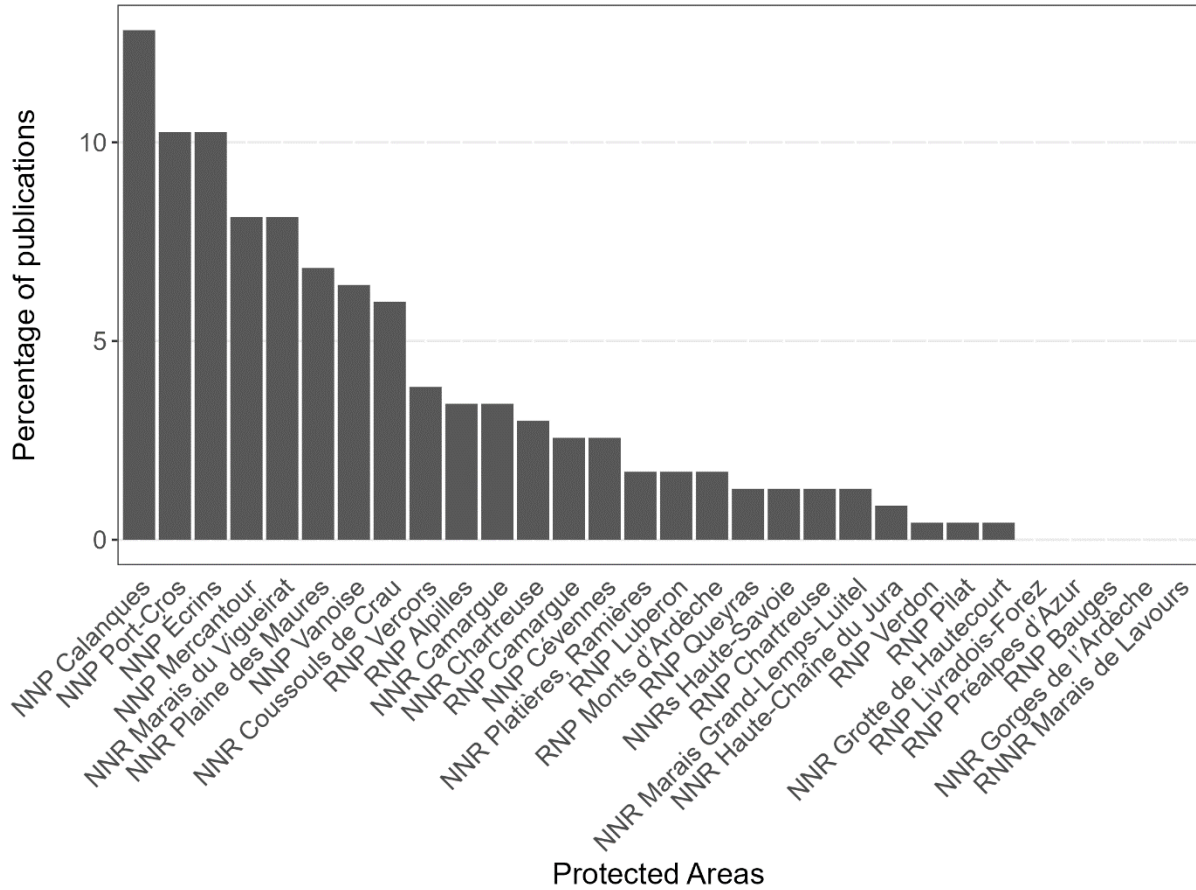
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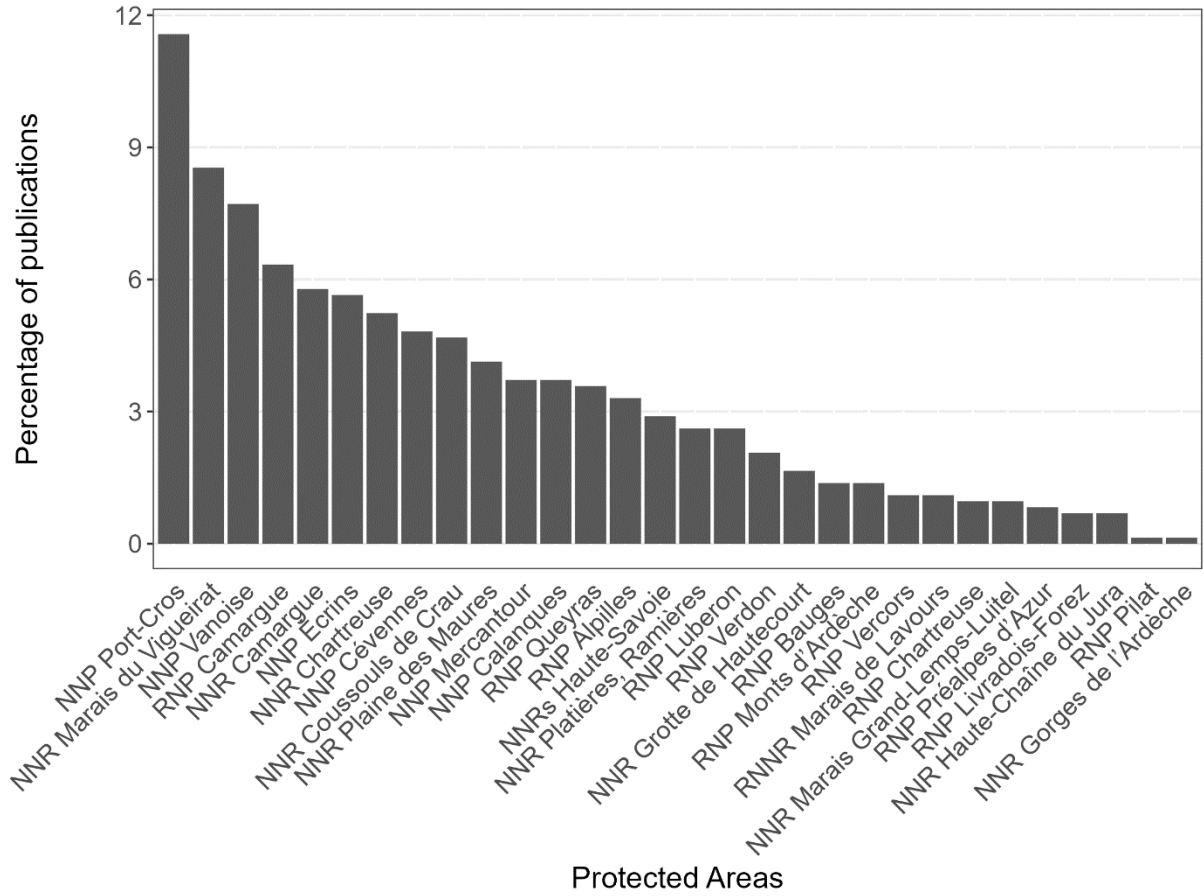


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Figure 7: Percentage of publications for each SCs dealing with “functional ecology” (n = 507).



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 462 Figure 8: Percentage of publications for each SCs dealing with “conservation planning” (n = 142).
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Figure 9: Percentage of publications for each SCs dealing with “invasive species” (n = 517).

Keywords used	Corresponding PA
Chartreuse	NNR + RNP Chartreuse
Camargue	NNR + RNP Camargue
Cévennes	NNP Cévennes
Vigueirat	NNR Marais du Vigueirat
Haute-Chaîne du Jura	NNR Haute-Chaîne du Jura
Luitel, Grand Lemps, Grand-Lemps, Lemps	NNR Marais Grand-Lemps-Luitel
Hautecourt	NNR Grotte de Hautecourt
Lavours	NNR Marais de Lavours
Livradois, Forez	RNP Livradois-Forez
Préalpes d'Azur	RNP Préalpes d'Azur
Maures	NNR Plaine des Maures
Crau	NNR Coussouls de Crau
Ardèche, Ardeche	NNR Gorges de l'Ardèche + RNP Monts d'Ardèche
Platières, Ramières, Haut-Rhône, Haut-Rhone	NNR Îles de la Platières, Ramières Val de Drôme et Haut-Rhône
Bout du Lac d'Annecy, Roc de Chère, Delta de la Dranse, Passy, Sixt-fer-à-cheval, Passy, Contamines-Montjoie, Aiguilles Rouges, Carlaveyron, Vallon de Berard	NNRs Haute-Savoie
Luberon	RNP Luberon
Alpilles	RNP Alpilles
Port-Cros	NNP Port-Cros
Ecrins, Écrins	NNP Écrins
Verdon	RNP Verdon
Calanques	NNP Calanques
Queyras	RNP Queyras
Bauges	RNP Bauges
Vercors	RNP Vercors
Vanoise	NNP Vanoise
Pilat	RNP Pilat
Mercantour	NNP Mercantour

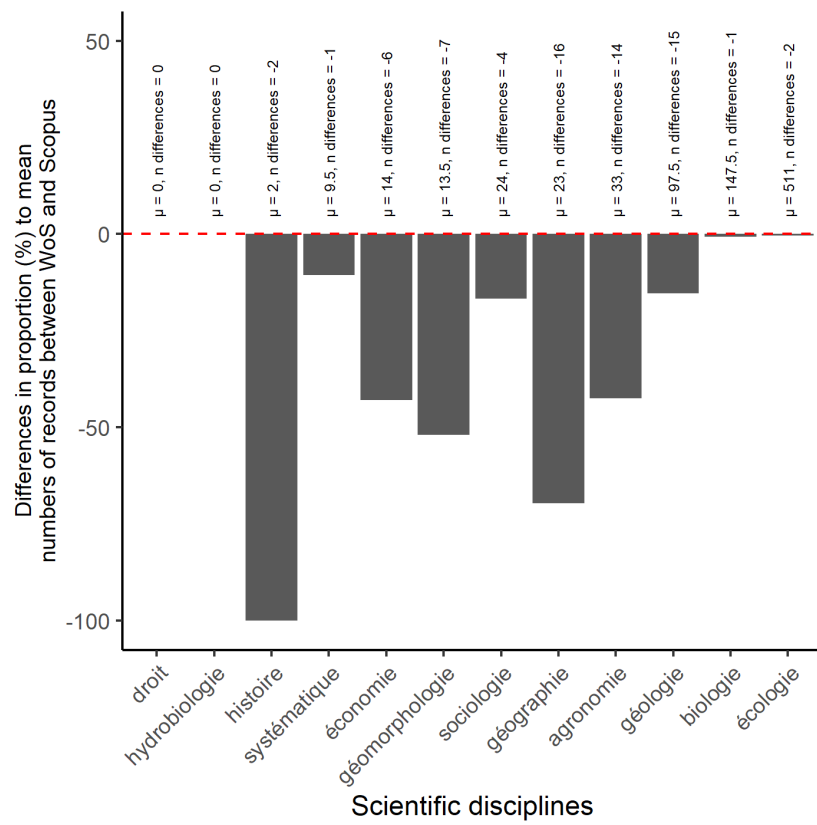
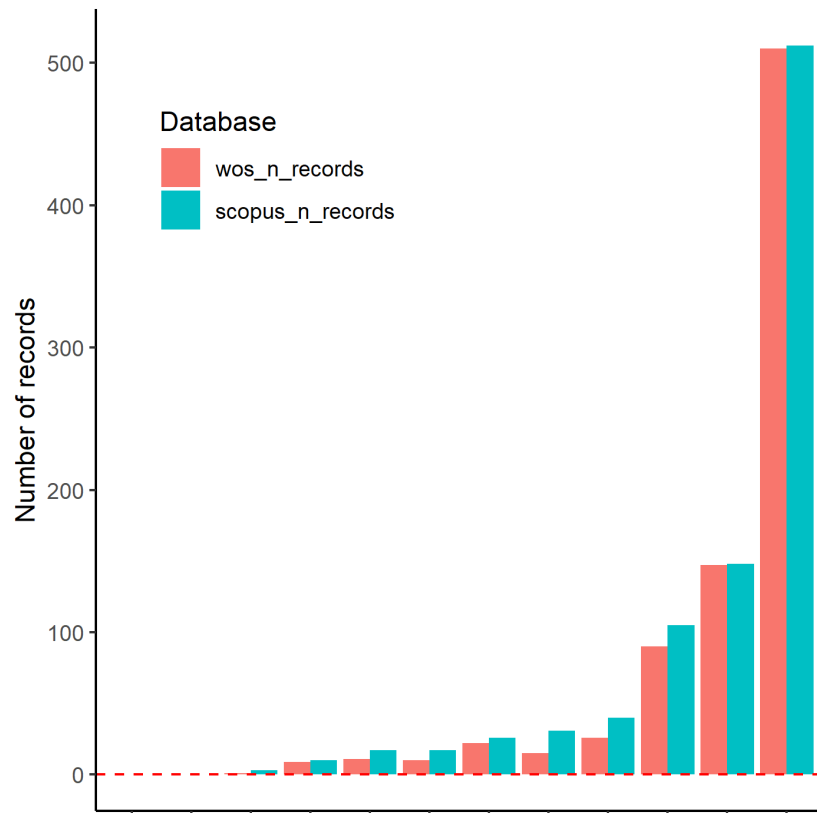
475 Supplemental material 1: Comparative study of the relevance of bibliometric searches from Web of
476 Science (WoS) and Scopus

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478 To realize this comparison, 30 members of SCs were randomly chosen in the database, weighted by the
479 relative importance of their scientific discipline across all SCs. After calculation of the relative
480 importance of each discipline (n = 40), disciplines that represent less than 2.5% of the total were removed
481 (n = 28). For the 12 remaining disciplines, their relative importance was used to select a representative
482 number of researchers for each discipline.

483 For each author, a research using the “author search” tool of WoS and Scopus was carried out. Several
484 authors could have homonyms and could be duplicated because of affiliation changes during their career
485 or other errors in referencing (e.g., spelling errors in the WoS or Scopus databases). Query results were
486 analyzed with great care to ensure that maximum information from each database were extracted.
487 Sometimes it could result in several data download (e.g., one author represented as two authors in the
488 database). For WoS, “full records” were downloaded (i.e., maximum information for each record, 68
489 columns). For Scopus, an easier way to select relevant information for our analysis was to limit the
490 number of columns to 25. All data were checked and aggregated in two tables: one for WoS, one for
491 Scopus.

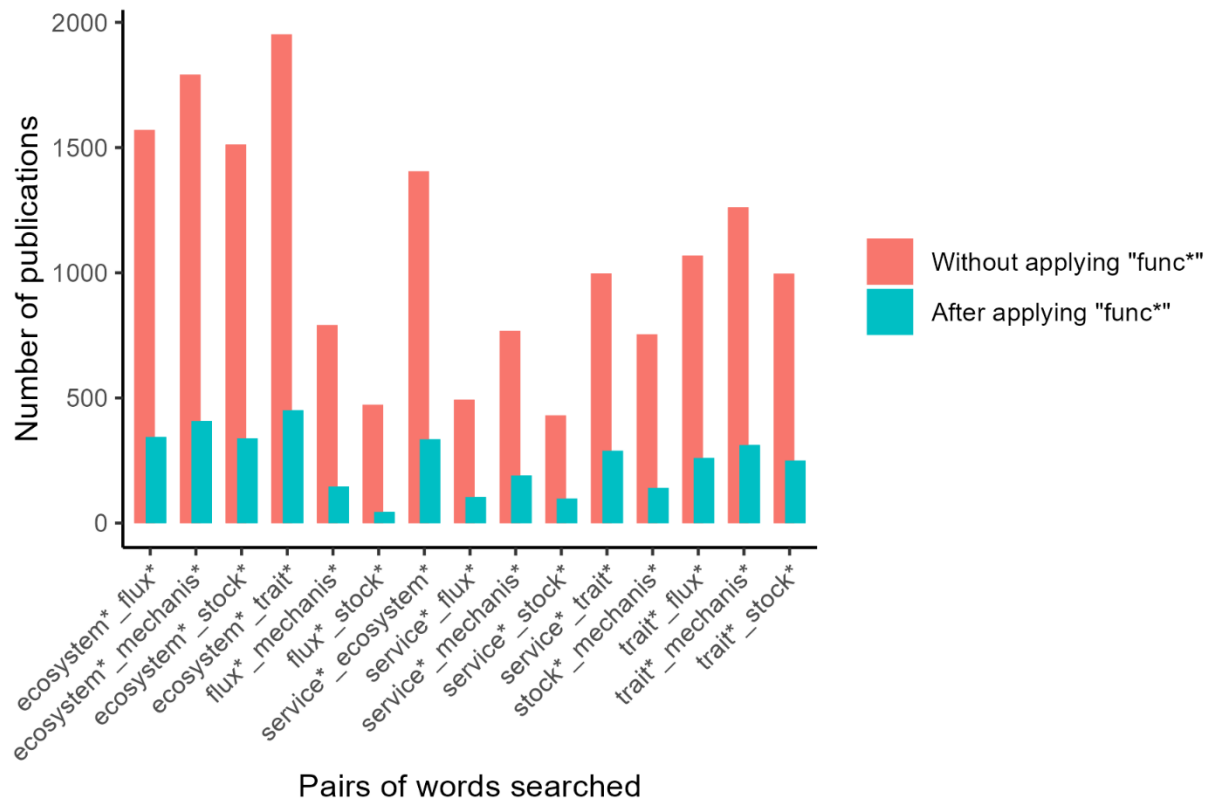
492 WoS results contain 841 unique records for all the authors found when Scopus gave 909 unique records.
493 The figure below shows that there are not much differences in disciplines with many records (e.g.,
494 ecology, biology), but that some disciplines (e.g., agronomy, geography) display high discrepancies in
495 terms of numbers of records. The Scopus database appears to be more than WoS. Finally, for some
496 “minor” disciplines in terms of numbers of records (e.g., history), the discrepancies represent a large
497 proportion of the mean number of records found in WoS and Scopus. The Scopus database can provide as
498 much as twice as many records as the WoS database.

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506 Supplemental material 2: The following graph show that the radical “func*” has an important impact,
507 deleting numerous publications, whatever the pairs of words used in the previous search on which it is
508 applied.



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