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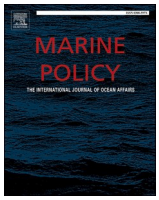

Cultural heritage and environmental ethical values in governance models: Conflicts between recreational fisheries and other maritime activities in Mediterranean marine protected areas

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ABSTRACT

The seas as the next economic frontier have led to conflicts at the intersection of resource conservation and exploitation; a space where cultural values and social practices overlap. Underpinned by a literature review, surveys and personal interviews, this study identifies the main policy, socio-economic, environmental and cultural drivers of conflicts arising from the coexistence of recreational fishing -a major maritime activity in Mediterranean marine protected areas- and other maritime users. Results show that the constant paradoxes arising from the conflict stem from different concepts of heritage, appropriation of resources and preservation. Recreational fishing lacks a common definition and governance institution, but nevertheless regards itself as a fishing community and has behavioural traits which challenge other maritime activities, particularly small-scale fishing. This study highlights the importance of fostering socio-ecological relational values, which must necessarily be evaluated through the lens of environmental ethics, and contends that this is almost as relevant as the governance system. Given the divergent values of the different stakeholders and the high degree of scientific uncertainty found, we conclude that the main challenge in attaining a solid governance of multiple recreational and professional activities in marine reserves is to adopt a "middle ground" approach that combines top-down and bottom-up governance approaches.

1. Introduction

Over the past decades, increased recreational maritime activities have transformed the sea, turning it into a contested social arena [2] sparking conflict and a political struggle rights and access to marine resources. The value of coastal and marine recreational activities deriving from the sea such as recreational fishing, diving, and wildlife viewing has attracted increasing attention and contributed significantly to local and regional economy [56]. Caught between conservation and exploitation, society has focused its attention on the sea as a new economic frontier, and in doing so has intensified the competition for using the ocean, constructing a double-bind discourse. Although threats to marine ecosystems such as unsustainable fishing practices, pollution, and climate change highlight that the ocean needs to be protected as a natural, cultural heritage, the sea is seen at the same time as an economic opportunity [74]. At present, only 7.14% of the Mediterranean Sea is a marine protected area (MPA), with a target of rising to 10% in the coming years. NGOs, however, point out that this needs to reach 40% [1]. Paradoxically, the Mediterranean is the world's leading tourist destination with more than 300 million international tourist arrivals per year, which represents around 30% of the total number of tourists in the world [58], and according to the World Tourism Organisation (https://www.https://www.e-unwto.org/doi/pdf/10.18111/9789284416929), this number will likely rise to 500 million by 2030. At the turn of the century, the seas witnessed significant transformations at the crossroads between resource conservation and overexploitation, which impinge on overlapping and contradictory cultural values and social practices in a contested space.

The second half of the 20th century and beginning of the 21st century saw recreational maritime activities increase and develop rapidly in countries surrounding the Mediterranean Sea, in parallel with increasing numbers of tourists. Apart from professional fishing in MPAs, these activities interacted and competed for the use of the environment. At the same time, Mediterranean MPAs have also grown in number and size

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due to efforts to conserve the region's marine ecosystems, which are under increasing pressure from human activities. Although these MPAs constitute a key tool for conservation, their individual effectiveness is highly dependent on how well they are integrated with their specific local conditions.

Despite studies highlighting potential existing conflicts in these contested spaces, there is a lack of in-depth studies which take into account the social and cultural issues causing these conflicts, and possible solutions to mitigate them. Studies carried out in Mediterranean MPAs have mainly dealt with ecological implications rather than the social, political and economic aspects of the problem [11]. Although conserving nature may be regarded as the main starting point for implementing MPAs, neglecting the sociocultural aspects embedded in the environment has led to misunderstandings among MPA stakeholders. This in turn has led to conflicts and/or underlying, irreconcilable points of view. On the whole, this may lead to only a partial understanding of MPAs and a move towards poor local consensus, if not outright hostility [11], leading to conflict among the various social actors in the MPA. As recreational fishing continues to grow, its environmental impact is being increasingly debated, (particularly in MPAs), but the issue is not without controversy. Recreational fishing raises a number of issues that question its long-term sustainability. These include pressure on fish resources, habitat degradation, biodiversity loss, social conflicts and pollution. Whether and how recreational fisheries can be sustainably practised in MPAs is a significant question which requires recreational fisheries to take management measures [57].

Among the activities conducted in European coastal waters, recreational fisheries stand out as one of the most important. The total number of European recreational sea fishers was estimated to be approximately 8.7 million, with 5.9 million and 2.8 million in Atlantic and Mediterranean regions, respectively. It has been estimated that more than 25% of the population practises recreational fishing in some northern European countries such as Norway and Iceland, whereas Mediterranean countries it is considerably less: 2.7% in Greece; 2.06% France; 1.32% in Italy and 0.61% in Spain. However, participation rates in many countries are uncertain [35,45]. Despite its popularity, recreational fishing has not yet been properly assessed and managed at either a Mediterranean or European level. The importance of recreational fisheries is particularly great in Mediterranean MPAs where a large number of people fish for pleasure.

Many studies have reported conflicts between professional (commercial) fisheries, particularly disputes over fishing rights between small-scale (artisanal) and large-scale fisheries (trawlers and purse seiners). Conflicts often stem from over-exploitation of resources by highly efficient industrial and semi-industrial vessels, and conflicts of interest may even arise with NGOs working to preserve marine ecosystems. However, to date, few studies have tackled the diversity of interactions between recreational fishing and the various maritime activities other than professional fishing, such as scuba diving. Recreational scuba diving in the Mediterranean has significant economic value; for example, in the Apulia region of Italy, scuba diving related to the existence of coralligenous habitat generated a revenue of €4.7 M in 2014 [13]. It is clear, therefore, that scuba diving also needs to be taken into consideration alongside recreational and small-scale fisheries (SSF) when setting priorities for conservation and coastal management decisions. Knowledge of scuba divers' preferences for management strategies is relevant for enhancing and the successfully adopting conservation strategies, while still maintaining the site as a tourism attraction [68]. As stated in Lopes et al. [41], conflicts between MPA users can jeopardise their effectiveness to the point of potentially making some MPAs less successful than the unprotected areas that surround them. Solving conflicts is an important step towards assuring the effectiveness of MPAs [41]. Although authors usually list conflicts that arise by sector, especially when recreational fisheries and commercial fisheries clash, a more global insight into conflicts between recreational fisheries interacting with all maritime activities has not yet been considered.

This paper tackles conflicts arising from the coexistence of recreational fisheries and other stakeholders in the light of the growing importance of recreational fisheries in Mediterranean coastal waters, especially in MPAs. We identify the main legal, socioeconomic, environmental and cultural drivers of conflicts with the ultimate goal of identifying the underlying conflicts which need to be addressed in management plans.

2. Material and methods

This research was conducted within the framework of an extended EU Interreg PHAROS4MPAS project (https://pharos4mpas.interreg-med.eu/). The study reviews various management actions with the aim of proposing a set of recommendations to tackle economic, sociocultural and ecological concerns related to the interaction of recreational fisheries and commercial fisheries and other maritime activities in Mediterranean MPAs. For this purpose, a comprehensive review of scientific publications from both within and outside the Mediterranean was conducted. This included grey literature and technical reports derived from management projects carried out in Mediterranean MPAs. Management experiences that tested viable solutions inside the Mediterranean were taken as best practices. The literature was researched using Scopus, Google Scholar and Mendeley, and guided by several keywords (*conflicts and *MPAs; *conflicts and *recreational fisheries; *conflicts and *small-scale fisheries; *conflicts and *scuba diving). The literature was analysed following different qualitative questions guiding the focus of our attention:

a) What is the status of progress towards high-quality management of recreational fisheries which takes biological, social, economic and governance into consideration?
b) What are the main gaps in knowledge and how can they be filled?
c) What should the vision and expectations for the future be?
d) What potential social conflicts could ecological mitigation measures cause?
e) Under what circumstances can MPAs and recreational fishing come together, considering the ecological and biological impacts, as well as the socioeconomic aspects and fishing method?
f) What new legislation and environmental awareness initiatives are needed (codes of conduct, co-management, etc.) to tackle the biological, social and economic challenges posed?
g) What local initiatives are needed to reduce conflicts between recreational fisheries, small-scale fisheries and scuba divers?
h) Are recreational fisheries threatening the future of artisanal fisheries? Should the cultural value of artisanal fisheries be taken into account?

Furthermore, different surveys addressing different issues (see Supplementary material) were sent to the managers of the most emblematic Mediterranean MPAs (Medes Islands, Cap de Creus, Cabo de Palos and Cabrera in Spain; Côte Bleue, Egadi, Port Cros, Syros, Cerbère-Banyuls, Porquerolles, Cap d'Agde and Bonifacio in France, Torre Guaceto and Portofino in Italy, Institute of the Republic of Slovenia for Nature Conservation in Slovenia, Cape Greco in Cyprus), as well as to some key stakeholders (members of the European Anglers Alliance and scientists working on MPAs, n = 3). They were collected by email or phone. Questionnaires from MPA managers and local administrations were complemented with face-to-face in-depth interviews to key recreational activity associations and small-scale fishers in one MPA as a case study (Cap de Creus) (n = 5). This case study was selected to further illustrate divergences resulting from the interaction between maritime activities.

Through a Google Forms survey, possible ecological/socio-economic solutions were proposed, and stakeholders requested to provide their opinion regarding mitigating conflicts and implementing best practices in MPAs (n = 10). Based on the analysis of the data collected in the

above sections, some conclusions will be drawn to guide the development of recommendations adapted to Mediterranean MPAs, some of which are part of the Pharos4MPA report (see [29]).

3. Results

3.1. What are the drivers of conflict?

An analysis of reviews and surveys in the literature show that conflicts in MPAs are mainly generated areas where there are poor institutional structures, ineffective surveillance, poor enforcement of MPA policies, lack of inclusive co-management policies and well agreed multi-actor governance systems, and above all, where the frameworks for integrating the social, ecological, and economic aspects of MPAs are weak [3,9,42,67]. Management shortcomings are the consequence of a lack of baseline measures providing the social, ecological and economic links into the inner workings of the management system. These measures have been identified as: (1) the asymmetric legal context of the two forms of fishing (non-commercial and commercial fisheries), reflected in the lack of recreational fishery data and management regimes; (2) the absence of a common definition of recreational fisheries at the European level, comprising a standardisation of different motivations, purposes and technical aspects of the activities; (3) the poor organisation of recreational fisheries as stakeholders, and (4) the lack of any standardised criteria for issuing licences at a national level. To this, we can add the difficulties involved in covering a wide array of maritime recreational fishing licences, and their various typologies in different Mediterranean countries [23,70]. What have to be added to: (5) divergent perceptions of environmental and cultural values, and (6) social conflicts derived from resource use that can be exacerbated by ecological mitigation measures (Fig 1).

3.1.1. The lack of agreement on a definition

One of the main sources of conflict lies in the fact that there is no agreed definition for recreational fisheries.[1] This results in it being identified as a maritime activity in a rather vague and poorly established way, which further complicates its regulation. It is clear that there is no specific European law enforcing recreational fishery laws, nor any standardisation of regulation goals amongst Mediterranean MPAs. This is in part due to the absence of an agreed definition of as activity that is far-reaching enough to encompass fishing systems and techniques at both Member State and European level. Recreational fisheries legislation varies widely among countries and MPAs in the Mediterranean basin; this variability encompasses all types of regulation measures including the maximum fishing effort allowed for each fishing modality (e.g. boat fishing, fishing from the shore, spear fishing, shellfish collection, etc.), as well as the minimum landing size of species, the interdiction of certain fishing modalities and the establishment of seasonal closures, among others ([65]. See Supplementary material).

The exact meaning of marine recreational fisheries in each European country remains unexplained so far. This opens up a prominent debate among academics and managers on whether or not commercial small-scale fisheries and recreational fisheries should be given equal rights of access to MPAs and their resources, which would imply imposing the same regulations. The lack of an agreed definition makes it difficult to manage competition for fishing resources as the impact of recreational fisheries on stock is not being assessed. Nor is the impact of commercial fishing on fish stocks being controlled and managed. This competition can take the form of spatial competition for allocation or access to fishing grounds and fish stocks. In certain areas the total catch from recreational fishing is comparable to, or may even exceed, that of commercial fishing [43]. Similarly, for specific species, recreational catches may often equal, or exceed, commercial catches [75]. Recent studies indicate that for certain species, recreational fishery in MPAs contributes significantly to fishing mortality and can magnify the negative effects of artisanal fisheries [49].

In 2002, the EU Council has approved regulations for monitoring and controlling recreational fisheries in order to mitigate their ecological impact. However, it is the responsibility of Member States to ensure these regulations are implemented in accordance with the conservation objectives established under the Common Fisheries Policy. In 2009, a chapter on recreational fishing was included in Council Regulation (EC) No 1224/2009. Article 55 of this regulation requires that "Member States should ensure that recreational fisheries on their territory and in Union waters are conducted in a manner compatible with the objectives and the rules of the Common Fisheries Policy". Only in cases where significant impacts are reported can the Council establish specific management measures. Recreational fishing is subject to European regulations outlining fishing opportunities for certain fish stocks and groups of fish stocks (EC No 2019-124). Management measures are set for recreational fisheries targeting species subject to recovery plans. In the Mediterranean these are species with minimum conservation reference sizes (MCRS) such as the European eel, bluefin tuna and swordfish. Even so, European priorities focus on only a few species managed by the total allowable catch (TAC) system as the general management of marine recreational fisheries mostly depends on national and regional legislation [55].

The FAO technical guidelines for responsible fisheries defines recreational fishing as an individual's motivation to fish, whether for personal objectives, incentives or rewards: "Recreational fishing is thus defined as fishing of aquatic animals (mainly fish) that do not constitute the individual's primary resource to meet basic nutritional needs and are not generally sold or otherwise traded on export, domestic or black markets" [16]. In 2009, Arlinghaus and Cooke [4] warned of a series of inconsistencies stemming from this premise, as its broad definition fails to specify the authorised target species, or indeed, the capture methods employed. The General Fisheries Commission for the Mediterranean (GFCM) defined recreational fishing as follows: "Fishing activities exploiting marine living aquatic resources for leisure or sport purposes from which it is prohibited to sell or trade the catches obtained" [69]. For GFCM management purposes, recreational fishing comprises two major segments: first, leisure fishing which is for pleasure, and secondly, sport fishing, which pertains to fishing contests (competitions), which take place within an established institutional framework. These definitions cover active fishing methods including line, spear, and hand-gathering and passive fishing methods including nets, traps, pots and set-lines. However, it should be noted that in some Mediterranean countries using methods such as nets, traps and pots is prohibited in recreational fishing and only allowed for commercial fisheries. Marine recreational fisheries activity involves many different techniques, takes place in many different locations, and targets a broad range of taxa (finfish, shellfish, crustaceans, etc.) [17,23]. Each type involves different fishing techniques and practices, each with its own specific socio-economic implications and impact on marine ecosystems [23].

Intrinsically connected to the lack of an agreed definition is the distinction between semi-subsistence fisheries and strictly recreational fisheries. Since the 2008 economic crisis, some recreational fisheries have been reported as semi-subsistence fisheries [36,44], in some cases providing supplementary income and competing with small-scale fisheries for the market [36]. Moreover, a few retired professional fishers practising recreative fishing sell catches without declaring them [78]. Studies carried out in Mediterranean MPAs up to date have dealt with mainly ecological aspects ignoring social, political and economic implications [11,62], whereas the few studies that attempt to assess the socioeconomic aspects connected to protection contain limited

[1] Similarly, it is worth noting that despite the existence of a European definition of small-scale fisheries, this does not necessarily accommodate the great variability of practices and conceptions of small-scale fisheries in Europe [53]. Even national definitions fail to cover the nuances existing between artisanal fisheries regarding spatial, ecological and cultural specificities [28].

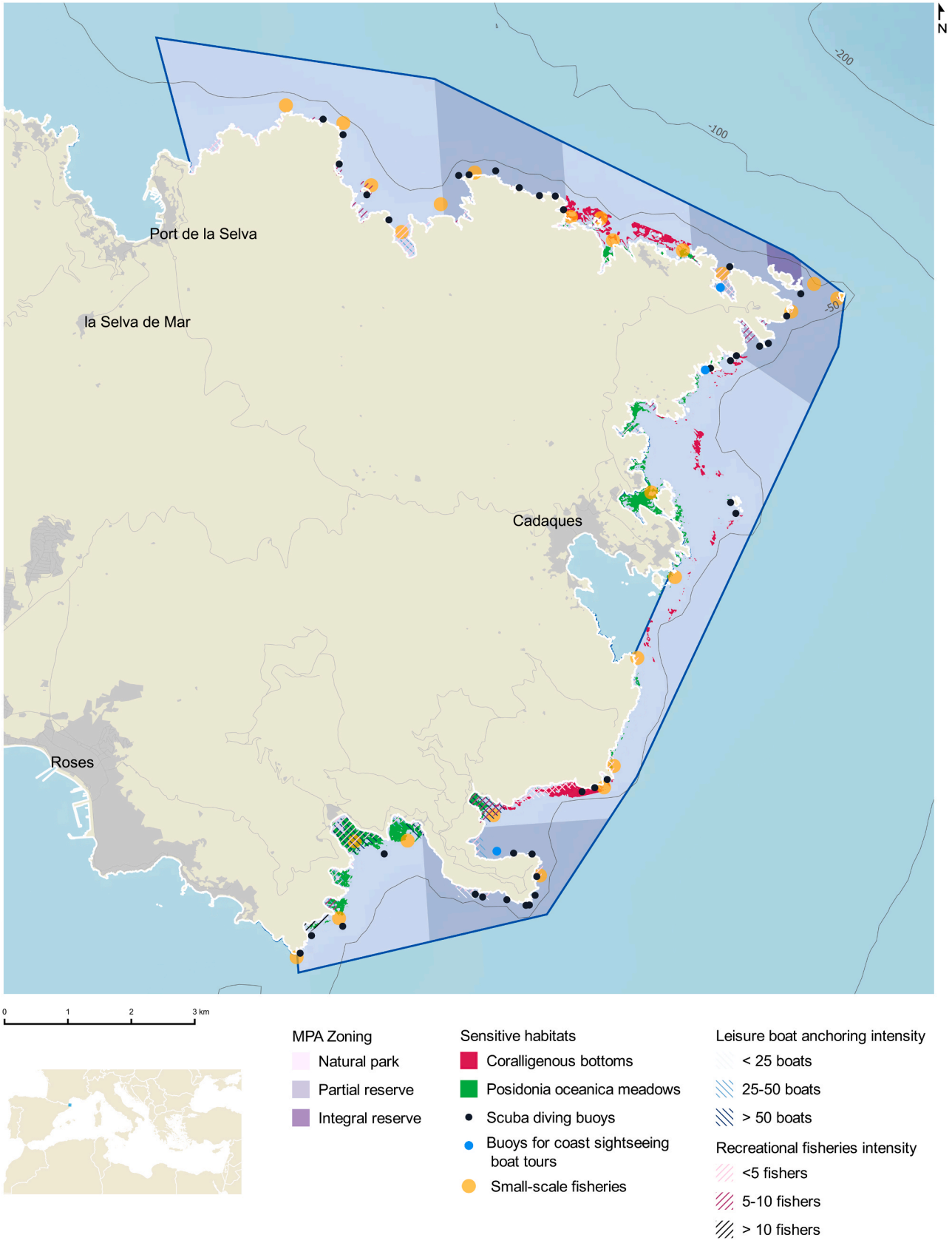

Fig. 1. Areas where recreational fisheries interact with other maritime activities.
Source: Map by Alessandro Mulazzani (CNR-ISMAR), in Gómez et al. [29].

information which make it difficult to segregate data between semi-subsistence fishing and occasional non-commercial fishing [61]. The FAO policy brief warns of the possibility that the economic impacts of the recent COVID-19 pandemic could fuel the continuation of these practices creating a worldwide problem [18].

Although marine recreational and subsistence fishing are commonly defined as practices prohibiting the sale of catches, black market transactions can take place, lowering the price of fish for SSF, directly affecting them. An EU report [46] highlights that before policies on non-commercial fisheries can be properly considered, thorough monitoring and analysis of valid scientific data need to be carried out.

3.1.2. Licence issuing

The lack of registration systems also hampers identifying recreational fisheries and estimating the extent of their activity. The literature review reveals that data are scarce and vary between countries [17], and that recreational fishing practices are particularly difficult to assess as they are carried out by a highly heterogeneous, mobile population [33]. Anecdotal evidence suggests that recreational fisheries in the Mediterranean witness significant fishing activity, with pressure on fish stocks still increasing in some areas. Licence issuing is a good benchmark for estimating the extent of recreational fishing. In Spain, where fishing with a licence is compulsory, the percentage of unlicensed fisheries nevertheless ranges from 26%, in the case of shore fishing in Cap de Creus, to 39% in Tabarca [21,23,47] and up to 59% in Mallorca [51]. Poaching negatively affects MPAs in terms of biomass and biodiversity, and can also cause serious economic losses while amplifying conflicts among other stakeholders (e.g. small-scale fishermen, scuba divers, etc.). Typically, the legislation for fisheries establishes three types of access regime for individual recreational fishing, recreational boats and divers. Licencing varies between Mediterranean countries, and six countries in the region (Albania, Croatia, Greece, Slovenia, Spain and the Syrian Arab Republic) have a licencing system in force for boat recreational fishing. In contrast, Bosnia and Herzegovina, France, Greece, Israel, Libya, Malta and Turkey have no licencing systems in place [17]. Furthermore, some licences require paying a fee, and compulsory fees are applied differently depending on where the MPA is located in the Mediterranean.

3.1.3. Recreational fisheries representation

Recreational fishing lacks any clear interlocutors, and its management is not centralised by a social institution, making conflict resolution difficult to frame. Another result from the literature review indicates that governments and other recreation bodies do not usually consider these fishermen as definitive stakeholders as they lack a certain degree of organisation. They are highly diverse and lack the official representation and organisation that exists in professional fisheries in the Mediterranean (*Cofradías* in Spain, *Prud'homies* in France and *Fraglie* in Italy). Despite this, several recreational fishing organisations have been established since the 1990s in many Mediterranean regions and nations, including EU level, such as the European Anglers Alliance, which has the capacity to influence the media and politicians because of the large number of licences and business turnover from recreational fisheries compared to professional ones. Furthermore, since the CFP reform in 2002, the decision-making process has changed with the establishment of Regional Advisory Councils (RAC). This was later renamed the Mediterranean Advisory Council (MEDAC) [59], and represents the various stakeholders (commercial fisheries sector, environmental organisations, consumer groups and sports/recreational fishery associations). Allegedly, regionalisation is decisive in implementing similar regulations in commercial fisheries. The CFP (EU Reg. 1983/2013) states that local voices throughout the regions should be taken into consideration during the decision-making process in order to ensure the policy is applied effectively. However, specific CFP measures for commercial fishing do not directly affect recreational fishermen, as these are only expected to comply with CFP conservation objectives left in the hands of Member States. A debate on the multiannual plan for the western Mediterranean, which included a fishing effort regime for all trawl vessels operating in the western Mediterranean, established that recreational fisheries would be included through regionalisation (this is, MEDAC). Nevertheless, we have to take into account that recreational fisheries should be represented at the local level, which is the appropriate political domain for MPAs.

3.1.4. Divergent perceptions of environmental and cultural values through a case study approach: Cap de Creus Natural Park

The literature review and data provided through face-to-face interviews in the Cap de Creus MPA show that a variety of conflicts may arise in relation to environmental and cultural issues in MPAs, most often connected to resource allocation and the need to match the MPA's biodiversity objectives with establishing sustainable livelihood objectives. A principal problem for MPA management in the European Mediterranean arises from conflicts over regulations and restrictions. It is reported that any changes made to regulations are often opposed by both small-scale fishermen and recreational fishermen [20]. Conflicts involving recreational fishing and artisanal fishing are, however, the most visible. Although these conflicts seem less relevant in some Mediterranean coastal zones, especially in the western Mediterranean where small-scale fishing operations can diversify their economic activity and/or benefit from tourism [11], this does not mean they do not exist. Small-scale fishing operators complain that other extractive and non-extractive maritime activities are threatening their livelihoods, at least in terms of "lifestyle" and cultural heritage [27,28,66]. Although more diverse livelihoods lead to improved perceptions of distributional equity [8], local small-scale fishermen feel they must compete with tourist activities such as scuba diving, leisure boating and recreational fishing, as well as the construction of ports for recreational boats which may have unfavourable socio-economic and environmental impacts which can particularly affect small-scale fisheries. Recreational fishing has a negative impact on traditional small-scale fishing, provoking a struggle for maritime and coastal territorial space and access to resources. Overall, although small scale fishing is still economically important for some communities, this type of fishing has been declining in many Mediterranean MPAs since the 90s [6,26,32]. Weak renewal, aging and demographic loss, decline in marine resources, lack of institutional support, rigidness of EU regulations and the fishermen feeling they are marginalised and undervalued in society, along with a decline in profits from fishing, are the main drivers of this downturn [15,26,36,79].

Nevertheless, small-scale fishing has cultural value, and besides being an economic activity, it forms a cultural relationship with nature which is rooted in local identities [27]. Sometimes small-scale fishermen declare that fishing is an activity that cannot be replaced by any other job [66]. These small-scale fishermen, therefore, depend on fishing, not just for economic reasons, but cultural reasons too [30,54], and this is a reason why scientists consider MPAs should ensure the economic and social sustainability of small-scale fishing activity [15]. An EU statement approving recreational fisheries pointed out that: "the development of recreational fishing activities must not mean a reduction in professional fishing opportunities or a sharing of scarce resources between professional and recreational activities, especially in the case of small-scale and artisanal fishing".[2]

At the same time, this recent EU document also recognised recreational fisheries as cultural heritage since it has been practised for

[2] Official Journal of the European Union, State of play of recreational fisheries in the EU European Parliament resolution of 12 June 2018 on the state of play of recreational fisheries in the European Union (2017/2120(INI))

centuries in the EU (European Parliament resolution of 12 June 2018 on the state of play of recreational fisheries in the European Union).[3] Similarly, recreational fishing is highlighted as bringing many social and public health benefits. For example, it increases participants' quality of life, encourages social interactions, and increases practitioners' awareness of the environment and the importance of sustainability [31,69].

In this context, conflicts usually generate from users' divergent points of view over perceived ownership of the space and resources, which besides being ideological, do not generally lead to major confrontations.

Fishing is a complementary activity for some small-scale professional fishermen, as they primarily work in tourism activities during summertime. However, they assert that it is the high frequency of other maritime activities in summer that leads them to cease their fishing activity during this time. On the other hand, recreational fishermen point out that professional fishermen make a living from common goods (aquatic living resources) that do not belong to them alone, but to everybody. Divers use similar arguments to complain about biodiversity-rich dive sites being occupied by small-scale fishermen in search of better sizes or highly valued species in the market, which compromises diving safety. Clubs come into the conflict the most with other activities; individual divers (using their own boats) have no major complaints and are more able to adapt to spaces and avoid interaction with other activities.

Another conflict that has recently been the focus of attention in MPAs is that of leisure boating, although little is known about it and there are no specific studies related to this type of conflict [5]. Managers in the Medes Islands MPA reported that among the main conflicts that need to be tackled are those between divers and hired leisure craft for which no licence or boating permit is required. Lack of navigation knowledge and experience amongst these unlicensed boaters leads them to tie up to dive buoys or encroach on the minimum distance required from divers' alpha flags. In other cases, large yachts and speedboats may be responsible for injuries or fatal accidents. Leisure boating can also disrupt the activities of small-scale fishing and recreational fishermen by accidentally dragging and destroying fishing gear, particularly nets. Collisions can also occur between recreational vessels and small-scale fishermen's boats [5].

The legitimate right to sea spaces and resources is a common argument used by professional fishermen, often appealing to historical rights to a relationship with the seascape and aquatic living resources, which they call "immemorial rights".[4] Tradition, the value of a culture embedded in an environment, and the history of fishing connected to the people are arguments understood as socially circumscribed moral principles, upholding these rights. A lack of replacement by the next generation, poor economic performance and a decline in fishery resources has led to a decline in small-scale fishing over the years, whereas the amount of recreational fishing is increasing year after year. This situation is leading to feeling helplessness in the face of an economic activity (recreational fishing) that generates larger revenues for the territory. Although fishermen benefit from some of the tourist activities in Cap de Creus, the feeling that small-scale fishing is a "disappearing socioecological system" strengthens the perception of conflict, and often underlines the fact that these are two different fishing sectors, with different habits and cultural values creates a sense of belonging and a reason for existence.

The sense of community, the social norms, and way of playing the "fishing game" often confronts different worldviews. Professional fishing in the Mediterranean is organised around the historical social institutions of fishery associations (*Confraries*, *Cofradías* and *Prudh'homies* in Catalonia, Spain and France, respectively), which are in charge of schedules, time of fishing and first registration. On the other hand, recreational fishermen have created an online community by connecting with each other using social networks (WhatsApp, Instagram, and Facebook), which has become the only registration system. The constant inter-connectivity of recreational fishermen through the media has established different cultural habits and a way of doing and fishing that clashes with the substantial cultural values of small-scale fishing. Recreational fishermen constantly upload photos of their catch, detailing quantity, species and place of fishing, as well as revealing fishing grounds and opening up access to everybody. This disrupts the "culture of secretiveness" that fishermen have traditionally used as a mechanism to restrict access to sea resources emerging from competition for resources. The culture of secretiveness is also a system of self-regulation used to prevent excessive fishing pressure [48]. Recreational fishermen exhibiting a fishing day trip via social media is a direct attack on the discretional system of small-scale fishing. Although the use of social networks is becoming more common among some small-scale fishers, it is perceived as more of a communication tool to enable information exchange; any sense of community in these professional fishers is expressed in other spaces (e.g. the fishing port or auction) where fishers share their daily working life.

The excessive regulation and progressive bureaucratisation to which professional fishers are exposed is another reason for complaint, together with a feeling of displacement due to the growing presence of recreational fishers, and more particularly, the allocation of fishing rights implemented by MPAs managers. Legislation regulating recreational fishing is not only out-dated, but vague and lacking enforcement, with over 50% of recreational fishermen declaring not having a licence and compliance with fishing regulations is generally very low [43]. Even though some fishermen are familiar with the legal framework, they are critical of measures that they consider to be inconsistent. In general, professional fishermen report unfairness in the way their activities are highly regulated and subject to a number of administrative procedures, while recreational fishing is poorly regulated, accessible to all, uses increasingly high tech means, and in some cases culminates in the illegal sale of catches [78]. A lack of surveillance is the main argument explaining this situation. The lack of control over the issue of licences means that the real number of recreational fishers practising the activity is largely unknown. Presumably this number is growing due to online resources helping amateur fishers to learn how to set up fishing gear easily, amongst other reasons. On the other hand, experienced fishermen usually come from the families of professional fishermen or from recreational fishing families that have passed down the practice of fishing from one generation to the next. Both profiles of recreational fishers coexist despite having different experiences of fishing, socio-ecological relationships and attachment to the territory.

The constant paradoxes emerging from the conflict between recreational fishers and other maritime activities reveal different conceptions of heritage, appropriation of resources, and their preservation. The same arguments of responsibility, sustainability and the existence of a common legacy that legitimates the preservation of the rights of the native-born population and their future generations over these resources are often used [27]. Tourist operators run by local people (who are not fishers) assert their rights, based on the assumption that the Natural Park is part of an age-old 'domain' inherited from their ancestors, legitimising their claim over the territory [28]. These conflicts affect management systems, while fishers feel they are being displaced and their activities over-regulated by local management plans which leaves tourism unregulated. This in turn hinders fishing and depletes resources. Tourist operators consider that introducing restrictions and zoning in the Natural Park is depriving them of their historical and legitimate rights over the territory.

[3] Official Journal of the European Union, State of play of recreational fisheries in the EU European Parliament resolution of 12 June 2018 on the state of play of recreational fisheries in the European Union (2017/2120(INI))

[4] Informations obtained from the allegation's fishermen from the Cap de Creus MPA made to the proposal of implementing a no-take zone.

3.1.5. Social conflicts derived from use of resources that can be exacerbated by ecological mitigation measures

Conflicts are also driven by competition for high market value targeted species which are in high demand. These coastal species are in rapid decline, which impinges even more on conflicts arising from the competition for resources between recreational and artisanal fisheries. On the other hand, seeing these species is a main attraction for scuba divers, originating another cause for conflict in MPAs.

The impact of certain recreational fishing methods such as spear fishing, jigging and trolling on vulnerable species is a major concern. According to recent studies [22,23,47], 30% of the species captured by recreational fishers in the Mediterranean MPAs studied are classified as vulnerable. However, in some areas such as Porquerolles (France), Côte-Bleue (France) and Serra Gelada (Spain), the proportion of vulnerable species in the recreational catch surpasses 50%. Overall, vulnerable species make up nearly 20% of the total recreational catch in coastal waters (including MPAs) of the western Mediterranean [45]. Clearly, recreational fisheries may pose a threat to vulnerable species, many of which have experienced marked declines in their populations in recent decades [45]. For instance, it was shown that spearfishing contributed to the decline of the vulnerable fish species Brown meagre (*Sciaena umbra*) population in the Scandola MPA (Corsica) [34]. Vulnerable species, such as *S. umbra* and grouper (*Ephinephelus marginatus*) are included in international conventions (e.g. Barcelona, Bern or Washington conventions), laws (e.g. EU Habitats Directive) and/or lists (e.g. the IUCN Red List). In particular, spearfishing is a very selective type of fishing since underwater fishers can see and choose the species to fish; this makes vulnerable species a target, particularly top predators and larger individuals. Although they are less selective than spearfishing, jigging and trolling may to an extent have the same effect, as large lures are often used to attract the biggest fish [22,47,63]. Many of the vulnerable species targeted by recreational fisheries have a high economic value and, therefore, are also exploited by small-scale fisheries. In fact, most of the target species of small-scale fishing are classed as vulnerable on the IUCN Red List. In a study carried out in France, Italy and Spain, nearly 50% of the total SSF catch in coastal waters – and 100% in offshore waters – was made up of vulnerable species [45]. Both sectors therefore compete for these valuable resources.

Furthermore, these vulnerable species targeted by both recreational and small-scale fishers are also very valuable for scuba divers, who depend on them for underwater viewing. This is similar to what occurs with vulnerable species in some Pacific Islands; these species are not only valuable for spearfishers, but are also highly valuable when kept alive for scuba diving tourism [25,64]. In fact, many Pacific Islands and Caribbean countries have banned the use of scuba spearfishing or spearfishing in general due to the fact that it conflicts with underwater tourism [80]. As for the ecological impacts of recreational fishing (e.g. affecting vulnerable species), recreational fishers often disagree with reports of monitoring programs, complaining that they are criminalised for the type of activity they carry out to the detriment of other activities (e.g. small-scale fishing), which they consider have a greater impact and/or are exempted from their responsibility.

Furthermore, the impacts of lost or abandoned fishing gear at sea exacerbates conflicts with both sectors (recreational and SSF) and scuba divers. Lost hooks may also pose a serious threat to marine fauna, while sessile organisms in coralligenous bottoms may have their growth compromised by the abrasive action of lost fishing nets and lines [12]. Coralligenous bottoms are the most frequented and valued bottoms by scuba divers in the Mediterranean. Furthermore, plastic fishing lines and lead (mostly from recreational fishing) and lost nets (mostly from commercial fishing) are a major source of marine pollution in some areas, leading to the pollution of bottoms where scuba divers operate. As pointed out by the European Commission, fishing gear accounts for 27% of all beach litter and around 20% of all gear is eventually lost at sea [71].

The environmental pressures each sector generates drives the different environmental arguments of right or wrong socio-environmental practices that each user wields to legitimise environmental rights according to their own notion of fair access and use of resources. Using Folchi's [24] concept, the conflicts faced by users are, rather, "conflicts with environmental content", and contain cultural values within the struggle of different social sectors. These conflicts often mask economic interests and power relations with concern for the environment. As Folchi [24] states: "conflict of environmental content occurs, precisely when the historical stability achieved between a community and its habitat is put under stress" (2001: 91).

4. Discussion

Conflict between recreational fishers and other users, particularly small-scale fishers, may arise because of multiple (social, economic and environmental) perspectives, values and trade-offs inherent in resource management. While some studies consider different agreement strategies as an ingredient for preventing future conflicts, others list and describe alternative systems to resolve disputes [81,82]. These include attitudes towards agreement and/or skills to consider when establishing a possible conflict resolution protocol. Nevertheless, few case studies show how these conflict resolution protocols and/or agreement strategies are put into practice, although an overall awareness exists that conflicts are usually generated at the core of MPA regulations, and that they have to be prevented and/or resolved. Resolving conflicts involves being proactive, creating a transparent process, and building trust. Although it is important to note that ways of resolving conflicts have to be context-specific [10]. One reference model cannot be considered valid for the whole Mediterranean since there is wide diversity in the socioeconomic and environmental characteristics of MPAs [11]. Notwithstanding the impacts of recreational activities on the marine environment, the conflicts generated, and the solutions adopted to regulate them depend upon the past and current context of the MPA and on the regulatory tools at the disposal of managers [20]. These refer directly to governance systems that, since 1990, imply institutional organisation, negotiation and conflict resolution [14], which must tackle the conflicts arising between different sectors operating in an MPA. In this sense, and according to Mermet [50], negotiation is "a decision system in which players who are interdependent, but have different interests or views, engage in dialogue in order to seek a mutually agreeable solution". Although, as stated by Jentoft [38], in many instances, conflicts triggered by management have been pinpointed as being cultural rather than just interest-driven. Therefore, sociocultural and ecological information needs to be more effectively integrated to attain a complete understanding of the trade-offs associated with MPAs. The tendency to conduct ecological assessments regardless of a socio-economic evaluation ignores that both realms are inextricably linked. Furthermore, historical deep-seated sociocultural experiences with territories leading to "territorial identities" and fuelling a feeling of jurisdiction over the space should be considered.

Conflicts may go from being a real physical competition for resources to economical and legal arguments about social and cultural priorities, which each sector uses to legitimate their own rights of access to the resources [72]. Rights over which territorial relationships and identities are built. On the basis of this discourse, legitimate relationships of inclusion in, or exclusion from, access to sea resources are built and/or claimed. On the one hand, professional, small-scale fishers appeal to socially circumscribed moral principles and social rights to subsistence and well-being, manifested through different historical processes of embeddedness in nature [27]. On the other, recreational fishers claim the "democratisation" of free access to common sea resources and the right to practise nature-based activities with health benefits. It is a question of space appropriation in the interests of a historical relationship with nature that does not involve privatisation, but rather negotiation, communication, agreement, and collaboration.

Notwithstanding these facts, stakeholders are often not particularly

interested in solving conflicts, as they are not really perceived as such, and seen more as the result of a process of interaction and claiming rights over the space. And this is not an issue to be resolved by judicial bodies (e.g. through politically established dispute resolution or negotiation systems), but rather through collaboration mechanisms, or what Jentoft [39] called "synergy", which implies the stakeholders' mutual knowledge, as well as their knowledge of the place and the environment, the coastal system, and of fisheries as a whole. As pointed out by Chuenpadgee et al. [60], initial images of MPAs shared by stakeholders influence their conceptualisation of governance and the governability of the MPA. According to Kooiman and Jentoft [76], this is why it is vital to establish good communication right from the initial steps of MPA governance implementation, so that these images can be assessed and taken into account from the beginning.

Nonetheless, MPAs with some experience of stakeholder collaboration can transform complex cooperative and competitive interactions, which could provide insights into different livelihoods and interests for long-term conservation success. Although MPA implementation can increase competitiveness among stakeholders, social cleavages can be overcome through mutual cooperation, which engage collective action at the same time [7]. Therefore, cooperation can enhance social cohesion among stakeholders in parallel with their feeling of representation, engagement and inclusion. This strategy has been highlighted by scholars as an informal way of resolving potential conflicts [39], preventing them by agreeing on cooperation actions.

Cooperation through trust-building activities and meetings encourages stakeholders to work together [73] and promotes good governance. Likewise, considering fishers' traditional and local knowledge to inform about sustainable methods integrates cultural value into the protected area management plans ensuring the participation of fishers and their activity are embedded in nature conservation. Consequently, not only are eco-economic aspects considered, but also the viewpoint of the social-ecological relationships, which should be involved in the process encompassing cultural devices.

To proactively establish a dialogue among different stakeholders implies designing a governance model able to include different viewpoints as stated for co-management systems [37,38]. MPA managers should embrace co-management as a key tool where decision-making power, responsibility and accountability are shared among governmental agencies and other stakeholders, including local communities that depend on the MPA culturally and/or for their livelihoods [52]. The failure of top-down systems of governance to sustainably manage marine protected areas has called for alternative approaches to be sought. Co-management has been considered a way of overcoming many of the failings of conventional modes of governance since it enables the legitimacy, transparency and accountability of resource management to be increased through greater stakeholder participation [38]. However, it should be borne in mind that co-management is difficult to legally fit into the regulatory and political frameworks of the Mediterranean.[5] Nevertheless, while co-management is not always possible in MPAs governed by a management board, effective participatory management can still be achieved through specific fisheries committees set up under the management board in which participants share decisions, responsibility and accountability.

Involving recreational fishers in MPA fisheries committees is not always straightforward, as recreational fishers may lack official representative organisations, and many do not belong to a representative organisation even where one exists (in France, only 3% of marine recreational fishers belong to federations or other relevant organisations) [19]. Nevertheless, in recent years recreational fishing organisations have been established in many Mediterranean regions and nations, including some at EU level such as the European Anglers Alliance.

In a study published in 2012, eight of the 21 Mediterranean MPAs analysed involved recreational fishers in making decisions governing their activity [23]. MPAs such as Côte Bleue (France), Bonifacio (France), Cala Ratjada (Spain), Cabo de Gata-Nijar (Spain) and Torre del Cerrano (Italy) have, on the other hand, established frequent contact with these fishers. Others, such as the Golfe du Lion Natural Park (France) and the Calanques National Park (France) have representatives of recreational fishing federations in their governing body. To ensure regulations are relevant and accepted by stakeholders, they are prepared in a participative manner – in some cases they are also tested before being made permanent. In the Natural Reserve of the Straits of Bonifacio (France), some experimental recreational fishing regulations were tested for a six-month trial period during 2012 [83]. These included that recreational fishers should declare their intention to fish in the area to the Corsican Environmental Office before going out, and that the maximum catch would be limited to 5 kg/person/day. The test period was followed by a consultation with local stakeholders on whether to make the regulations permanent or not. This allowed the regulation to evolve until it was adopted permanently in 2018.

In other cases, committees are starting to be established, such as in the areas adjacent to the Cap de Creus and Medes Islands MPAs, in the framework of the regional government's co-management programs. Despite highlighting a good experience as far as building social capital is concerned, already pointed out by authors [37] as paramount in creating connections between actors and sharing values arising from these networks, sometimes the excessive in-between committees are not effective in making the different voices heard. The lack of agility hampered by the multiple bodies between down and top often results in concealing power relations, which neutralises the conflict as a way of claiming rights. The agreement can be reduced to a socialisation process that achieves social capital, mutual knowledge and trust, neutralising the effect of fighting for equity and rights. At the same time, excessive over organisation and bureaucratisation derived from every agreed step at each committee and subsequent body leads to claims being lost and discordant voices being sealed.

Therefore, almost as important as the governance system is the incorporation of valid socioecological relational values. Given the divergent values of different stakeholders, the high degree of scientific uncertainty, and the high stakes involved in marine resource management, the key challenge is to adopt a 'middle-ground' approach which combines top-down and bottom-up approaches, following Jones [40].

Taking MPAs as a socio-cultural, ecological and economical whole integrated on the basis of cultural and natural values, the place's history and its relationship with the people from the place under conservation criteria is the first step to resolving conflicts. Although the history of professional fisheries is known, very little is known about the history of recreational fisheries and their interaction with seascapes or their bonds with the environment. For this, it is necessary to understand their relationship with the environment in order to consider the different environmental and cultural values in management plans, which should be evaluated through the lens of environmental ethics and morality. This implies an accurate analysis of interests associated to values created by different stakeholders in order to highlight the environmental and sociocultural values of stewardship (custody) and co-responsibility aligned with environmental protection and conservation from the intrinsically relational and deontological point of view.

In order to achieve this goal, the main institutional drivers impeding stakeholder cooperation have to be resolved. First, a clear, European-

[5] Co-management has only been legally regulated in Catalonia. This is part of one of the key points set out in the 2030 Maritime Strategy of Catalonia, through Decree 118/2018 of 19 June on the governance model for professional fishing in Catalonia published at the Official Journal of the Generalitat de Catalunya (DOGC-A-18170141-2018). Moreover, the decree, which sets out the guidelines for the co-management decision making body (the co-management committee), has recently (January 2021) been enforced by the co-management of the MPA Cap the Creus. In 2019, Medes Islands MPA was incorporated within the co-management of a larger area (Natura 2000 network).

wide agreed definition of marine recreational fisheries is still needed for regulation and enforcement purposes. An appropriate definition should enable a clear distinction between different types of fishery, and the different methods of recreational fishing [33]. The definition should extend across the whole Mediterranean basin, where subsistence issues are also very important in some areas. It is strongly recommended that national licence systems should be developed so that the numbers of recreational fishers (among other parameters) can be better evaluated. The licence system should include the obligation to report all catches – this is an essential element in obtaining greater accuracy regarding the status of fish stocks and a clear assessment of the share of catches from recreational fisheries in relation to commercial fishing. In countries without such a licence system, MPAs should still be allowed to issue licences themselves, depending on their regulatory framework. Whenever possible MPAs should establish an obligatory licensing system for fishers who want to fish within their boundaries, particularly in countries without a national licence system. The establishment of recreational fishing fees when licences are issued is an effective mechanism towards sustainable management. These fees can contribute to lessening the environmental impacts of recreational fishing, covering the costs of management and – importantly – control measures. A number of studies have demonstrated that most fishers are willing to pay if the fees are used for environmental protection. For example, a study conducted in 2007 in the marine reserve of Cap de Creus showed that 64.6% of shore anglers were willing to pay a fee for fishing in the MPA, while 25.6% refused [22]. Finally, in order to ensure the good development of each activity, an agreed zoning approach can be a key tool. Following the Avoid-Mitigate-Compensate approach is the primary and most effective measure to ban recreational fishing from some sensitive and critical areas, despite already recurrent patterns in Mediterranean MPAs. Zoning approaches should aim to avoid gear interaction or conflicts of access to marine resources, both with other stakeholders (e.g. small-scale fishers) and among recreational fishers themselves (e.g. spearfishers vs. boat anglers). This spatial zoning should not only mitigate conflicts between individual users and different sectors but also contribute to diversifying captures.

5. Conclusions

As small-scale fishery continues to decline along the Mediterranean coast, the importance of recreational activities such as recreational fishing, scuba diving and leisure boating will continue to grow. Ensuring the effectiveness of good practices in interactions among social actors and in conflict prevention will ensure and strengthen the success of MPAs. This is done by linking the commitment of all maritime activities in resource protection with livelihoods and cultural and socioecological values, and positive economic outcomes derived from conservation as part of a feedback process involving environmental, sociocultural, and economical aspects. Everyone engaging in maritime activities must be made fully aware of the range of benefits (cultural wellbeing, livelihoods, health and social benefits) and new opportunities brought about by the implementation of marine protected areas. These results argue for a mixed fishing-tourism approach to marine protected area management, making both activities compatible and well-regulated to ensure fishing, visitor numbers and recreational activities are sustainable [77]. By establishing synergies between different sectors, linking the benefits of extractive uses (e.g., fisheries) to non-extractive uses (e.g. eco-tourism) of ecosystems may be a good alternative to meet ecological, economic, sociocultural goals. Suitable legislation, definition and licence systems have to be developed in recreational fisheries in order to provide the necessary context in which sociocultural dimensions, territorial identities, moral and ethical values can be integrated into a governance model that is valid for ensuring good conservation with commercial fisheries and other maritime activities interacting in MPAs.

CRediT authorship contribution statement

S.G.: Conceptualization, Investigation, Methodology, Data collection, Formal analysis, Writing-original draft, Review and editing. A.C.: Investigation, Data collection, Review and editing. J.LL.: Investigation, Methodology, Review and editing, Funding acquisition, Project administration. All authors have read and agreed to the published version of the manuscript.

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Declaration of Interest Statement

The authors declare no conflicts of interest.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.marpol.2021.104529.

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