



## Research and management priorities for Atlantic marine recreational fisheries in Southern Europe

Pablo Pita<sup>a,b,\*</sup>, Iñaki Artetxe<sup>c</sup>, Hugo Diogo<sup>d</sup>, Pedro Gomes<sup>e</sup>, Ana Gordo<sup>f</sup>, Kieran Hyder<sup>g</sup>, João Pereira<sup>h,i</sup>, Cristina Pita<sup>j</sup>, Mafalda Rangel<sup>k</sup>, João Garcia-Rodrigues<sup>a,b</sup>, Oscar Sagué<sup>l</sup>, Pedro Veiga<sup>k</sup>, José Vingada<sup>e,j</sup>, Sebastián Villasante<sup>a,b</sup>

<sup>a</sup> University of Santiago de Compostela, Faculty of Political Sciences, Department of Applied Economics, Av Angel Echevarry s/n, 15782 Santiago de Compostela, Spain

<sup>b</sup> Campus Do\*Mar, International Campus of Excellence, Spain

<sup>c</sup> Marine Research Division, AZTI, Txatxarramendi ugarte a z/g, Sukarrieta, E-48395 Bizkaia, Spain

<sup>d</sup> University of Açores, Marine and Environmental Sciences Centre, Departamento de Oceanografia e Pescas, 9901-862 Horta, Azores, Portugal

<sup>e</sup> University of Minho, CBMA-Molecular and Environmental Biology Centre, Campus de Gualtar, 4710-074 Braga, Portugal

<sup>f</sup> Centro de Estudios Avanzados de Blanes (CEAB, CSIC), Accés a la Cala S. Francesc 14, 17300 Blanes, Spain

<sup>g</sup> Centre for Environment, Fisheries & Aquaculture Science, Pakefield Road, Lowestoft, Suffolk NR33 0HT, UK

<sup>h</sup> Direcção Geral de Recursos Naturais, Segurança e Serviços Marítimos, Av. Brasília, 1449-030 Lisboa, Portugal

<sup>i</sup> Instituto Português do Mar e da Atmosfera, Av. Brasília, s/n, 1400-038 Lisboa, Portugal

<sup>j</sup> Department of Environment and Planning & Centre for Environmental and Marine Studies (CESAM), University of Aveiro, Portugal

<sup>k</sup> Centre of Marine Sciences (CCMAR), University of Algarve, FCT-7, Campus de Gambelas, 8005-139 Faro, Portugal

<sup>l</sup> International Forum for Sustainable Underwater Activities, C/ Valencia 231, Bajos, Apartado de Correos 36003, 08007 Barcelona, Spain

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### ABSTRACT

Marine Recreational Fishing (MRF) is an important activity in Europe, with 9 million fishers and generating annually € 6 billion in direct expenditures. However, there is a lack of data and understanding of MRF in Europe, particularly in Southern countries, which prevents a number of fish stocks from being effectively assessed and managed. In November 2016, a participatory workshop on MRF was held in Vigo (Spain) to identify challenges and opportunities for data collection, and to diagnose key research gaps and management issues for MRF in the Southern European Atlantic. Experts from a wide range of disciplines (researchers, policy makers, fisheries managers and commercial and recreational fishers) highlighted that the management of MRF is a challenge due to complex and dispersed legal frameworks, with multiple administrations involved, and overlapping uses of space with commercial fishing, aquaculture, navigation and tourism, among others. The lack of strong and representative fishing associations hampers research and management initiatives. Effective communication between recreational fishers, researchers and fisheries managers is also lacking. Despite the ecological, social and economic relevance of MRF, there is no systematic and comprehensive collection of information on fishing effort, recreational catches, expenses, social profile and access conditions of European recreational fishers. These data would be useful to avoid biases in the assessment of recreational fisheries due to the great diversity of ecosystems, species and typologies of users. Strategic recommendations and research priorities were also identified to address knowledge gaps and are discussed in the context of the management of MRF across Europe.

### 1. Introduction

Marine European fisheries are being recovered [1] from historic overfishing practices of commercial fleets [2–5]. In this context, there are concerns about the impacts of Marine Recreational Fishing (MRF) on ecosystems [6–8] and its combined effects with other human activities such as commercial fishing, especially on species in higher

trophic levels [9]. The European Union (EU) Common Fisheries Policy (CFP) states that “recreational fisheries can have a significant impact on fish resources and Member States should, therefore, ensure that they are conducted in a manner that is compatible with the objectives of the CFP” [10]. Moreover, MRF representatives can join the Advisory Councils, stakeholder-led organizations that provide recommendations on fisheries management in the EU [11].

\* Corresponding author at: University of Santiago de Compostela, Faculty of Political Sciences, Department of Applied Economics, Av Angel Echevarry s/n, 15782 Santiago de Compostela, Spain.

E-mail address: [pablo.pita@usc.es](mailto:pablo.pita@usc.es) (P. Pita).

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MRF is an important activity in Europe, with almost 9 million fishers spending around 6 billion euros per year [12]. However, little research has been conducted on MRF in Europe, particularly in the South. MRF in Southern European waters has begun to be studied in recent years in France e.g., [13–16], Portugal, e.g., [17–19] and Spain, e.g., [20–23], but extensive research is still needed to better support current and future management initiatives and to reduce conflicts between recreational and commercial fishers, and other users of marine ecosystems [24].

In November 2016, a workshop on MRF organized in Galicia (NW Spain) brought together a group of experts from different disciplines (biology, ecology, economics and other social sciences) that included researchers, fisheries managers, policy makers and recreational and commercial fishers and other stakeholders. Based on the expert knowledge the attendees, this article presents a synthesis of the current state of knowledge on ecological, social, and economic aspects of MRF in the Southern Atlantic European waters (Section 3.1) and an assessment of the main MRF modalities (Section 3.2). In addition, main challenges and recommendations to policy makers, researchers and managers are presented (Section 3.3); including future priorities for MRF research are discussed in a global context to guide future management plans (Section 4).

## 2. Materials and methods

The 2-day workshop on MRF was held in Vigo in November 11–12, 2016. It was attended by 35 experts including researchers (13), recreational fishers (13), public fisheries managers (3), NGOs representatives (3), commercial fishers (2), and managers of nautical companies (2) from Spain and Portugal.

The workshop began with opening lectures on key topics describing current management systems, socioeconomic characteristics of recreational fishers, and current research on the field. This information was incorporated as part of the results of this article. The next step consisted of dynamic sessions designed to encourage collective participation and discussion among different stakeholders in focus groups designed to collect the expert knowledge of the attendees [25]. Likewise, final consensual conclusions of each of the topics covered during the sessions was incorporated to this article.

Moreover, the current institutional fit of MRF was also analysed (Section 3) by using an adaptation of the Institutional Analysis and Development Framework (IADF) [26,27]. The experts were asked to assign values (1 = very poor to 5 = excellent) to a list of 13 principles included in the framework (Table 1). Furthermore, experts also performed a Strengths, Weaknesses, Opportunities and Threats (SWOT) analyses of the main modalities of MRF in Europe (Section 4).

**Table 1**

List of principles (P) scored by experts included in the Institutional Analysis and Development Framework (IADF) used to analyse the institutional fit of MRF [26,27].

P	IADF principle
1	Differences between recreational fishers, commercial fishers and poachers are well established in regulations. Their numbers are known
2	Target species and fishing areas are clear in regulations. Ecology and dynamics of fish stocks are known
3	Regulations are balanced at national, regional and local levels. Legal adaptation to sudden events is easy
4	Administrative fees partly finance fisheries management and are proportional to fishers' catches
5	Recreational fishers' organizations are powerful, representative and democratic and use fishers' knowledge to modify regulations, adapting them to local circumstances
6	Fisheries control bodies can be supervised by recreational fishers' organizations, or integrate them into their operations
7	Fisheries research bodies can be supervised by recreational fishers' organizations, or integrate them into their operations
8	Proportionality of penalties to illegal fishers is established by recreational fishers' organizations or by agents supervised by them
9	There are cheap arenas to solve conflicts quickly between recreational fishers
10	There are cheap arenas to solve conflicts quickly between recreational fishers and managers
11	Recreational fishers' organizations are managed without the supervision of the authorities
12	Catch regulation, monitoring, enforcement and control, and general governance or MRF rely on entities dependent on recreational fishers' organizations
13	Catch regulation, monitoring, enforcement and control, and general governance or MRF rely on government entities

## 3. Results

### 3.1. Current state of knowledge about MRF in the European South Atlantic

#### 3.1.1. Management

EU institutions define MRF as “non-commercial fishing activities exploiting marine living aquatic resources for recreation, tourism or sport” [11]. The EU has recently begun to include MRF, together with commercial fisheries, in fisheries regulations [10,11,28], but European priorities focus on a few species managed by the total allowable catch system and on species with minimum conservation reference sizes [29]. Therefore, management of MRF still largely depends on national and regional legislations [30].

Unlike other European regions (e.g., the Netherlands, United Kingdom), in France, Portugal and Spain there is social and legal support to manage MRF jointly with commercial fisheries [30]. However in these countries, the actual management of MRF is hampered by complex and dispersed legal frameworks [31] due to the existence of multiple administrations (local, regional, national and European) in charge of different competences (e.g., issuing licenses, on-board security or fisheries management). Furthermore, the lack of a license system in France makes more difficult to establish the actual number of recreational fishers [13]. In addition, MRF is carried out in coastal areas intensively used by other stakeholders, carrying out both recreational (e.g., navigation and tourism) and commercial activities (e.g., fisheries, aquaculture, shipping and energy generation). The direct conflict over space and resources with the small-scale inshore commercial fisheries sector is particularly relevant in this area of the Atlantic [23,32].

In fact, retired commercial fishers often engage in MRF, particularly in Spain [33]. Despite the lack of factual information, it is likely that in some cases the illegal sale of catches of retired commercial fishers, among other potential poaching collectives like unemployed people, is significant. For instance, illegal sale of catches by some recreational fishers is documented in Portugal [17,19,34]. Furthermore, illegal sale of catches by this group of recreational fishers is very relevant in Turkey [35], where a similar management framework is in place [30]. Low reported incomes (e.g., the current average pension in Spain is € 1122 per month, while that of retired fishers is only € 958 [36]) are likely the main triggering factor for this phenomenon. Furthermore, environmental degradation of European coasts [37], and lack of basic knowledge about the different MRF modalities (mainly shore angling, spear fishing and boat fishing in Southern Europe [38]) poses additional challenges to the management and sustainability of the recreational fishing sector.

Moreover, results from the workshop indicate that the current institutional fit of MRF in the Atlantic coasts was found to be poor (mean IADF = 1.96 ± 1.19 SD) and therefore needs to be improved (Fig. 1). In this context, each of the actors involved in MRF has an agenda: fisheries administrations are mainly interested in the impact of the catches, the

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