MEDAC Advice for a regulatory framework and efficient management for recreational fisheries in the Mediterranean based on "*FAO Technical Guidelines on Responsible Recreational Fisheries*"

RECREATIONAL FISHERIES IN THE MEDITERRANEAN

MEDAC Advice for a regulatory framework and efficient management

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MEDAC
MEDITERRANEAN ADVISORY COUNCIL

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PRESENTATION

One of the objectives of the Common Fisheries Policy (CFP) published on December 2013 is to ensure that fishing activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits.

In addition, the CFP shall aim to ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels which can produce the maximum sustainable yield.

Finally, the CFP shall implement the ecosystem-based approach to fisheries management so as to ensure that negative impacts of fishing activities on the marine ecosystem are minimised.

On the other hand, coastal ecosystems are of key importance in the Mediterranean because many exploited species live there their whole lives or part of them (spawning or nursery habitats). Many human activities are developed there too, being fisheries one of the most common. But while coastal commercial fisheries (small-scale) have been deeply studied and monitored, recreational fisheries have been forgotten and abandoned by managers and decision makers. Many Mediterranean countries lack of a recreational fisheries regulation, in others it is scarce and old and in others is completely inefficient. But who knows what marine recreational fisheries mean in each country? How much and what do they catch? When? All of these are questions without answer. Moreover, underestimating or forgetting this stakeholder, how can coastal ecosystems be managed efficiently?

In this context, at the end of 2014 the MEDAC Working Group on Recreational Fisheries (from now on WG4), aware of this lack of knowledge, started an attempt to provide rough but serious advice about recreational fishing in the Mediterranean. This document is only a first picture specially thought to provide some initial light to managers and decision-makers but based on the soundest piece of scientific literature about recreational fisheries management that we found, the FAO Technical Guidelines on Responsible Recreational Fisheries (from now on TG13).

Our aim is that EU and Member States adopt it and take it into account and start developing serious recreational fisheries managing and regulations.

SPECIAL CONSIDERATIONS

The statements below should be taken into consideration when reading this document:

- In order to achieve sustainable and responsible recreational fisheries, we consider that the adoption of the TG13 by the EU is paramount. (We should adopt them, too, as MEDAC and as Stakeholders)

- We consider inappropriate the term **Artisanal** to describe coastal commercial fisheries as it includes an important degree of subjectivity. We consider much more suitable to call them **Small Scale Fisheries** (SSF).

- For us Small-scale fisheries are those traditional professional fisheries involving fishing households and making short fishing trips (daily), using vessels until 12m length and relatively small amount of capital and energy.

- Coastal waters (half mile from shore) are of paramount importance to recreational fisheries. Special actions in favour of recreational fisheries should be considered.

DESCRIPTION AND DEVELOPMENT OF A REGULATORY FRAMEWORK

Introduction

In the face of the growing socio-economic and ecological importance of recreational fisheries, the FAO Technical Guidelines on Responsible Recreational Fisheries is proposed as a guide intended to steer the activity towards sustainability at all levels, based on the FAO Code of Conduct (1995).

All policy and management decisions are influenced by social values and demand. These values are not predetermined and unchangeable, they change with the passage of time and the changes within society. The regulatory (or ethical) framework should represent all of these interests or principles together, that will be used in the development of the various laws. Our working group defines in this document its own values in relation to recreational fisheries, indicating what should be taken into consideration in the development of European legislation applicable to the Mediterranean basin.

On the other hand, most of the rules and decisions relating to the management process will have a positive or a negative effect depending on various factors, not least the correct identification of the category to which they refer. Currently there does not appear to be any attempt at a reliable description of the recreational fishermen category within the EU area of the Mediterranean. The WG4, made up among others of various national and regional organisations of recreational fishers, tries to provide a first picture of the real population of recreational fishers of the EU area of the Mediterranean. This should help to support and stimulate feasibility studies, market surveys, researches and projects to implement innovative and sustainable services in the sector of recreational fishing.

All cursive characters in the document are quotes from the TG13.

Characterization of recreational fisheries in the EU Mediterranean

In this section the various organisations within WG4 that are linked to recreational fishing took advantage of the data they have access to, as well as their knowledge and contacts with various authorities, in order to define the number of existing recreational fishermen as realistically as possible, according to the sector that they represent and the geographical reference area.

Data introduced, however approximate, is accompanied by an indication of the sources from which they were obtained. In the case of France and Spain numbers are only referred to the Mediterranean basin.

	COAST	BOAT	SPEARFISHING	TOTAL
ITALY	866342	68723	80000	1015065
SPAIN	111000		11222	122222
FRANCE	200000		40000	240000
GREECE			10000	
CROATIA				28000

ITALY (angling) – Information provided by Ministero delle Politiche Agricole Alimentari e Forestali MIPAAF at 23/03/2015.
ITALY (spearfishing) - Information provided by FIPSAS from a census made by equipment industry.

SPAIN - Information provided by regional administration, sport federations and scientific studies. Data provided in coast category includes also boat category.

CROATIA - Information provided by Croatian recreational fishing federation (CFOSA) from official data. Number provided is for all categories, as the same license allows fishing from coast, boat and spearfishing.

FRANCE - Information provided by Fédération Nationale des Pêcheurs Plaisanciers et Sportives de France (FNPPSF) and Fédération Nautique de Pêche Sportive en Apnée (FNPSA). No difference between boat and coast.

GREECE - Information provided by Greek underwater activities federation from market estimations. Indeed, those estimations consider that those 10000 are those who practice spearfishing regularly, so the numbers provided must be considered underestimated, as those who go occasionally are not considered.

Development of the regulatory framework

MEDAC considers essential to adopt the principle below as a fundamental in any regulatory framework on recreational fisheries developed in the EU:

[...] We should define and implement strategies of governance and management that in decision making represent all stakeholders and their potentially different points of view, to maximize socio-economic benefits and gain commitment to environmentally sustainable actions and behaviour, avoiding overfishing and maintaining aquatic biodiversity on a global scale.

[...] Recreational fishing is considered biologically sustainable if it avoids irreversible or highly damaging changes to wild fish stocks and it retains the structure and function of aquatic habitats and the ecosystem at the disposal of recreational fishers and other active individuals. Once these biological conservation goals have been achieved, the social and economic benefits derived from the use of the resources by recreational fisheries should be maximized in order to ensure socio-economic sustainability.

Indeed, maximizing social and economic benefits is one of the ways to achieve biological conservation goals.

Social and economic criteria that should be borne in mind in a regulatory framework adapted to the European Mediterranean.

1. **Social aggregation/cohesion** – recreational fishing is an activity which can be performed "from the cradle to the grave", for this reason it facilitates people from different age and gender to meet and know each other. This reduces generational gaps and promotes cultural exchange among generations and also among different social classes. It is very common in recreational fisheries to see how low class people share their recreational fishing experiences with high class. This generates very interesting and beneficial social and cultural exchanges that deserve to be studied in depth.

2. **Social benefits of competitions** – Fish caught is donated to charity organizations which usually don't have access to such good quality and fresh fish.

3. **Health** – As an outdoor activity, recreational fishing can help to minimize the bad consequences of the currently usual sedentary life (TVs, videogames, internet...) spread through all generations. Moreover, developing an outdoor activity helps to understand much better what ecosystems are and, consequently, the reasons why they should be preserved.

4. **Low season fuel for coastal communities** – Recreational fishing can be a good opportunity for coastal communities' economies to face low incomes during low season. Where fisheries resources are well managed, it generates all season tourism. This means income for small hotels, restaurants, shops in low season (winter/autumn/early spring). In Europe a good example of this is the recreational angling tourism to Ireland, where the good sea bass management attracts anglers from several EU countries.

5. Recreational fishing economy is more dependent on the **conservation of aquatic resources** than on their exploitation.

6. **Recreational fishing economy** should be evaluated in its complexity taking into account all the aspects which contributes to it, some examples:

a. Tackle trade industry (jobs).
b. Diving and spearfishing industries (jobs).
c. Boat industry (jobs).
d. Money spent to buy fishing tackle
e. Money spent to move to the fishing area (transportation costs (fuel, tolls...), renting for an itinerant fishing journey, flight tickets...)
f. Money spent to stay more than one day in the fishing area (accommodation, restaurants, apartments, supermarkets, bar…)
g. Money spent for boats (port fees, mechanics...)
h. Money spent to rent a boat.
i. Spearfishing and angling stores.
j. Insurances.
k. Training courses (recreational fishing, free-diving...)
l. Club membership fees
m. Money spent to rent/contract local coastal services when competitions are developed (security, medicine, big boats renting to transfer participants...)
n. Taxes to develop fishing competitions

7. **Ethics** – Some recreational fishermen only consume the fish they get, as they consider is the most ethical way to catch fish. They practice active and selective fishing, so they guarantee that, compared to professional fishing, the fish suffers the less possible and only the species they eat are caught. Spearfishers can decide before shooting what is the fish they want to keep, anglers can release alive fish caught accidentally or those fish which haven't reached yet the MLS.

8. **Educational benefits of competitions** – Recreational fishers are gathered in fishing competitions and they internalise competition regulations (in many cases more restrictive than administration's ones) as those to follow in their fishing trips.

Other principles or values that we highlight

1. Justice and fairness in the allocation of fishing opportunities.

2. For us "quality recreational fishing" means healthy stocks with fish of all age classes, sustainable harvesting and attention to biodiversity. This should be achieved developing management schemes based on scientific advices and monitoring feedback, which take into account recreational/sport fisheries peculiarity. The necessary constrains would however not represent a limit to the development, but an incentive for creating a new approach for the sustainable growth and development of recreational fisheries.

This should be supported by effective control enforcement on illegal fishing.

3. The integration of recreational fisheries in the decision-making process involving aquatic ecosystems. This integration should be at an equal level of commercial fisheries and environmental associations.

4. Scientific researchers should develop a specific approach to investigate recreational fisheries forgetting the approach used for commercial fisheries.

5. Adaptation of the normative system that underlines the big potentialities of the development and the coexistence of multiple local fishing systems (professional and recreational) that represent an important and additional value for the socio-economic growth of a coastal territory.

6. Recreational fisheries should not be confused with subsistence fisheries. Both are clearly defined at FAO/EIFAC code of practice.

The concept of **aquatic stewardship** as a moral principle should guide the thoughts and actions of the recreational fishing sector. From the perspective of each active individual or fisher, this means a moral obligation to protect aquatic ecosystems and to control activities carried out in this regard.

This regulatory framework, which aims to regulate behaviour is guided by the following principles and key aspects:

- It focuses on flexibility and the adaptation of management processes, and the development of skills in adaptive management.

- It avoids management objectives and reference points with an excessively limited approach, such as MSY.

- It focuses on the management of the resilience of social-ecological systems, its impact and critical variables, maintaining the whole range of diversity: biology, stakeholders and institutions.

- It takes into account the interests and knowledge of the various stakeholders to schedule management interventions and in decision-making.

- It emphasises the contribution to ecological sustainability made by each fisher and by each individual actor adopting behaviour that benefits the environment.

In this context MEDAC agrees with the adoption of the concept of aquatic stewardship as part of our proposed regulatory framework. It's the principle from which it is necessary to depart for a synergistic action wherein the exigencies of all interested categories are gathered: managers and operators of the recreational fishing sector, managers and operators of the tourist sector, environmentalists, researchers…

Nevertheless, in order that aquatic stewardship becomes accepted and embraced by the recreational fisheries sector it is paramount that other stakeholders that share the resource behave accordingly, developing sustainable and responsible fisheries.

MANAGEMENT FRAMEWORK FOR SUSTAINABLE RECREATIONAL FISHERIES

Introduction

With aquatic stewardship for sustainability as the key normative framework governing recreational fisheries we must define a guiding framework for "day-to-day" management. Taking into account that uncertainty in recreational fisheries is pervasive we need to define the processes and principles that will tackle this uncertainty and will enable robust decisions to help implement normative framework of aquatic stewardship.

The process and principles that will make recreational fisheries resilient should go through:

- **Adaptive management** and **Structured decision-making**.

Adaptive management of recreational fisheries

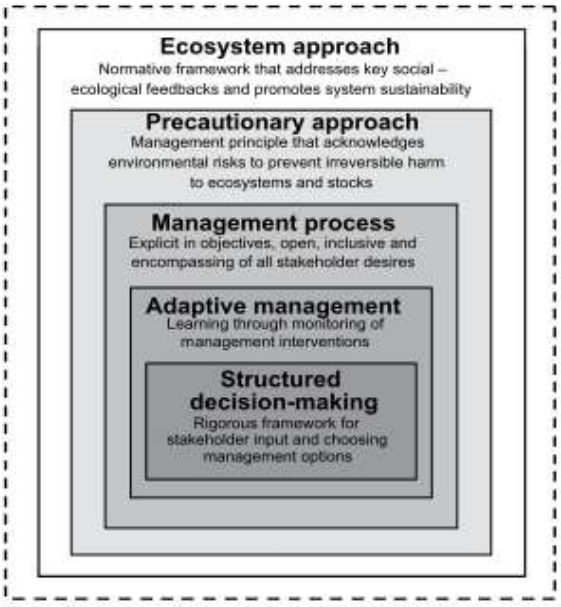


Notes: Adaptive management of renewable natural resources such as fish is a formalized iterative process that acknowledges uncertainty and achieves management objectives by increasing system knowledge through monitoring, feedback and revision of objectives and means to achieve objectives. Integral to it are both a decision component and an opportunity to learn. Structured decision-making (grey circles) is an organized and transparent approach to the decision process for identifying and evaluating alternatives and justifying complex decisions. However, structured decision-making does not necessitate the iteration and consequential higher-order learning (white circles) inherent in adaptive management.

And, in the other hand, and in order to guarantee sustainability, this process should be always developed embracing two key principles:

- **Ecosystem approach** and **Precautionary approach**.

The nested structure of management principles affecting the core management process of adaptive management



Notes: The core management process of adaptive management (AM) in recreational fisheries management is perceived as nested in, and being affected by, overarching management principles (PA), which are in turn derived from the guiding normative frameworks of the ecosystem approach and aquatic stewardship. Core elements of each component are given inside each box. The dotted line visualizes the flexibility and context-dependence of the prevailing normative. By contrast, the suggested management process of decision-making is less open to change, and, similarly, the underlying risk-averse approach to avoid irreversible loss to ecosystem structure and function will prevail in the light of pervasive data uncertainties that characterize many of today's recreational fisheries. Note that AM can mean either passive or active AM.

Suggested adaptive management in EU Mediterranean

Central to the success of the structured decision-making process in recreational fisheries management is the requirement to ***articulate fundamental*** *(long-term desired outcomes)* ***and operational*** *(i.e. quantifiable)* ***objectives clearly****, acknowledge uncertainty explicitly and respond transparently to all stakeholder interests in the decision process*.

The first step is to accept that ecosystem-level impacts are possible through recreational fishing, rather than discounting such effects as has happened in the past. Then, rather than focus on target species only, a broader ecosystem outlook is needed, and this ecosystem perspective should then be used in the routine assessment and evaluation of alternative management options.

If faced with considerable uncertainty and risks, and if it is no clear which action to choose, actions should be chosen to give priority to conserving the biological productivity over the long term rather than satisfying short-term economic or social demands.

It is obvious that when talking about marine recreational fisheries, this last statement should be applied not only to recreational fisheries but also to commercial fisheries that may share the same stocks (i.e. small-scale commercial fisheries).

According to the adaptive management and structured decision-making process, and from the EU Mediterranean basin recreational fisheries scope, WG4 sets the objectives (what do we want to achieve) of the management plan, discusses plausible alternative tools (solutions) and evaluation criteria, and evaluates alternatives.

PROBLEM: Lack of exhaustive knowledge (quantitative and qualitative) of marine recreational fisheries population at EU. This does not allow making an appropriate ecological, social and economic assessment of the activity.

OBJECTIVE: Have a clear picture of recreational fisheries at EU level by basin.

ALTERNATIVE 1: Create a compulsory marine recreational fisheries annual census for all EU countries. The information gathered should be discussed and agreed with stakeholders, but could include aspects like modalities practiced, assiduity, gender, age...

EVALUATION 1: After a few years after EU implementation results could be compared easily.

OUTCOMES 1: Good quality, reliable data due to compulsory measure. This must not necessarily be linked to a tax neither a license.

TRADEOFFS 1: Develop EU regulation. Develop common data base and initial implementation (bureaucracy).

ALTERNATIVE 2: Make a periodical survey (telephone, on the spot...)

EVALUATION 2: After some annual surveys results could be compared easily.

OUTCOMES 2: A rough picture of recreational fisheries in the EU. Quickly applicable due to

the lack of regulation needs.

TRADEOFFS 2: A substantial risk of bias in the results due to suspicion among recreational fisheries. Also cultural aspects could show different results among countries. Also regular funding will need to be invested in order to make the annual surveys.

ALTERNATIVE 3: Request stakeholders to make a rough picture (like the one we include in this document).

EVALUATION 3: No chances of evaluating the results until stakeholders make new estimations.

OUTCOMES 3: A rough picture of recreational fisheries in the EU. Quickly applicable and without cost.

TRADEOFFS 3: Stakeholders' dependent. If multilateral relations break due to policy reasons EU would eventually face a lack of data situation. Results may, in addition, include some important bias depending on the stakeholder and country where the data is provided from.

ALTERNATIVE 4: Create a free EU recreational fishing app and get the data provided.

EVALUATION 4: After a few years after app launching, data obtained could be compared easily.

OUTCOMES 4: On-the-spot, high quality data in terms of user.

TRADEOFFS 4: Risk of some bias due to the acceptance of the app. Probably stakeholders' acceptance dependent and probably mostly accepted by regular recreational fishers and not so much by occasional.

ALTERNATIVE 5: Mix together some of the previous alternatives.

EVALUATION 5: Annual comparison of data obtained. After few years a close and reliable picture could be drawn.

OUTCOMES 5: Mixing previous alternatives could help to understand faster the degree of bias and reliability of the data obtained.

TRADEOFFS 5: Risk of some bias depending on the alternatives chosen, but always less than choosing only one of them.

RECOMMENDATION: Alternative 5, mixing together alternatives 1 and 4, is for sure the one that will give more reliable results. If not enough funding for 4, alternative 1 should be at least guaranteed.

PROBLEM: Passive gears (nets, long-lines, pots...) still allowed in some EU countries. Passive gears do not allow controlling neither the species nor the sizes or number of individuals caught. Also catch and release is almost impossible due to the fish usually dies earlier. In a context of overexploited marine ecosystems we cannot allow this.

OBJECTIVE: Permit only recreational fisheries modalities that allow the fisherman to have control over catches (number, species...) and are highly selective (rod, hand-line, spearfishing...).

ALTERNATIVE 1: Discuss with stakeholders which modalities should be allowed by basin.

EVALUATION 1: During several years, request MS control statistics, in order to assess the enforcement of the measure. On the other hand, in those countries were passive gears are currently allowed, try to create projects with local scientific institutions in order that they monitor areas where they were popular in order to see whether or not biomass increases.

OUTCOMES 1: Banning passive gears will have three main outcomes. First, catches will decrease and biomass will increase, because these practices are highly effective. Second, recreational fishermen will have more control over species caught and their sizes, with benefits to ecosystems. And finally, many conflicts with small-scale fishermen that use the same gears will disappear.

TRADEOFFS 1: In some EU countries these practices are highly accepted within recreational fisheries community (northern countries) and a ban on them may have strong political impact. But our seas are highly overexploited and we cannot allow these kinds of gears (at least the Mediterranean).

ALTERNATIVE 2: Alternative 1 but with a period of adaptation. This period should be agreed with stakeholders (like with discards).

EVALUATION 2: As in Alternative 1.

OUTCOMES 2: As in Alternative 1 but with later results.

TRADEOFFS 2: As in Alternative 1 but no so abrupt.

RECOMMENDATION: Alternative 1 is recommended in the Mediterranean. The state of this sea is critical and allowing those gears makes no sense. Indeed, they are mainly used by those who late sell the fish.

NOTE: FIPSAS disagrees with this recommendation but recognizes the scarce sustainability of these gears. They suggest to subject their use to a specific license allowed only in a limited number per each fishing zone.

PROBLEM: For many recreational fisheries targeted species there is no MLS or, if there is, it is far below the first maturity size.

OBJECTIVE: Avoid as much as possible catches of immature fish.

ALTERNATIVE 1: Design, together with scientists and stakeholders, first maturity sizes for all RF targeted species. Make them compulsory for all fisheries (recreational and commercial).

EVALUATION 1: During several years, request MS control statistics, in order to assess the enforcement of the measure. Discards data may also be valuable. Create monitoring programs.

OUTCOMES 1: More fish will have the opportunity to spawn at least once so biomass should increase and biodiversity loss should not be so threatened.

TRADEOFFS 1: There can be a strong rejection from commercial fisheries. It will be difficult that they accept more restrictions.

ALTERNATIVE 2: Alternative 1 but only compulsory for recreational fisheries.

EVALUATION 2: As Alternative 1 but without discards data.

OUTCOMES 2: As Alternative 1 but as commercial won't enforce the measure the results will be minor.

TRADEOFFS 2: There can be a strong rejection from recreational fisheries because commercial won't enforce it.

ALTERNATIVE 3: Alternative 1 not compulsory, but as a recommendation. This should be accompanied with a strong acceptance campaign.

EVALUATION 3: During several years, request MS control statistics, in order to assess the enforcement of the measure

OUTCOMES 3: If accepted outcomes can be really positive. In order to achieve this acceptance, the campaign must last in time for several years.

TRADEOFFS 3: If there is no campaign the results may be slow and negligible.

RECOMMENDATION: Alternative 1.

PROBLEM: Some recreational fishermen have unsustainable or hazardous behaviours while practicing their activity due to their ignorance. This can pose a problem on marine ecosystems or on the security of other people or themselves.

OBJECTIVE: Provide recreational fisheries community with basic and simple knowledge in order that they fish in a more sustainable and secure way.

ALTERNATIVE 1: Design, together with scientists and stakeholders, and accounting for basin and modality, a very general and simple set of key concepts in matters of marine ecosystems, fish and security. Every recreational fisherman that wanted to be included in the RF census or get the RF license should demonstrate at least once in his/her life that he/she has achieved that knowledge.

EVALUATION 1: Create a set of questions that should be answered (online or in-person) by recreational fishers at least once.

OUTCOMES 1: Unsustainable and hazardous practices would reduce, mainly in new generations more inclined to change their behaviour.

TRADEOFFS 1: There could be some rejection from some stakeholders that initially could consider this a barrier to fishing access. It is important to note that this should not be intended to create a barrier to recreational fisheries access but to improve knowledge. So concepts should be very general and easy to achieve. Designing and implementing the online and/or in-person questionnaire would also require funding.

ALTERNATIVE 2: Alternative 1 but not compulsory. Reading and achieving this knowledge should be “recommended”.

EVALUATION 2: As Alternative 1 but with a voluntary questionnaire.

OUTCOMES 2: Depending on stakeholders’ response could be quite similar or be far away from Alternative 1.

TRADEOFFS 2: The uncertainty on the rate of response and the funding required.

RECOMMENDATION: Alternative 1 would be desirable. If stakeholders’ pressure is too strong Alternative 2 should be considered.

POLICY AND INSTITUTIONAL FRAMEWORKS

Introduction

Coherent and effective fishery management requires an appropriate policy and institutional framework that usually involves fisheries laws and regulations as well as organizations or community-derived alternative structures that fulfil important roles in the governance and management of fisheries.

[...] Stakeholders are diverse and may have conflicting interests, so policy should provide the means for development of a framework of fishing-rights and management institutions. Appropriate mechanisms for gathering input and managing conflicts within and among user groups are needed if recreational fisheries management is to succeed.

As in the Mediterranean many recreational resources are shared with commercial fisheries, fair, joint and non-exclusive management plans are essential to reach a good conservation status and development of the fisheries.

On the other hand**, *sufficient funding*** *is required to execute management, outreach, monitoring and enforcement responsibilities.*

To encourage compliance with regulations, management organizations must not only enforce them but ***educate stakeholders****.*

Governance structure

When talking about governance of natural resources in the Mediterranean we consider co-management as the best way to go, but it should involve different actors in the different steps of the decisional process. Natural resources are a common good whose management requires:

- Regulation and clear recommendation at central level (involving Government, scientists and stakeholders).
- Data collection and monitoring.
- Law enforcement (Government).
- Funds (Government, private and community).
- Awareness (community).

The risk of co-management is to make the decisional process too slow and bureaucratic with too many involved, but we think that with the support of facilitators (when necessary) it is feasible and effective.

Access, rules, compliance and enforcement

MEDAC members consider that EU should establish a legal framework for recreational fisheries that encompasses issues as rights and priorities, agents responsible for management, licensing requirements, fees and regulations.

This legal framework should obviously be based on all issues **developed in section 1** of this document.

Currently EU nor the MS are treating fairly recreational sea fishing. The EU and MS are well aware of this as recreational fisheries organisations routinely raise this issue with the relevant institutions and decision makers at EU and national level. However, it seems most MSs in the Mediterranean prefer not to treat recreational fisheries as a fully legitimate stakeholder on an equal footing with commercial fisheries and aquaculture. The reasons for that are not investigated in any detail by anybody (but it would be nice if somebody did). This unfairness seems to be based on a number of factors in combination including the institutional setups, which for good reasons historically were focused on commercial fisheries alone. Time has changed but the institutional setups have not followed suit. This is reflected by the institution's staff, which are mostly or all skilled in commercial fisheries only. Also the scientific community is overwhelmingly hired to deal with commercial fisheries issues, much less recreational issues. Cost implication is another and maybe the biggest issue. Unfortunately, there is little understanding among managers and decision makers that society could benefit a lot from a rebalanced allocation of access to and exploitation of the fish resources.

It will be necessary, therefore, that management organizations are provided with staff that has expertise in recreational fisheries.

The COUNCIL REGULATION (EC) No 1967/2006 'concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea' has mentions of "leisure fisheries", "recreation" and "sport" (Art 2(8) and Art 17). The provisions of the CFP apply to the Mediterranean Sea (recital 1). The reformed CFP (EC 1380/2013) strangely enough only mentions about recreational fishing (recital 3): "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."
Nothing is said in either of the two pieces of legislation about all the positives which recreational fishing provides to its practitioners and society as a whole. This is a great shame.
This puts recreational fishing in a disadvantaged position from the outset. Fishing access and funding are made a commercial fishing prerogative whereas recreational sea fishing seems mainly or only of interest if it is considered to be a nuisance or a threat to the commercial fisheries (e.g. the rules about RF keeping a certain distance to commercial gears).
An often heard argument for not dealing properly with recreational fishing is "lack of data on recreational fisheries". Indeed, the lack of data is immense, in particular the lack of socio-economic data. Since several years recreational fishing organisations have asked more and better data to be provided – not the least socio economic data. For purposes of data collection and the Control Regulation funds should be found within the CFP or EMFF to research the catches and socio economics of RF across European states.

Recreational fisheries generate and support as much or more economy and jobs than do commercial fisheries per fish exploited. These jobs are totally dependent on healthy fish stocks and the recreational fishers' access to them.

COUNCIL REGULATION (EC) No 1967/2006 is about, as the title says: "management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea". The scope states, that *This Regulation shall apply: (a) to the conservation, management and exploitation of living aquatic resources where such activities are pursued*.

The CFP is more detailed as to what is meant by *sustainability*. It puts *environmental sustainability* above other objectives, which also must be taken into account. According to the CFP of 2013 (Article 2, Objectives) the CFP *shall ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits, and of contributing to the availability of food supplies*.

From a recreational fisheries and a "best use of the resource" views, the *availability of food supply* objective shall not be regarded as an objective which exclude other legitimate uses of the fish resources.

When developing regulations stakeholders' input should be essential to set the goals and objectives and the management organization should determine the appropriate strategy to achieve the stated goals.

Funding and licensing

EU should provide enough funding to guarantee the development of this framework.

Management organizations must base their decisions on stakeholders' input but also on scientific advice. Hence enough funding for scientific studies is essential. Funding is also required for control activities, monitoring and proper management teams (staff).

There are several ways to obtain this funding, being licensing an interesting option as it is not only a potential funding stream to support management actions but also offers some alternative advantages:

- A mechanism for limiting access to a fishery.

- The means to better study a fishery.

The potential fee should be commensurate with functions provided by the management and it should vary according social considerations. All money collected by licensing should be reinvested in recreational fisheries management.

Nevertheless, a fee-free EU license system in the Mediterranean should help the assessment of recreational fisheries in the Mediterranean. As recreational fishing is a no-profit activity we consider that a payment license is not compulsory. Citizens who go fishing already pay for fisheries management via direct taxes to the MS and indirect by buying tackle and gears, boats, fuel and so on through the payment of VAT. Funding should be provided by the EMFF (European Maritime Fishing Fund) as research on recreational fishing and on the impact of recreational fisheries to the resources involves the fishing sector.

Design principles for sustainable management

To achieve a sustainable management of recreational fisheries a well-defined policy and institutional framework should incorporate the principles defined by Ostrom (1990):

- Clearly defined boundaries.

- Right to self-determination.

- Collective choice arrangements.

- Effective monitoring.

- Graduated sanctions.

- Mechanisms for conflict management.

RECREATIONAL FISHERIES MANAGEMENT

Introduction

Fisheries management is the process by which sound information is used to achieve management goals by directing actions at the three components of the fishery system: the habitat, the biota and the humans.

The primary goals of fisheries management should be consistent with those in the Convention on Biological Diversity (2011): (i) conservation of biodiversity, (ii) biologically sustainable use of its components and (iii) equitable sharing of benefits among diverse stakeholders.

[...] The benefits to be gained from recreational fisheries may include food but this is secondary to other outputs from the fishery such as psychological and physiological aspects of the fishing experience (Fedler and Ditton, 1994; Weithmann 1999). Thus, the first challenge for the recreational fishery manager is to ***understand stakeholder attitudes and values*** (already developed at section 1 of this document).

The potential impact (negative or positive) of recreational fisheries may be relevant in some ecosystems, local communities and civil society. Thus, managers should not omit their management, in order to maintain healthy ecosystems while guaranteeing the benefits that recreational fisheries provide. To better understand these impacts, data collection programs should be developed on:

1- Biological impact (catches, waste, anchoring...)
2- Social impacts
3- Economic impacts (industry and businesses)

This management should not be addressed without taking into account other interested stakeholders. MEDAC considers that, in our context, other main interested potential stakeholders are:

- Small-scale fisheries
- Recreational fishing industry and businesses
- Divers
- All the activities involved in the tourism sector
- Environmental NGOs

The management purview

Recreational fisheries in the Mediterranean are selective, targeting several different species, some of them top predators. So management measures may have cascading effects on other species and ecosystem processes.

Main species targeted by modality in EU Mediterranean		
Coast	**Boat**	**Spearfishing**
Argyrosomus regius	*Argyrosomus regius*	*Argyrosomus regius*
Belone belone	*Auxis thazard*	*Balistes capriscus*
Conger conger	*Balistes capriscus*	*Conger conger*
Coriphaena hippurus	*Belone belone*	*Dentex dentex*
Dentex dentex	*Conger conger*	*Dicentrarchus labrax*
Dicentrarchus labrax	*Coriphaena hippurus*	*Diplodus cervinus*
Diplodus spp	*Dentex dentex*	*Diplodus puntazzo*
Epinephelus aeneus	*Dicentrarchus labrax*	*Diplodus sargus*
Epinephelus costae	*Diplodus spp*	*Epinephelus aeneus*
Euthynnus alletteratus	*Epinephelus aeneus*	*Epinephelus costae*
Labrus merula	*Epinephelus costae*	*Epinephelus marginatus*
Labrus viridis	*Epinephelus marginatus*	*Labrus merula*
Lichia ama	*Euthynnus alletteratus*	*Labrus viridis*
Lithognathus mormyrus	*Labrus merula*	*Lichia ama*
Loligo vulgaris	*Labrus viridis*	*Lophius piscatorius*
Mugilidae spp	*Lichia ama*	*Mugilidae sp*
Mullus surmuletus	*Lithognathus mormyrus*	*Mullus surmuletus*
Oblada melanura	*Loligo vulgaris*	*Muraena helena*
Octopus vulgaris	*Lophius piscatorius*	*Mycteroperca rubra*
Pagrus auriga	*Mugilidae sp*	*Octopus vulgaris*
Phycis phycis	*Mullus surmuletus*	*Pagrus auriga*
Pomatomus saltatrix	*Mycteroperca rubra*	*Phycis phycis*
Psetta maxima	*Naucrates ductor*	*Plectorhinchus mediterraneus*
Sarda sarda	*Oblada melanura*	*Pomatomus saltatrix*
Sarpa salpa	*Octopus vulgaris*	*Sarda sarda*
Sciaena umbra	*Pagellus acarne*	*Sarpa salpa*
Scomber spp	*Pagellus bogaraveo*	*Sciaena umbra*
Scorpaena porcus	*Pagellus erythrinus*	*Scorpaena porcus*
Seriola dumerili	*Pagrus auriga*	*Scorpaena scrofa*
Serranus scriba	*Pagrus pagrus*	*Sepia officinalis*
Sparus aurata	*Phycis phycis*	*Seriola dumerili*
Sphyraena sphyraena	*Plectorhinchus mediterraneus*	*Serranus scriba*
Sphyraena viridiensis	*Polyprion americanus*	*Sparisoma cretense*
Symphodus tinca	*Pomatomus saltatrix*	*Sparus aurata*
Todarodes sagittatus	*Sarda sarda*	*Sphyraena viridiensis*
Trachinotus ovatus	*Sarpa salpa*	*Spondylosoma cantharus*
Trachurus spp	*Sciaena umbra*	*Symphodus tinca*
Umbrina cirrosa	*Scomber spp*	
	Scorpaena porcus	
	Scorpaena scrofa	
	Sepia officinalis	
	Seriola dumerili	
	Serranus scriba	
	Sparisoma cretense	
	Sparus aurata	
	Sphyraena sphyraena	
	Sphyraena viridiensis	

	Spondylosoma cantharus *Symphodus tinca* *Tetraptursu belone*	

Managers must be aware of the roles of recreational fisheries and the interdependences that link them to other members of the ecosystem.

In order to assess the impact of recreational fisheries in fish stocks, the prior implementation of two key measures is paramount:

1- A census for all recreational fisheries in EU, with standardized and defined data for all EU to be collected.

2- Assessment of coastal species targeted by recreational fisheries.

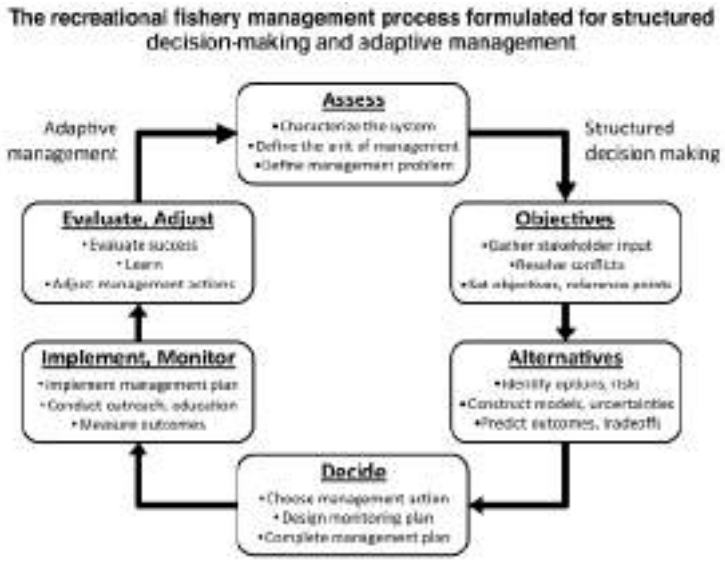
The single-species management approach is a "necessary but insufficient" purview that should be complemented with a more ecologically realistic system view and a more environmentally responsible perspective.

The management process

We have previously mentioned in this document that in such complex systems like inshore fisheries, structure decision-making in an adaptive management framework is the optimal management solution.

The process of recreational fishery management should involve:

- Characterizing the system (will be done by WG4 in 2016).
- Assessing the fishery (more investment in research is needed).
- Setting goals and objectives (together with stakeholders).
- Choosing and implementing a course of action.
- Monitoring, evaluation and adjustment (funding needed).



The development of a recreational fishery management plan can provide a framework for identifying problems, stakeholder desires, goals and objectives.

General elements of a recreational fishery management plan

Plan element	Description
1. Characterize the system	Characterize: (i) the fishery: background, history, status, types of fishers and their preferences; (ii) the geographic and legal setting: environmental characteristics, socio-economic and political factors, laws; and (iii) the ecosystem – food web, sensitive species, system productivity. Identify threats to fishery and potential for habitat modification that has impacts on stocks. Identify potential limiting factors (biological, physicochemical).
2. Goals and objectives	Gather stakeholder input, resolve conflicts, and set measurable objectives, including establishment of reference points and performance indicators, and indicators of ecosystem status.
3. Strategies	Define the management actions necessary to achieve goals and objectives and set a timeline for implementation. Predict outcomes for the fishery and indirect effects on the ecosystem.
4. Monitoring	Monitoring required and reference points, performance indicators. Enforcement and outreach plan.
5. Financial responsibilities	The cost of implementing the plan, including monitoring and enforcement. Methods for having users and beneficiaries pay a portion of management costs.

As general provision (plan elements 2, 3 and 4) the management plan should be at Regional level (sea basin level, for example Mediterranean). The system (p.e. 1) should be characterized at sub-regional level. The financial responsibilities should belong to European and National level mainly through the EMFF.

The main difficulty that we find today is the lack of willingness to deeply understand recreational fisheries by governments, managers and decision makers, which are traditionally under pressure by commercial fisheries stakeholders. As a consequence, no funds are allocated on the research, which only recently showed interest in the recreational fisheries sector. Furthermore, we need a specific scientific approach as recreational fisheries can't be investigated or understood using research methods commonly applied to the commercial fisheries sectors (different purposes).

It should be considered that when recreational fisheries stakeholders lose faith in managers, decision makers and scientists they are no longer open to collaboration. On the other hand, with boost in confidence they can give very good support in the development of the management plan elements 1 to 4.

Regarding management objectives, *the responsible manager must understand stakeholder desires, optimize where possible and educate where not, [...] providing a more sustainable alternative by enhancing the fishery by other means*.

Manager must also take into consideration the need to restore to the feasible extent the habitat where recreational fisheries are developed. Some actions will be directly addressed to

stakeholders (anchoring, bait, boat discharges) while others, when possible, should be addressed to external factors. To reach this, Maritime Spatial Planning and the Marine Strategy Framework Directives should help.

We consider that the main external factors that have an impact on Mediterranean recreational fisheries are:

- Commercial fisheries gears allowed with no distance from the shore (for example trammel nets).
- Lack of assessment of illegal fishing practices by both commercial and non-commercial sector.
- Anthropization of rivers: dams and/or river mouth structures which affect habitats of euryhaline species
- Pollution mainly in high urbanized coastal areas

Harvest regulations

Although most EU Mediterranean countries do not apply them, recreational fisheries science offers an important array of measures to regulate harvests. *These are often categorized as either input controls (regulating the amount and manner of fishing) or output controls (regulating the fate of the catch), but can also be indirect, using information and outreach to influence human behaviour*.

An understanding of the life history of recreational fish and the effort response by fishers to altered regulations is necessary if harvest regulations are to be effective and achieve their objectives. [...]Inadequate regulations at any location may jeopardize fishery sustainability for all anglers.

Management actions and regulations targeting recreational fishers and interactions between fish and recreational fishers

Control type	Explanation and examples
Input controls	
Licensing, fees	Fees based on duration of licence, species, recreational fisher residency, recreational fisher status (e.g. youth, elderly, military, student, native, tourist)
Gear restrictions	Hook and line, hook type, artificial vs bait
Method restrictions	Motor trolling; attractants: ground baiting, artificial light, scents
Closed times, seasons	Spawning period, aggregations, stressful environmental conditions
Closed areas	Spawning areas, aggregations, refuges, marine protected areas
Fishing contests	Minimize conflicts with other users; can be employed to encourage harvest of overabundant or undesirable species
User conveniences	Provision of boat landings, fishing piers, fish-cleaning stations may attract recreational fishers
Effort restrictions	Limited entry, number of rods/lures/lines

Output controls	
Length limits	Limit size of fish retained (minimum, maximum, open or closed slot limits, 'one over X' limits)
Bag limits	Limit number of fish retained; daily or annually, and in possession with tags and stamps as variants for particular sizes
Sale of fish	Prohibit commercialization of recreational fish species
Harvest restrictions	Restrict based on wild vs hatchery, conservation status
Fish holding	Prohibit to reduce sorting, stress, translocation
Harvest mandates, bounties	Encourage harvest of overabundant or undesirable species

Note: In general, input controls regulate the amount and manner of fishing and output controls regulate the fate of the catch.

Bag and size limits and annual quotas have several purposes but, generally, they are used to limit fishing mortality. Daily bag limits are the most common output control in recreational fisheries. These rules affect the per capita harvest rate, but because access to many recreational fisheries is unlimited, not necessarily the total harvest from the fishery (Radomsky et al., 2001). Daily bag limits affect harvest expectations and thus, fisher behaviour (Beard et al., 2011). However, unless bag limits are very restrictive, potentially displacing the effort or severely limiting the take, they will not reduce harvest mortality sustainably because few recreational fishers actually catch the daily limit. Effort controls and size limits on harvesting may be more effective for reducing fishing mortality, and bag limits would then allow more recreational fishers to participate and "share the benefits".

Length-based harvest limits are another common form of output control in recreational fisheries. By tailoring size restrictions to match fish population characteristics and level of fishing effort in the light of objectives, the manager can use fishing as a means to manipulate fish population structure. [...] Generally, size limits that disregard fish population demographics and ecosystem characteristics can be counterproductive.

Five common size-based harvest regulations for managing recreational fisheries, and the associated vulnerability to harvest, management objectives and demographic conditions necessary for the tool to be effective

Size (total length) limit type	Fish that must be released	Management objectives	Demographic conditions
Minimum	Fish smaller than the size limit	Conserve recruits; produce larger fish for reproduction and harvest	Low recruitment, rapid growth, low M
Maximum	Fish larger than the size limit	Reduce abundance and competition among small fish; maintain trophies and fecund large spawners	High recruitment, slow growth, moderate M
Open slot	Fish above and below an intermediate size class (combination of minimum-size and maximum-size limits)	Protect young recruits and spawners; maintain yield and CPUE; protect large, fecund spawners, maintain trophies	Low recruitment, rapid growth, low M; particularly useful when size-dependent maternal influences affect recruitment and when fishing could deplete the spawning stock
Closed slot	Fish within an intermediate size class	Reduce abundance and competition; allow harvest of large fish	High recruitment, slow growth, high M
Total catch-and-release	All fish	Improve CPUE and size, maintain stock in "natural" condition, consumption prohibitions	Little interest in harvest by fishers, high F; sensitive stock; high contamination

Note: F = fishing mortality; M = natural mortality; CPUE = catch per unit of effort.

The choice of optimal harvest regulations for recreational fisheries or for a combined exploitation of commercial and recreational fisheries will thus be fishery-specific and site-specific.

Application of harvest regulations provides means to improve the fishery for recreational fishers. However, it is also an opportunity to learn about the system and improve management in the future. In some cases, regulations may not produce the desired effects so it is important for managers to follow up regulation changes with fishery evaluation.

RECREATIONAL FISHING PRACTICES

The activities and behaviour of individuals may affect their safety, gear selection, use of aquatic resources and the impact that their fishing has on the environment and on individual aquatic animals, particularly fish. Because in some cases the behavioural choice is voluntary we consider that maritime recreational fisheries should follow some guidelines that would minimize or eliminate the potential negative consequences.

Although next we provide for each modality some general guidelines to influence in that behaviour, each stakeholder should develop its own, together with managers, when developing a management plan for a specific region.

COAST AND BOAT

+ Release fish caught in the spawning season

+ Release large females not only in the spawning season

+ Follow catch & release **best practices**

+ Don't leave trash behind

+ Avoid lead weights

+ Use circle hooks and/or barbless hooks

+ Observe always the **first sexual maturity size**. All species have a size from which they are sexually mature. Do not catch smaller individuals and they'll be able to spawn at least once!

+ Do not catch more fish than those **you are able to eat** in a short period of time. Although bag limits may be higher leave the fish for the next fishing day. They will have more opportunities to spawn and you more chances to catch them.

+ Join a recreational fishing **club or association**. This will allow you to know other colleagues and learn from experienced ones.

+ Respect courtesy distance from other users

BOAT

+ Avoid **anchoring** on rocky bottoms, on calcareous structures (coralligenous) or on plants like *Posidonia oceanica*. Search, whenever is possible, sandy bottoms or mooring buoys.

+ When visiting new fishing spots, collect all the information about **special regulations** in the zone (marine protected areas, closing seasons, licensing...)

+ Respect safety distance from other users

SPEARFISHING

+ Diversify your **target species**. Do not focus always on the same species as it could be especially vulnerable. It's important that you don't put too much pressure on species that are in spawning season.

+ Diversify **sizes**. Catching always same-sized fish could have important consequences on population structure of local stocks. You must take into account also that there are species that change their sex depending on their size, so we would be contributing to limit the quantity of individuals of that species.

+ Observe always the **first sexual maturity size**. All species have a size from which they are sexually mature. Do not catch smaller individuals and they'll be able to spawn at least once! In this site we present you a list with those sizes for the most popular species.

+ Do not catch more fish than those **you are able to eat** in a short period of time. Although bag limits may be higher leave the fish for the next fishing day. They will have more opportunities to spawn and you more chances to catch them.

+ Coming close to the end of your fishing day avoid **shooting difficult potential catches**. You may end having to leave them badly wounded because you don't have time enough to remove them from the cave.

+ Avoid shooting fish in **difficult caves**, as if you are not able to remove them the fish will die and the cave would be blocked to other eventual inhabitants.

+ Join a spearfishing **club or association**. This will allow you to know other colleagues and learn from experienced ones.

+ Sign up for a **spearfishing course**. You will learn basic security measures to minimize risks.

+ If you use a boat to reach your fishing spot avoid **anchoring** on rocky bottoms, on calcareous structures (coralligenous) or on plants like *Posidonia oceanica*. Search, whenever is possible, sandy bottoms or mooring buoys.

+ When visiting new fishing spots, collect all the information about **special regulations** in the zone (marine protected areas, closing seasons, licensing...)

+ Make sure all your **equipment** is in perfect conditions. If not, there is high risk of loosing your catches, that will unnecessarily die.

It would be desirable that, when possible, managers integrate those guidelines into regulations, and when not, help to spread them developing educational programs together with stakeholders.

INFORMATION, KNOWLEDGE SHARING AND RESEARCH

Information, knowledge sharing and research are essential elements of fisheries management. Particularly relevant is the idea of education and capacity building within the

recreational fishing community and among recreational fisheries managers so as to be prepared to solve past and future sustainability issues.

Information and knowledge sharing

Information must be exchanged and shared among various actors internal and external to the recreational fishing sector in order to reduce conflict, promote sustainable fishing practices and obtain the interdisciplinary information needed to assess adequately the state of the fisheries and implement strategies intended to maintain or rehabilitate them. [...] It is becoming increasingly important for resource managers to involve most, if not all, stakeholders in discussions about management policies as a way to solicit constituency support, to facilitate rule compliance and to conserve and manage the resource base effectively (Krueger and Decker, 1999; Plummer and Fitzgibbon, 2004). Unlike in many fields of scientific endeavour, stakeholder and traditional knowledge is an essential source of information and regarded as relevant for both recreational fisheries research and management (Fraser et al., 2006).

[...] In order to incorporate stakeholder information effectively, it is essential to understand the biases associated with different information sources and their reliability. Sound management should always be based on the best available information, and if possible, scientific methods should be used to generate this knowledge, which can then be supplemented and complemented by stakeholder and traditional knowledge and local experiences.

[...] It is well documented that transitions in recreational fisher behaviour can often be facilitated through education, outreach and awareness (Arlinghaus et al. 2007). As such, effective communication is critical for regulatory agencies or NGOs to encourage behavioural change (Gray and Jordan, 2010).

MEDAC members consider that in EU Mediterranean countries there is a disconnection between science, management and practitioners that should be acknowledged and changed.

Thus, in a context where the Mediterranean seems to be in a critical situation and in order to know faster the real state of inshore ecosystems and what is happening there it is paramount to share recreational fisheries knowledge with science and managing institutions. On the other hand, those sectors should transmit to recreational fisheries stakeholders all the knowledge they have that could help to improve recreational fisher behaviour.

[...] Understanding how and where fishers and stakeholders acquire and use information about responsible recreational fishing will play a central role in crafting effective conservation and management strategies.

Some MEDAC recreational fisheries stakeholders use these platforms to spread their guidelines about responsible fishing:

European Anglers Alliance (EAA)

EAA is an umbrella organization at European level. Its members disseminate responsible fishing recommendations in each own language on their own websites. It is possible to find EAA members and their websites here:

- http://www.eaa-europe.org/about-eaa/members.html

Some examples can be found from its Italian member Alleanza Pescatori Ricreativi (APR) here:

- http://www.pescaricreativa.org/notizie/iniziative.html

International Forum for Sustainable Underwater Activities (IFSUA)

- http://ifsua.net/index.php/en/2015-08-03-08-55-01/underwater-spearfishing
- http://ifsua.net/index.php/en/2015-08-03-08-55-01/minium-sizes
- http://ifsua.net/index.php/en/useful-documentation

Research

Effective management of recreational fisheries, whether or not jointly exploited by other sectors, requires an understanding of the features and dynamics of targeted fish stocks and the associated social-ecological system dynamics (Arlinghaus, Johnson and Wolter, 2008). Currently recreational fisheries research is either absent or underdeveloped, and existing approaches are mainly biological in orientation, somewhat limiting the usefulness of research. [...] In short, if recreational fisheries research is to understand fully the system dynamics, it must extend beyond the traditional fisheries biology and integrate the social and economic sciences (Ditton, 2004; Arlinghaus, 2005). [...] The research capacities in many countries are slim or only developing, partly because studies on recreational fisheries were often considered of low social priority (given its leisure focus). This needs to change if the sector wants to develop sustainably, and the call is for policy-makers and decision-makers to respond.

Specific research needs vary regionally and through time, but there are some that seem relevant generally. These include:

- *Descriptive information (monitoring, landings...)*
- *Analytical tasks (integrative fisheries models)*

[...] A basic first step in any fisheries assessment is descriptive work to characterize the scope and magnitude of recreational fisheries on a global and national scale in relation to other fisheries (Welcomme, 2001).

[...] In general, successful implementation of fisheries management programmes relies on the development of broad-based monitoring schemes. These could collect pertinent data on the habitat, fishery and fish stocks to ensure that progress towards management goals and objectives can be documented.

Indeed, managing recreational fisheries without understanding the wider aquatic ecosystem framework and its influence on fish population dynamics and community assemblages is problematic and could result in misguided management initiatives (Lester et al., 2003) rather than the desired sustainable trajectory.

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